# Army Educational Outreach Program

## UNITE

## 2014 Annual Program Evaluation Report

UNITE_03_06032015

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# Contents

## 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, 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 FY14 UNITE program. The evaluation 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, 3 focus groups with students and 1 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).

| 2014 UNITE Fast Facts | |
|---|---|
| Description | STEM Enrichment Activity - Pre-collegiate, engineering summer program at university host sites, targeting students from groups historically underserved and under-represented in STEM |
| Participant Population | Rising 10th and 11th grade students from groups historically underserved and under-represented in STEM |
| No. of Applicants | 437 |
| No. of Students | 280 |
| Placement Rate | 64% |
| No. of Adults | 162 |
| No. of Army S&Es | 20 |
| No. of Army Agencies | 12 |
| No. of K-12 Teachers | 48 |
| No. of K-12 Schools | 121 |
| No. of K-12 Schools – Title I | 53‡ |
| No. of College/Universities | 10 |
| No. of HBCU/MSIs | 7 |
| Total Cost | $359,940 |
| Stipend Cost | $80,400 |

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| Administrative Cost to TSA | $102,200 |
| Cost Per Student Participant | $1,286 |

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

## Summary of Findings

The FY14 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.

| 2014 UNITE Evaluation Findings | |
|---|---|
| **Participant Profiles** | |
| UNITE continues to have success at serving students of historically underrepresented and underserved populations. | • UNITE was successful in attracting female participants—a population that is historically underrepresented in engineering fields. Enrollment data indicate that 65% of participants were female. |
| | • UNITE had success in providing outreach to students from historically underrepresented and underserved minority race/ethnicity and low-income groups. Enrollment data indicate that 55% of participating students identified as Native American or Alaskan Native, 22% as Black or African American, and 17% as Hispanic or Latino. A majority of students responding to the questionnaire reported qualifying for free or reduced-price lunch (53%). |
| | • UNITE served students across a range of school contexts. Most student questionnaire respondents attended public schools (78%) and schools in urban settings (55%) or frontier/tribal schools (16%), which tend to have higher numbers or proportions of underserved groups. |
| UNITE engages a diverse group of adult participants as STEM mentors. | • In total, 162 adults, including university faculty, high school and university students, local teachers, and industry STEM professionals served as program mentors. Additional STEM professionals from a range of business sectors participated in career day activities. |
| **Actionable Program Evaluation** | |
| UNITE is strongly marketed to schools and teachers serving historically underrepresented and underserved groups. | • Many UNITE sites employed multi-pronged efforts to market programs to and recruit students from schools and school networks identified as serving large populations of traditionally underrepresented and underserved students. These efforts included university press releases distributed to area media, printed promotional materials, university websites, social media (Facebook), and marketing at existing programs at the site (e.g., Upward Bound). |

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| | • Students most frequently learned about the local UNITE program from school or university newsletters, emails, or websites (34%); teachers/professors (21%); mentors from the UNITE program (21%); immediate family members (16%); and the AEOP website (16%). |
| UNITE students are motivated by opportunities to learn about STEM in ways not possible in school. | • Students were most frequently motivated to participate in UNITE by the desire to learn something new or interesting (66%), because of their interest in STEM (62%), to have fun (62%), and to learn in ways not possible in school (61%). |
| UNITE engages students in meaningful STEM learning, through team-based and hands-on activities. | • Most students (54-83%) report learning about STEM topics, applications of STEM to real-life situations, STEM careers, and cutting-edge STEM research on most days or every day of their UNITE experience. |
| | • Most students had opportunities to engage in a variety of STEM practices during their UNITE experience. For example, 85% reported working as part of a team, 76% participating in hands-on activities, 70% building or simulating something, and 67% coming up with creative explanations/solutions on most days or every day. |
| | • Students reported greater opportunities to learn about STEM and greater engagement in STEM practices in their UNITE experience than they typically have in school. |
| | • Large proportions of mentors report using strategies to help make learning activities to students relevant, support the needs of diverse learners, develop students' collaboration and interpersonal skills, and engage students in "authentic" STEM activities. |
| UNITE promotes DoD STEM research and careers but can improve marketing of other AEOP opportunities. | • Most mentors had no awareness of or past participation in an AEOP initiative beyond UNITE. In addition, although most students reported an increase in awareness of other AEOPs, a substantial proportion reported never hearing about any of the other programs. However, a substantial portion of students were made aware of, and expressed interest in the REAP program, indicating that the effort to cross-market these programs is having the desired results. |
| | • 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. Six of the 10 UNITE sites engaged Army engineers as speakers, or went to Army facilities in career day events. |
| | • All responding students indicated being satisfied with their UNITE experience, highlighting the opportunity to learn about STEM fields and career opportunities. |

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| The UNITE experience is greatly valued by students and mentors. | Students also commented on how UNITE provided opportunities they do not get in school and would not otherwise have. |
| | • The vast majority of responding mentors indicated having a positive experience. Further, many commented on the benefits the program provides students, including deepening their knowledge about and confidence in STEM. |
| **Outcomes Evaluation** | |
| UNITE had positive impacts on students' STEM knowledge and competencies. | • A majority of 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. These impacts were identified across all student groups. |
| | • Many students also reported impacts on their abilities to do STEM, including such things as applying knowledge, logic, and creativity to propose solutions that can be tested, making a model that represents the key features or functions of a solution to a problem, communicating information about their design processes and/or solutions in different formats, supporting a proposed explanation with data from investigations, and using mathematics to analyze numeric data. |
| UNITE had positive impacts on students' 21st Century Skills. | • A large majority of students reported large or extreme gains on their ability to work collaboratively with a team, communicate effectively with others, include others' perspectives when making decisions, sticking with a task until it is complete, and connecting a topic or field and their personal values. |
| UNITE positively impacted students' confidence and identity in STEM, as well as their interest in future STEM engagement. | • Many students reported a large or extreme gain on their confidence to do well in future STEM courses (71%), ability to think creatively about a STEM project or activity (67%), academic credentials in STEM (63%), and preparedness for more challenging STEM activities (66%). In addition, 63% reported increased confidence in their ability to contribute to STEM, 61% reported clarifying a STEM career path, and 54% increased interest in a new STEM topic or field. |
| | • Students also reported on the likelihood that they would engage in additional STEM activities outside of school. A majority of students indicated that as a result of UNITE, they were more likely to tinker with mechanical or electrical devices, participate in a STEM camp, fair, or competition, work on a STEM project in a university or professional setting, help with a community service project related to STEM, or mentor other students about STEM. |
| UNITE succeeded in raising students education aspirations, but did not | • 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 (44% before UNITE, 59% after). |

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| change their career aspirations. | • 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. Although many students indicated interest in a STEM-related career, there was not a statistically significant difference from before UNITE to after. This result is likely due to the requirement for students to demonstrate interest in STEM in order to be selected for the program. |
| UNITE students are largely unaware of AEOP initiatives, but students show substantial interest in future AEOP opportunities. | • With the exception of REAP, students and mentors were largely unaware of other AEOP initiatives. However, 79% of students indicated that UNITE made them more aware of other AEOPs, and 75% credited UNITE with increasing their interest in participating in other programs. |
| UNITE raised student awareness and appreciation of DoD STEM research and careers, as well as their interest in pursuing a STEM career with the DoD. | • A majority of students reported that they had a greater awareness (77%) and appreciation (76%) of DoD STEM research and careers. In addition, 62% indicated that UNITE raised their interest in pursuing a STEM career with the DoD. |

## Recommendations

1. The UNITE program has the goal of broadening the talent pool in STEM fields, and, overall, the program has been successful at attracting students from groups historically underrepresented and underserved in these fields. However, the program may want to consider doing more to increase the likelihood that the program has a long-term impact on the number of students who pursue STEM. Strategies that have been shown to be effective in this area include providing role models for students, exposing them to different education and career possibilities, providing guidance on how to pursue specific education and career paths (e.g., what courses they need to take in school, how to navigate the college application process), and providing coaching on the "soft skills" (e.g., time management, communication skills) needed to be successful in STEM careers. Although many mentors reported using a number of these strategies (e.g., highlighting the under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM), substantive proportions did not. The program should consider ways to ensure that these areas are addressed systematically. For example, the program may want to work with each site to see how these areas could be built into their schedules, or provide more guidance to mentors for how and when to address these issues.

2. Similarly, given the goal of having students progress from UNITE into other AEOP programs, particularly REAP and JSHS, the program may want to work with sites to increase students' exposure to AEOP. Only about half of mentors recommended other AEOPs to students, typically REAP. Further, although many students expressed

interest in participating in other AEOP programs, a substantial proportion indicated having no interest. Given the proportion of students who reported learning about other AEOPs from invited speakers, career events, or their mentors, the program may want to work with each site to ensure that all students have access to structured opportunities that both describe the other AEOPs and provide information to students on how they can apply to them. In addition, given the limited use of the program website, print materials, and social media, the program should consider how these materials could be adjusted to provide students with more information and facilitate their enrollment in other AEOPs.

3. A number of students suggested the UNITE program could be improved by changes to the content. For example, some students wanted opportunities to engage in a broader range of STEM topics, others wanted more field experiences. Mentors also expressed a need for more resources for engaging students in hands-on, authentic STEM experiences. To help ensure a high-quality experience across sites, the program should consider creating a "library" of activities and resources for individual sites and mentors to draw upon. These resources could range from suggested curricula for the entire UNITE experience to specific activities in different topic areas that mentors could use with their students. To start building this library, sites and mentors could be asked to submit their most successful activities, which could be vetted, edited as necessary, and then made available to all sites and mentors.

4. For a number of outcomes (impacts on students' STEM abilities and STEM identity), there were significant differences in reported impacts between female and male students; in each case, males reported greater impacts. These types of results might raise concerns about whether there were inequities in how males and females were being served by the program. However, the majority of survey respondents identified themselves as Black or African American, and previous research has shown that males from this group often have worse education outcomes than other students, including their female counterparts.[1] Thus, it will be important to monitor this issue in future years, and if sample sizes allow, disaggregate results into more specific subgroups (e.g., Black/African-American males, Black/African-American females, White males, White females) to ensure the program is serving all students equitably.

5. Efforts should be undertaken to improve participation in evaluation activities, as the low response rates for both the student and mentor questionnaires raise questions about the representativeness of the results. Improved communication with the individual program sites about expectations for the evaluation may help. In addition, the evaluation instruments may need to be streamlined as perceived response burden can affect participation. In particular, consideration should be given to whether the parallel nature of the student and mentor questionnaires is necessary, with items being asked only of the most appropriate data source.

[1] Pollard, D.S. (1993). Gender, achievement and African American students' perceptions of their school experience. Education Psychologist, 28(4), 341-356.

## 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.

This report documents the evaluation of one of the AEOP elements, UNITE. UNITE is administered on behalf of the Army by the Technology Student Association. The evaluation study was performed by Virginia Tech, the Lead Organization (LO) in the AEOP CA consortium. Data analyses and reports were prepared in collaboration with Horizon Research, Inc.

### 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.

## 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 10$^{th}$ grade students in the first year of the cycle and returning and new rising 11$^{th}$ 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 as they had positions for the 2014 UNITE program: 437 students applied and 280 enrolled, which represents a 49% increase in enrollment with essentially the same number of applicants compared to FY13 (188 enrolled out of 434 applicants). Table 1 summarizes interest and final enrollment by site.

**Table 1. 2014 UNITE Site Applicant and Enrollment Numbers**

| 2014 UNITE Site | No. of Applicants | No. of Enrolled Participants |
|---|---|---|
| Alabama State University (ASU) | 20 | 12 |
| University of Colorado, Colorado Springs (UCCS) | 19 | 14 |
| Florida International University (FIU) | 45 | 25 |
| Savannah State University (SSU) | 15 | 13 |
| Xavier University of New Orleans (XULA) | 54 | 20 |
| Jackson State University (JSU) | 25 | 10 |
| New Jersey Institute of Technology (NJIT) | 27 | 21 |
| University of New Mexico (UNM) | 25 | 10 |
| University of Pennsylvania (UPENN) | 27 | 12 |
| South Dakota School of Mines and Technology (SDSMT) | 180 | 143 |
| **TOTAL** | **437** | **280** |

UNITE programs also engaged 158 adult participants in day-to-day program activities, 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. 2014 UNITE Participation | | | | | |
|---|---|---|---|---|---|
| **UNITE Site** | **Professors / Instructors** | **Teachers** | **Univ. Student Mentors** | **Army/DoD Scientists & Engineers** | **Others** |
| Alabama State University | 2 | 4 | 9 | 2 | - |
| University of Colorado, Colorado Springs | 2 | 4 | 8 | 4 | - |
| Florida International University | 1 | 7 | 5 | - | - |
| Savannah State University | 2 | 19 | 2 | 3 | - |
| Xavier University of New Orleans | - | 7 | 4 | - | 1 |
| Jackson State University | 3 | - | 1 | 3 | - |
| New Jersey Institute of Technology | - | 4 | 2 | 1 | - |
| University of New Mexico | 14 | 3 | 2 | 2 | 11 |
| University of Pennsylvania | 2 | - | 4 | 2 | 5 |
| South Dakota School of Mines and Technology | 7 | - | 7 | 3 | - |
| **TOTAL** | **33** | **48** | **44** | **20** | **17** |

The total cost of the 2014 UNITE program was $359,940. The average cost per student was $1286. 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. 2014 UNITE Program Costs | |
|---|---|
| **2014 UNITE – Cost Per Participant** | |
| Total Participants | 280 |
| Total Cost | $359,940 |
| **Cost Per Participant** | **$1286** |
| **2014 UNITE - Cost Breakdown Per Participant** | |
| Average Administrative Cost to TSA | $365 |
| Average Program Cost to Host Site (not including stipend) | $634 |
| Average Participant Stipend | $287[†] |
| **Cost Per Participant** | **$1286** |

[†] This figure would be higher, except UPENN financed student stipends from a source other than UNITE.

## Evidence-Based Program Change

Based on recommendations from the FY13 summative evaluation report, the AEOP identified three key priorities for programs in FY14: (1) increase outreach to populations that are historically underserved and underrepresented 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 FY14 administration of the UNITE program in light of the key AEOP priorities, the FY13 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. Student recruiting and selection criteria were more clearly outlined in RFP – continued focus on underserved and underrepresented populations.
b. Once funded, UNITE sites received immediate and ongoing communication and guidance from TSA to ensure proper recruiting and continuation of participants.
c. The IPA conducted site visits at all UNITE sites to ensure adherence to criteria from the RFP.
d. At one site, Jackson State University, a TSA state advisor successfully assisted the UNITE site director in targeting schools that serve underserved and underrepresented populations for recruitment.

**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. Unfortunately, contact with the Army did not result in any new connections for sites in 2014.

**III. Increase participants' awareness of other AEOP opportunities.**

a. TSA was awarded a mini-grant that was used to order and send AEOP brochures with appropriate rack-cards, AEOP instructional materials, and UNITE-branded marketing materials to every UNITE site. A banner and informational flyer was also sent to each UNITE site all in an effort to bolster awareness of AEOP programs.
b. UNITE sites ensured that students were given computer time to research AEOP opportunities online.
c. Meetings were arranged for UNITE and REAP students at sites that also have REAP apprentices participating at that university.
d. Sites distributed brochures (at orientations and closing ceremonies), and site directors and classroom instructors made brochures regularly available to students.

**IV. Other changes activities**

a. FY14 evaluation include a mentor survey that collected information about how mentors become aware of UNITE, perceived benefits of UNITE to participants, and mentorship activities including exposing students to AEOPs and Army/DoD STEM careers.

## FY14 Evaluation At-A-Glance

Virginia Tech, in collaboration with TSA, conducted a comprehensive evaluation study 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. This logic model provided guidance for the overall UNITE evaluation strategy.

| Inputs | Activities | Outputs | Outcomes (Short term) | Impact (Long Term) |
|---|---|---|---|---|
| • Army sponsorship<br>• TSA providing oversight of site programming<br>• Operations conducted by 10 universities<br>• Students participating in 10 UNITE programs<br>• STEM professionals and educators serving as UNITE instructors<br>• Stipends for students to support meals and travel<br>• Centralized branding and comprehensive marketing<br>• Centralized evaluation | • Students engage in hands-on programs focused on rigorous classroom instruction that prepared students for admissions into engineering tracks in college<br>• STEM professionals and educators facilitate hands-on learning experiences for students<br>• 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<br>• Number and diversity of STEM professionals and educators serving as instructors for programs<br>• Number and diversity of Army/DoD scientists and engineers and other military personnel engaged in programs<br>• Number and Title 1 status of high schools served through participant engagement<br>• Students, instructors, site coordinators, and TSA contributing to evaluation | • Increased participant STEM competencies (confidence, knowledge, skills, and/or abilities to do STEM)<br>• Increased interest in future STEM engagement<br>• Increased participant awareness of and interest in other AEOP opportunities<br>• Increased participant awareness of and interest in STEM research and careers<br>• Increased participant awareness of and interest in Army/DoD STEM research and careers<br>• Implementation of evidence-based recommendations to improve UNITE programs | • Increased student participation in other AEOP opportunities and Army/DoD-sponsored scholarship/ fellowship programs<br>• Increased student pursuit of STEM coursework in secondary and post-secondary schooling<br>• Increased student pursuit of STEM degrees<br>• Increased student pursuit of STEM careers<br>• Increased student pursuit of Army/DoD STEM careers<br>• Continuous improvement and sustainability of UNITE |

The UNITE evaluation gathered 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, 3 focus groups with students and 1 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. 2014 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 |
| | **Mentor Capacity:** Perceptions of mentor/teaching strategies (students respond to a subset) |

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| AEOP Goal 2 and 3 | **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. 2014 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. 2014 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. 2014 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. 2014 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. Questionnaires and respective data summaries are provided in Appendix B (student) and Appendix C (mentor). Focus group protocols are provided in Appendix D (students) and Appendix E (mentors); the APR template is located in Appendix F. Major trends in data and analyses are reported herein.

## Study Sample

Students from 9 of 10 UNITE sites responded to questionnaires, as did mentors from 8 of the 10 sites. Table 9 shows the number of student and mentor respondents by site.

| Table 9. 2014 UNITE Site Survey Respondent Numbers | | | | |
|---|---|---|---|---|
| **2014 UNITE Site** | **Students** | | **Mentors** | |
| | **No. of Participants** | **No. of Survey Respondents** | **No. of Participants** | **No. of Survey Respondents** |
| Alabama State University (ASU) | 12 | 8 | 17 | 12 |
| University of Colorado, Colorado Springs (UCCS) | 14 | 12 | 18 | 4 |
| Florida International University (FIU) | 25 | 0 | 13 | 1 |
| Savannah State University (SSU) | 13 | 11 | 26 | 0 |
| Xavier University of New Orleans (XULA) | 20 | 20 | 12 | 11 |
| Jackson State University (JSU) | 10 | 10 | 7 | 4 |
| New Jersey Institute of Technology (NJIT) | 21 | 20 | 7 | 5 |
| University of New Mexico (UNM) | 10 | 2 | 32 | 0 |
| University of Pennsylvania (UPENN) | 12 | 12 | 13 | 6 |
| South Dakota School of Mines and Technology (SDSMT) | 143 | 21 | 17 | 4 |
| Unspecified[†] | | | | 1 |
| **TOTAL** | **280** | **116** | **162** | **48** |

[†] One mentor did not indicate which UNITE location s/he was affiliated with.

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, indicating that the samples may not be representative of their respective populations. Note that the student response rate is substantially lower than in 2013 (which had response rates of 82% and 72% for the pre and post surveys, respectively). There was no mentor survey in 2013; thus the 30% response rate for mentors can be seen as a positive first step, but clearly is an area in which continued effort will be needed.

| Table 10. 2014 UNITE Questionnaire Participation | | | | |
|---|---|---|---|---|
| **Participant Group** | **Respondents (Sample)** | **Total Participants (Population)** | **Participation Rate** | **Margin of Error @ 95% Confidence[2]** |
| Students | 116 | 280 | 41% | ±7.0% |
| Mentors | 48 | 162 | 30% | ±11.9% |

[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.

Three student focus groups were conducted that included students from 7 of the 10 UNITE sites. Student focus groups included 13 students (9 females, 4 males) ranging from grades 9 to 11 (or rising 10th grade to rising 12th grade). One mentor focus group was also conducted, which included 5 mentors (2 females, 2 males, 1 did not submit a demographic survey) from 5 sites. Mentors included a local teacher, a university faculty member, a university student majoring in STEM, and a STEM professional. Focus groups were not intended to yield generalizable findings; rather they were intended to provide additional evidence of, explanation for, or illustrations of student questionnaire data. They add to the overall narrative of UNITE's efforts and impact, and highlight areas for future exploration in programming and evaluation.

## Respondent Profiles

**Student demographics.** Demographic information collected from UNITE questionnaire respondents is summarized in Table 11.[3] More females (61%) than males (35%) completed the questionnaire. More responding students identified with the race/ethnicity category of Black or African American (53%) than any other single race/ethnicity category, though there is substantial representation of Native American or Alaskan Natives (17%) and Hispanic or Latino (18%) populations. Although the survey respondents are similar to the population of participating students reported in the APR (66% female, 34% male), the race/ethnicity proportions are substantially different (22% Black or African American, 55% Native American or Alaskan Native, and 17% Hispanic or Latino).

Eighty percent were rising 10th graders; the remaining students who answered this item were rising 11th graders. A majority of respondents (53%) reported qualifying for free or reduced-price lunch (FRL)—a common indicator of low-income status. As can be seen in Table 12, the vast majority of respondents attended public schools (85%); most 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.

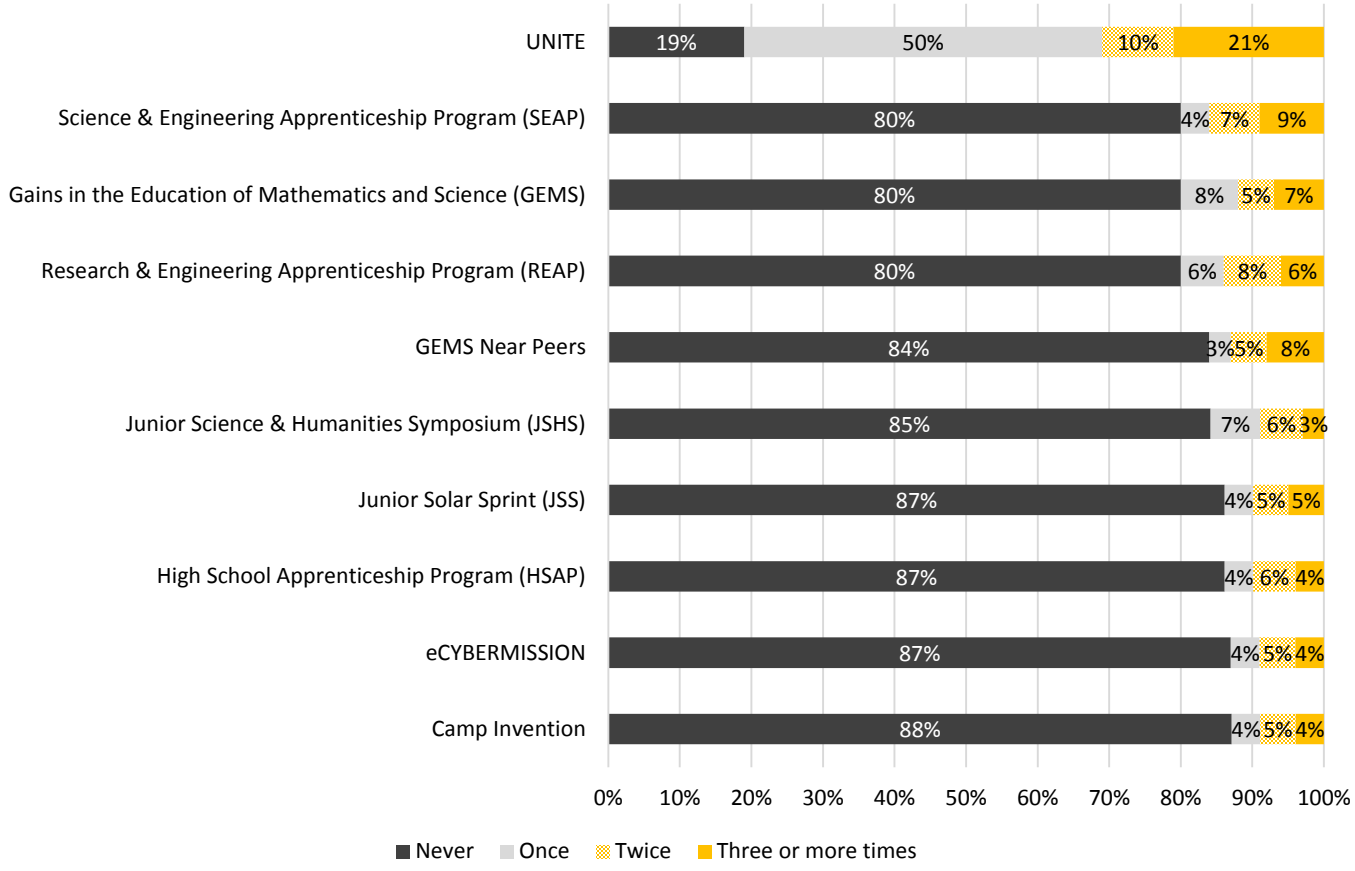
| Table 11. 2014 UNITE Student Respondent Profile | | |
|---|---|---|
| **Demographic Category** | **Questionnaire Respondents** | |
| **Respondent Gender (n = 114)** | | |
| Female | 69 | 61% |
| Male | 40 | 35% |
| Choose not to report | 5 | 4% |
| **Respondent Race/Ethnicity (n = 116)** | | |
| Asian | 5 | 4% |
| Black or African American | 61 | 53% |
| Hispanic or Latino | 21 | 18% |
| Native American or Alaska Native | 20 | 17% |
| Native Hawaiian or Other Pacific Islander | 0 | 0% |
| White | 6 | 5% |
| Other race or ethnicity, (specify):[†] | 2 | 2% |
| Choose not to report | 1 | 1% |
| **Respondent Grade Level (n = 115)** | | |
| 10th | 92 | 80% |
| 11th | 22 | 19% |
| Choose not to report | 1 | 1% |
| **Respondent Eligible for Free/Reduced-Price Lunch (n = 116)** | | |
| Yes | 62 | 53% |
| No | 43 | 37% |
| Choose not to report | 11 | 9% |

[†] Other = "Black & Haitian", and "Jewish/Middle Eastern."

| Table 12. 2014 UNITE Student Respondent School Information | | |
|---|---|---|
| **Demographic Category** | **Questionnaire Respondents** | |
| **Respondent School Location (n = 116)** | | |
| Urban (city) | 64 | 55% |
| Suburban | 28 | 24% |
| Frontier or tribal school | 18 | 16% |
| Rural (country) | 6 | 5% |
| **Respondent School Type (n = 116)** | | |
| Public school | 91 | 78% |
| Private school | 24 | 21% |
| Home school | 1 | 1% |

In addition, students were asked how many times they participated in each of the AEOP programs. As can be seen in Chart 1, 81% of responding students reported participating in UNITE at least once. Few students (20% or less) reported participating in any of the other AEOP programs, though these results indicate a much higher level of participation in other AEOPs than was the case in 2013.

**Chart 1: Student Participation in AEOP Programs (n = 107-108)**




**Mentor demographics.** The 2014 Mentor Questionnaire collected more extensive demographic information on the mentors than past years, which are summarized in Table 13. Slightly more responding mentors were male than female (54% vs. 46%). Similar to the responding students, over half of the responding mentors identified themselves as Black or African American (52%). Mentors were drawn from a variety of professions, with 27% of respondents being teachers; 17% scientists, engineers, or mathematicians in training; 13% scientists, engineers, or mathematics professionals; and 13% university educators. Another 27% indicated "other" for their occupation. In the UNITE program, the majority of

responding mentors served as instructors (55%); 30% served as classroom assistants, 2% as resource teachers, and 6% in some other role. Additional characteristics of the mentors are included in Appendix C.

| Table 13. 2014 UNITE Mentor Respondent Profile | | |
|---|---|---|
| **Demographic Category** | **Questionnaire Respondents** | |
| **Respondent Gender (n = 48)** | | |
| Female | 22 | 46% |
| Male | 26 | 54% |
| **Respondent Race/Ethnicity (n = 48)** | | |
| Asian | 4 | 8% |
| Black or African American | 25 | 52% |
| Hispanic or Latino | 0 | 0% |
| Native American or Alaska Native | 0 | 0% |
| Native Hawaiian or Other Pacific Islander | 1 | 2% |
| White | 15 | 31% |
| Other race or ethnicity, (specify):[†] | 1 | 2% |
| Choose not to report | 2 | 4% |
| **Respondent Occupation (n = 48)** | | |
| Teacher | 13 | 27% |
| Other school staff | 2 | 4% |
| University educator | 6 | 13% |
| Scientist, Engineer, or Mathematician in training (undergraduate or graduate student, etc.) | 8 | 17% |
| Scientist, Engineer, or Mathematics professional | 6 | 13% |
| Other, (specify):[‡] | 13 | 27% |
| **Respondent Role in UNITE (n = 47)** | | |
| Instructor (typically a University or Army Scientist or Engineer) | 26 | 55% |
| Resource teacher | 1 | 2% |
| Classroom assistant | 14 | 30% |
| Other, (specify)[§] | 6 | 13% |

[†] Other = "British Jamaican."

[‡] Other = "Student" (n = 3), "Team/Group Leader" (n = 3), "Teacher Aide/Assistant" (n = 2), "University Staff" (n = 2), "Educational Research and Writing," "Volunteer," and "Workshop Coordinator."

[§] Other = "PI," "Staff Supervisor," "Program Coordinator," "Instructor and program leader," "Mentor," and "Group Leader."

# 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*

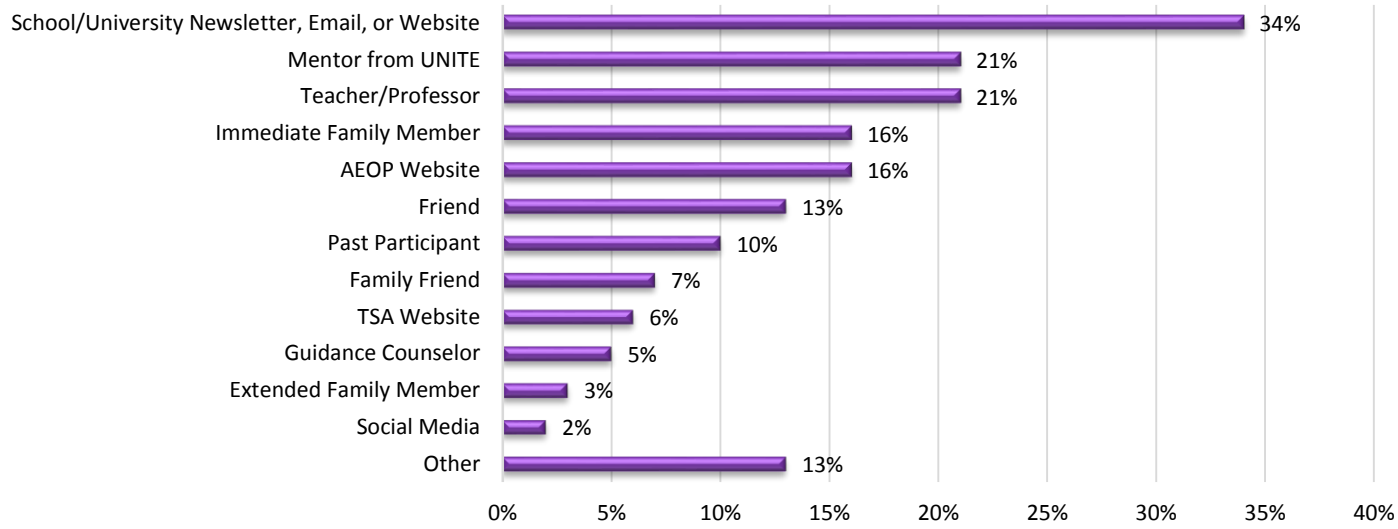
Many UNITE sites employed multi-pronged efforts to market programs to and recruit students from schools identified as serving large populations of traditionally underrepresented and underserved students. Although the goal of the program was to recruit rising 10$^{th}$ grade students (who would then return for a second year as rising 11$^{th}$ graders), some sites were unsuccessful in recruiting a sufficient number of students. Consequently, some sites recruited rising 11$^{th}$ graders; one site (SDSMT) created a "pre-UNITE" program for rising 10$^{th}$ graders and a full UNITE program for rising 11$^{th}$ graders. UNITE sites marketed their programs in a variety of ways:

- University press releases and ads were distributed to local and surrounding area newspapers, radio, and telvision stations (all sites)—the ASU site director appeared on a local television telecast to promote the program;
- Brochures and information booklets were distributed to local schools, school districts, and STEM youth organizations (all sites); NJIT distriubted to school districts in New Jersey designated as "Abbott districts" (typically urban districts with high concentrations of poverty);
- University webpages (all sites);
- Social media via Facebook (JSU); and
- Recruitment through exisiting site STEM programs, such as Upward Bound (SSU), the Pre-Collegiate Development Program (UCCS), the Summer Mentorship Program (SMP), the South Dakota GEARUP Summer Honors Program (SDSMT), or city robotics coaches (UPENN).

In order to understand which recruitment methods are most effective, the questionnaire asked students to select all of the different ways they heard about UNITE. Chart 2 summarizes students' responses. The most frequently mentioned source of information about the local UNITE program was a school or university newsletter, email, or website (34%). Other sources mentioned relatively frequently were mentors from UNITE (21%), teachers or professors (21%), immediate family members (16%), and the AEOP website (16%). The "Other" category typically included references to site-specific programs that occur concurrently with UNITE (e.g., Gear-up, Upward Bound).

These data were analyzed by student sub-groups (gender, race/ethnicity, and FRL)[4] to determine if different groups of youth learned about the UNITE program in a different manner. No meaningful differences were found among student sub-groups in how they learned about UNITE by any of these factors. Taken together, these findings suggest that the multi-pronged approach is helpful in student recruitment for students from all sub-groups. 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.

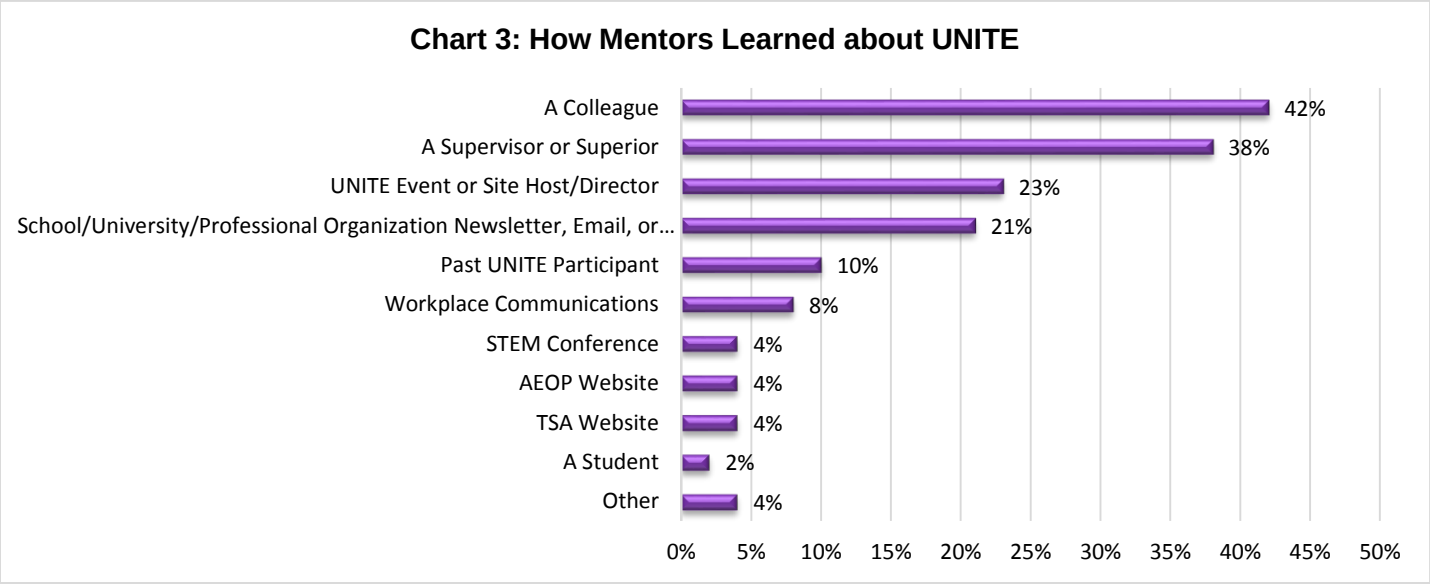
**Chart 2: How Students Learned about UNITE**




Mentors were also asked how they learned about UNITE (see Chart 3). The vast majority of responding mentors learned about UNITE through work, either from a colleague (42%) or a supervisor/superior (38%). A UNITE event at the local site

[4] Item-level tests were conducted without a Type I error control, increasing the possibility of false positives (i.e., detecting a significant difference when no difference truly exists).

(23%), or a school, university, or professional organization newsletter, email, or website (21%) was also relatively frequently identified.




To examine whether mentors are expanding their participation in AEOP programs, the questionnaire asked how many times they participated in each of the AEOP programs. With the exception of REAP and SMART, the majority of responding mentors indicated never hearing of the other AEOP programs. Because UNITE and REAP are hosted at some of the same sites, it is not surprising that 63% of mentors reported hearing of REAP; 31% indicated participating in that program at least once. Half of the mentors reported participating in any program only one or two times (33% and 17%, respectively). Thirty-six percent indicated participating 3 or more times (14% indicated never participating in any AEOP program, perhaps because the local site did not use the official AEOP program name).

## Motivating Factors for Participation

**Motivating factors for students.** Student questionnaires and focus groups included questions to explore what motivated students to participate in UNITE. Specifically, the questionnaire asked how motivating a number of factors were in their decision to participate. As can be seen in Table 14, more than 6 in 10 responding students indicated that the desire to learn something new or interesting (66%), having fun (62%), interest in STEM (62%), and learning in ways that are not possible in school (61%) were "very much" motivating. The opportunity to do something with friends (52%), parent encouragement (52%), building their college application or résumé (51%), and the opportunity to use advanced laboratory equipment (50%) were each indicated as very much motivating by a majority of respondents.

| Table 14. Factors Motivating Students "Very Much" to Participate in UNITE (n = 114-116) | |
|---|---|
| **Item** | **Questionnaire Respondents** |
| Desire to learn something new or interesting | 66% |
| Having fun | 62% |
| Interest in science, technology, engineering, or mathematics (STEM) | 62% |
| Learning in ways that are not possible in school | 61% |
| Opportunity to do something with friends | 52% |
| Parent encouragement | 52% |
| Building college application or résumé | 51% |
| Opportunity to use advanced laboratory technology | 50% |
| Exploring a unique work environment | 47% |
| Teacher or professor encouragement | 45% |
| Earning stipend or award while doing STEM | 48% |
| Desire to expand laboratory or research skills | 45% |
| Networking opportunities | 38% |
| An academic requirement or school grade | 34% |
| The program mentor(s) | 32% |
| Serving the community or country | 30% |
| Interest in STEM careers with the Army | 20% |

Interest and exploring possible careers in STEM were also mentioned in the student focus groups. As four students said when asked why they chose to participate in UNITE:

> *I decided to participate because I thought it was interesting and I wanted to see what kind of engineering there is. Because I'd like to be a scientist.* (UNITE Student)

> *I chose to participate in UNITE because I wanted to get more exposure to engineering and STEM related careers. I'm a minority female and we are really underrepresented in [STEM].* (UNITE Student)

> *Because I was really interested in engineering fields. I wanted to get more exposure to see if they are a life-long career for me.* (UNITE Student)

> *Because I want to go into mechanical engineering when I go to college. I really wanted to have something to put on résumé because I want to go to a top-tier school. So I thought UNITE would be a good program.* (UNITE Student)

For each item in Table 14, differences between females and males, minority students and non-minority students, and FRL-eligible students and non-FRL-eligible students were tested to identify whether different factors were more or less

motivating for different student groups. Overall, there were few significant differences. Males were moderately more likely than females to indicate being motivated by their interest in STEM[5] (effect size,[6] d = 0.57 standard deviations) and the opportunity to use advanced laboratory technology[7] (d = 0.46 standard deviations). Students eligible for FRL were more likely than those not eligible for FRL to be motivated by the opportunity to do something with friends (a large effect, d = 0.75 standard deviations), the opportunity to use advanced laboratory technology (d = 0.70 standard deviations), serving the community or country (d = 0.64 standard deviations), and the stipend (a moderate effect, d = 0.41 standard deviations).[8]

### The UNITE Experience

The student questionnaire included several items asking about the nature of students' experience 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. As can be seen in Chart 4, the vast majority of respondents indicated learning about new STEM topics and communicating with other students about STEM on most or every day of the experience. Students also reported interacting with STEM professionals, applying STEM knowledge to real-life situations, learning about different STEM careers, and learning about cutting-edge STEM research on most days or every day. 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).[9]

[5] Two-tailed independent samples t-test, $t(107) = 2.82$, $p = 0.006$.

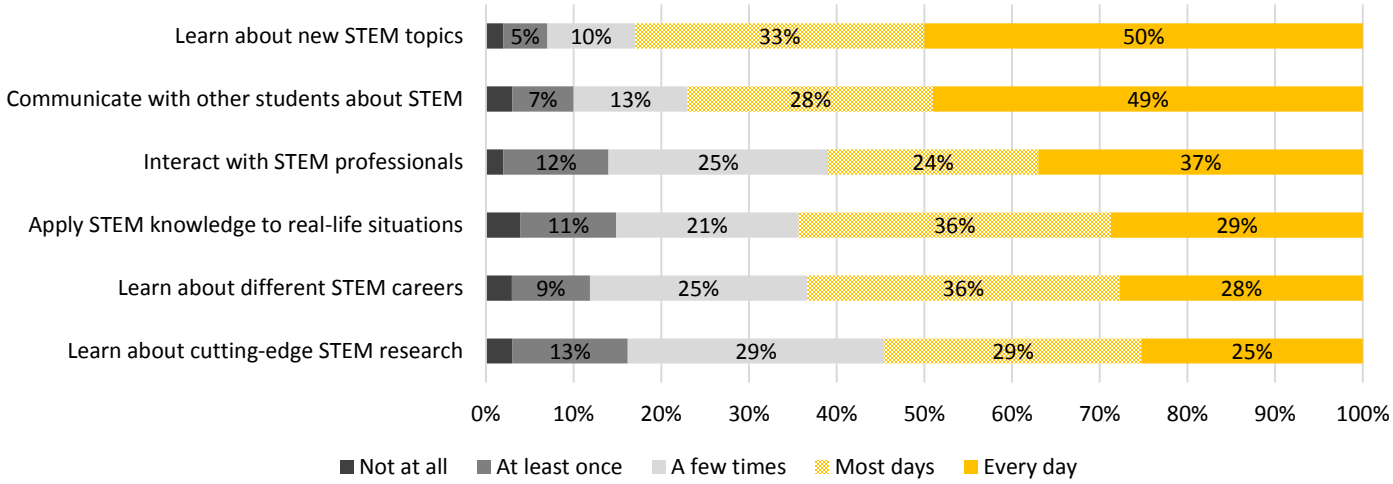
[6] Effect sizes are used to facilitate comparison of the magnitude of differences across different outcomes and/or studies by putting differences on a standardized metric. For difference between means, effect size is calculated as Cohen's d: the difference in means of the two groups divided by the pooled standard deviation. For Cohen's d, effect sizes of about 0.20 are typically considered small, 0.50 medium, and 0.80 large. Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.

[7] Two-tailed independent samples t-test, $t(106) = 2.27$, $p = 0.025$.

[8] Two-tailed independent samples t-tests, respectively: $t(102) = 3.68$, $p < 0.001$; $t(102) = 3.50$, $p = 0.001$; $t(103) = 3.18$, $p = 0.002$; $t(102) = 2.02$, $p = 0.046$.

[9] 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.

**Chart 4: Nature of Student Activities in UNITE (n = 112-114)**



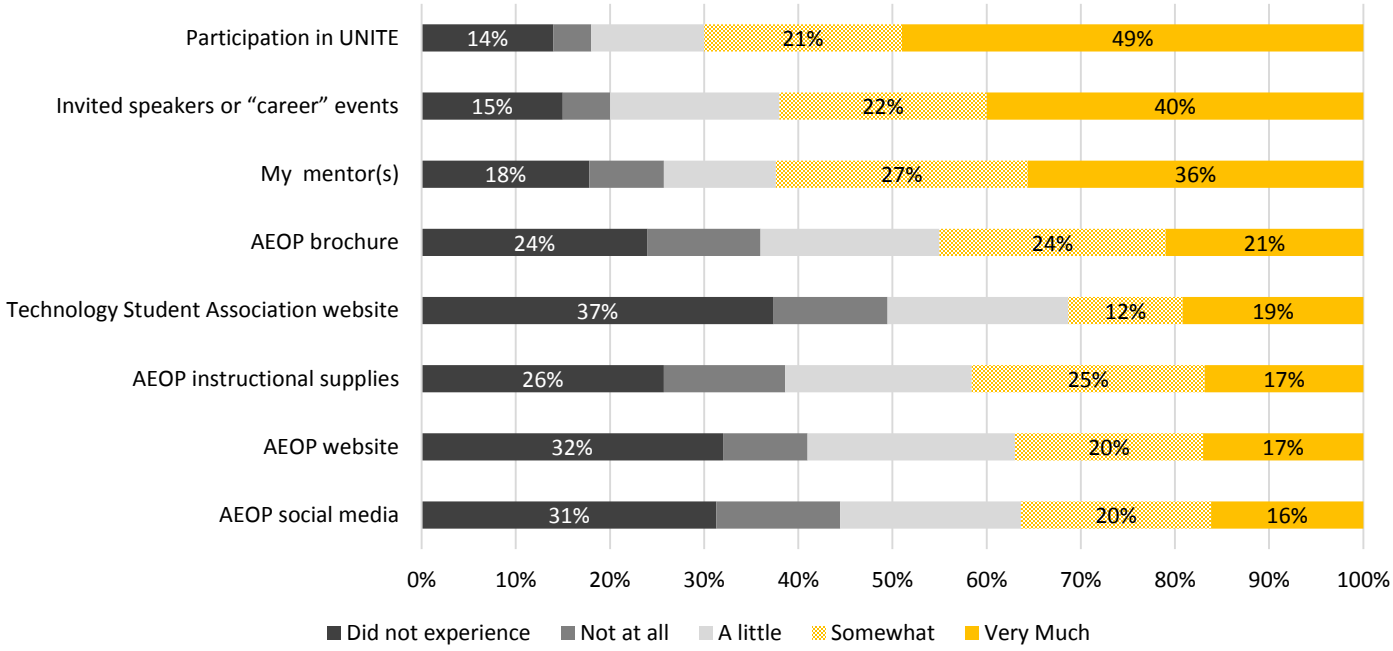

Because increasing the number and diversity of students who purse STEM careers is one goal of the UNITE program, the student questionnaire also asked how many jobs/careers in STEM in general, and STEM jobs/careers in the DoD more specifically, students learned about during their experience. As can be seen in Table 15, nearly all students reported learning about at least one STEM job/career, and the majority (56%) reported learning about 5 or more. Similarly, 80% of students reported learning about at least one DoD STEM job/career, though few reported learning about many different STEM jobs/careers in the DoD. The distributions of responses to these items are not statistically different between 2014 and 2013, indicating that there was no change in the number of jobs, STEM or DoD, that students learned about in 2014 compared to the previous year.

**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) | 2013 (n = 68) | 2014 (n = 108) |
| None | 0% | 3% | 8% | 20% |
| 1 | 2% | 1% | 11% | 14% |
| 2 | 4% | 7% | 22% | 15% |
| 3 | 9% | 18% | 19% | 21% |
| 4 | 20% | 15% | 11% | 6% |
| 5 or more | 65% | 56% | 29% | 24% |

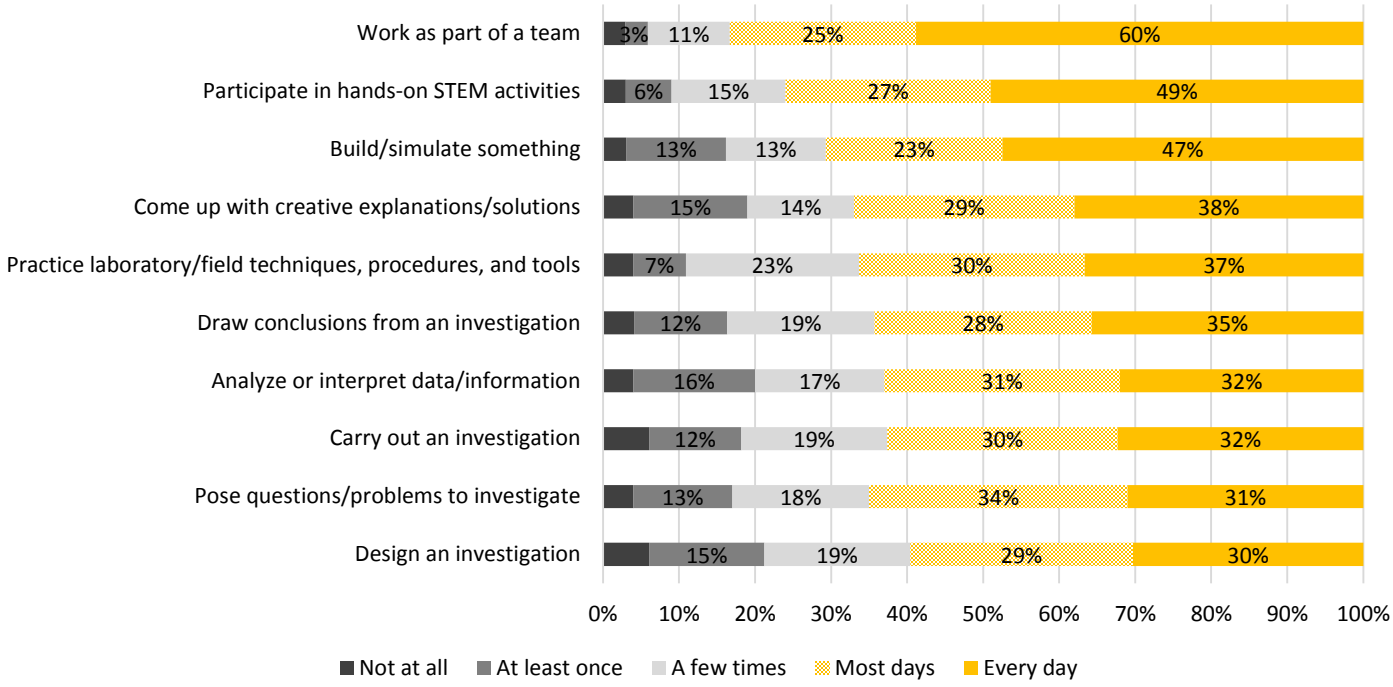
Students were also asked which resources impacted their awareness of DoD STEM careers. Participation in UNITE (70%), invited speakers or career events (62%), and students' mentors (63%) were most often reported as being somewhat or very much responsible for this impact (see Chart 5).

**Chart 5: Impact of Resources on Student Awarenessof DoD STEM Careers (n = 112-113)**




The questionnaire also asked students 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, 85% of responding students indicated working as part of a team on most days or every day; 76% reported participating in hands-on activities and 70% reported building/simulating something. In addition, students indicated being integrally involved the work of STEM on most days or every day, including posing questions to investigate (65%), designing investigations (59%), carry out investigations (62%), analyzing or interpreting data (63%), and drawing conclusions from an investigation (63%). Again, data from the mentor questionnaire (shown in Appendix C) are generally aligned with data from the student questionnaire.

**Chart 6: Student Engagement in STEM Practices in UNITE (n = 112-114)**




A composite score[10] was calculated for each of these two sets of items, the first titled "Learning about STEM in UNITE,"[11] and the second "Engaging in STEM Practices in UNITE."[12] Response categories were converted to a scale of 1 = "Not at all" to 5 = "Every day" and the average across all items in the scale was calculated. The composite scores were used to test whether there were differences in student experiences by gender, race/ethnic group (minority vs. non-minority students), and FRL status. There was a significant difference in scores on both composites by race/ethnicity group. Minority students had, on average, lower scores on the Learning about STEM in UNITE composite than did non-minority students (a medium effect of d = 0.574 standard deviations).[13] However, minority students had higher scores than non-

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

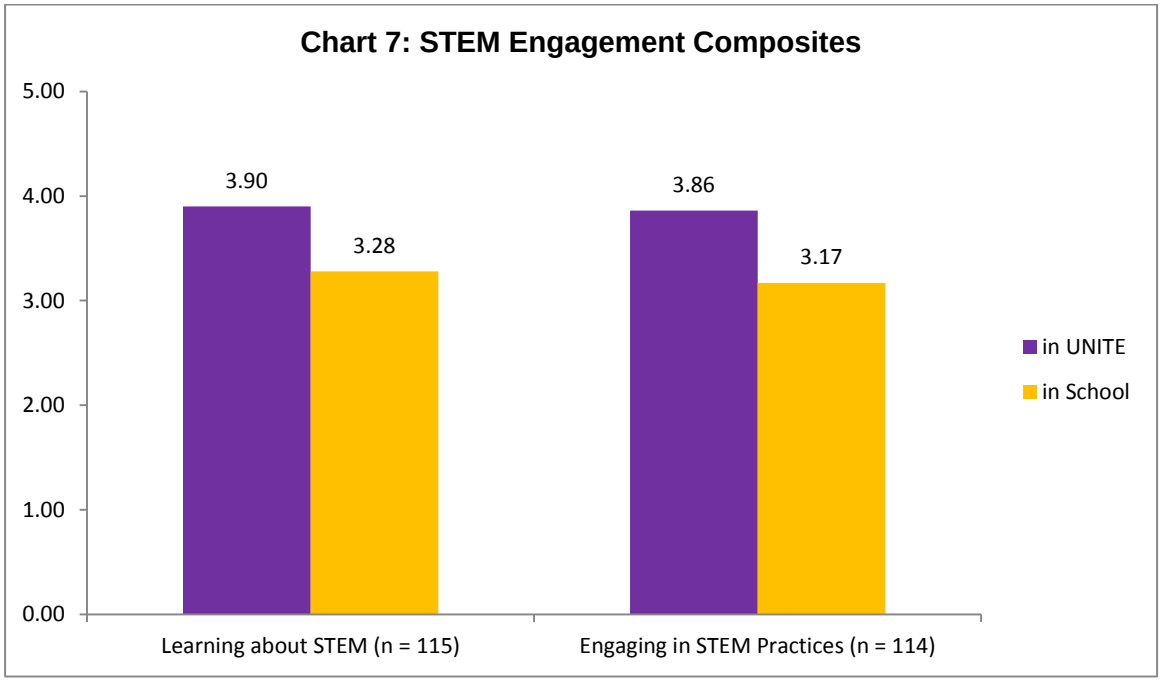
[11] The Cronbach's alpha reliability for these 6 items was 0.880.

[12] The Cronbach's alpha reliability for these 10 items was 0.952.

[13] Two-tailed independent samples t-test, $t(113) = 2.00$, $p = 0.048$.

minority students on the Engaging in STEM Practices in UNITE composite (a large effect of d = 0.780 standard deviations).[14] There were no significant differences by gender or FRL status.

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,"[15] and "Engaging in STEM Practices in School"[16] 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 (moderate effects of d = 0.545 standard deviations and d = 0.703 standard deviations, respectively).[17] These data indicate that UNITE provides students with more intensive STEM learning experiences than they would typically receive in school.




## 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

[14] Two-tailed independent samples t-test, $t(112) = 2.71$, $p = 0.008$.

[15] Cronbach's alpha reliability of 0.904.

[16] Cronbach's alpha reliability of 0.950.

[17] Two-tailed independent samples t-tests: Learning about STEM, $t(114) = 5.85$, $p < 0.001$; Engaging in STEM Practices, $t(113) = 7.50$, $p < 0.001$.

students, advise students on educational and career paths, and generally serve as STEM role models for UNITE students. On average, mentors responding to the mentor questionnaire reported working with 20 students, with a range of 10 to 75 students. The average number of students per mentor varied widely by site, with a low of 10 students per mentor at JSU to a high of 32 at SDSMT.

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:[18]

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.

Large proportions of responding mentors used several strategies to help make the learning activities relevant to students (see Table 16). For example, nearly all reported asking students to relate outside events or activities to topics covered in the program (96%) and giving students real-life problems (96%). A vast majority also helped students see how STEM can affect them or their communities (91% and 85%, respectively), and many tried to learn about the students and their interests at the beginning of the program (81%). Fewer selected readings or activities related to students' backgrounds (54%) or made explicit provisions for students wishing to carry out independent studies (43%).

**Table 16. Mentors Using Strategies to Establish Relevance of Learning Activities (n = 46-47)**

| Item | Questionnaire Respondents |
|---|---|
| Asking students to relate outside events or activities to topics covered in the program | 96% |
| Giving students real-life problems to investigate or solve | 96% |
| Helping students become aware of the roles STEM plays in their everyday lives | 91% |
| Helping students understand how STEM can help them improve their communities | 85% |
| Finding out about students' backgrounds and interests at the beginning of the program | 81% |
| Encouraging students to suggest new readings, activities, or projects | 68% |
| Selecting readings or activities that relate to students' backgrounds | 54% |
| Making explicit provisions for students who wish to carry out independent studies | 43% |

[18] 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.

Similarly, mentors reported using a variety of strategies to support the diverse needs of students as learners. As can be seen in Table 17, 96% of mentors reported treating all students the same way, regardless of gender or race/ethnicity, and 91% indicated using diverse teaching/mentoring activities. Many mentors used gender neutral language (80%), helped students find additional support if needed (74%), and tried to find out about student learning styles (66%).

| Table 17. Mentors Using Strategies to Support the Diverse Needs of Students as Learners (n = 45-47) | |
|---|---|
| **Item** | **Questionnaire Respondents** |
| Interacting with all students in the same way regardless of their gender or race and ethnicity | 96% |
| Using diverse teaching/mentoring activities to address a broad spectrum of students | 91% |
| Using gender neutral language | 80% |
| Directing students to other individuals or programs if I can only provide limited support | 74% |
| Finding out about students' learning styles at the beginning of the program | 66% |
| Integrating ideas from the literature on pedagogical activities for women and underrepresented students | 50% |
| Providing extra readings, activities, or other support for students who lack essential background knowledge or skills | 50% |

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 (98%) and listen to the ideas of others with an open mind (96%). The vast majority also had students exchange ideas with others whose backgrounds or viewpoints were different from their own (89%), participate in giving and receiving feedback (89%), develop ways to resolve conflict and reach agreement among the team (87%), explain difficult ideas to others (85%), and pay attention to the feelings of all team members (84%).

| Table 18. Mentors Using Strategies to Support Student Development of Collaboration and Interpersonal Skills (n = 45-47) | |
|---|---|
| **Item** | **Questionnaire Respondents** |
| Having students work on collaborative activities or projects as a member of a team | 98% |
| Having students listen to the ideas of others with an open mind | 96% |
| Having students exchange ideas with others whose backgrounds or viewpoints are different from their own | 89% |
| Having students participate in giving and receiving feedback | 89% |
| Having students develop ways to resolve conflict and reach agreement among the team | 87% |
| Having students explain difficult ideas to others | 85% |
| Having students pay attention to the feelings of all team members | 84% |
| Having students tell others about their backgrounds and interests | 77% |

When asked about strategies used to support student engagement in authentic STEM activities, 96% of responding mentors reported encouraging students to see support from other team members (see Table 19). 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. Giving constructive feedback to improve students' STEM competencies (89%), helping students practice STEM skills with supervision (84%), demonstrating the use of laboratory/field techniques, procedures, and tools (80%), and teaching/assigning readings about specific STEM subject matter (70%) were also widely used strategies. Interestingly less than half of the responding mentors reported having students access and critically review technical texts or media (47%).

| Table 19. Mentors Using Strategies to Support Student Engagement in "Authentic" STEM Activities (n = 43-45) | |
|---|---|
| **Item** | **Questionnaire Respondents** |
| Encouraging students to seek support from other team members | 96% |
| Allowing students to work independently as appropriate for their self-management abilities and STEM competencies | 91% |
| Encouraging opportunities in which students could learn from others (team projects, team meetings, journal clubs) | 91% |
| Giving constructive feedback to improve students' STEM competencies | 89% |
| Helping students practice STEM skills with supervision | 84% |
| Demonstrating the use of laboratory or field techniques, procedures, and tools students are expected to use | 80% |
| Teaching (or assigning readings) about specific STEM subject matter | 70% |
| Having students access and critically review technical texts or media to support their work | 47% |

The last series of items about mentoring strategies focused on supporting students' STEM educational and career pathways (see Table 20).[19] Nearly all of the responding mentors reported asking students about their educational and career interests (96%) and sharing their own experiences, attitudes, and values about STEM (94%). Many also provided guidance to students, either about educational pathways that would prepare them for a STEM career (89%) or recommending extracurricular programs that align with their educational goals (83%).

However, given the UNITE program's goals of broadening the talent pool in STEM fields, it is somewhat surprising that two-thirds or fewer of the responding mentors reported: (1) highlighting the under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM (67%), (2) discussing STEM career opportunities outside of the DoD or other government agencies (65%), or (3) discussing STEM careers within the DOD or government (57%). In addition, given the interest in having students graduate into other AEOP opportunities, it is also surprising that only 54% of mentors recommended other AEOP programs to students.

[19] 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.

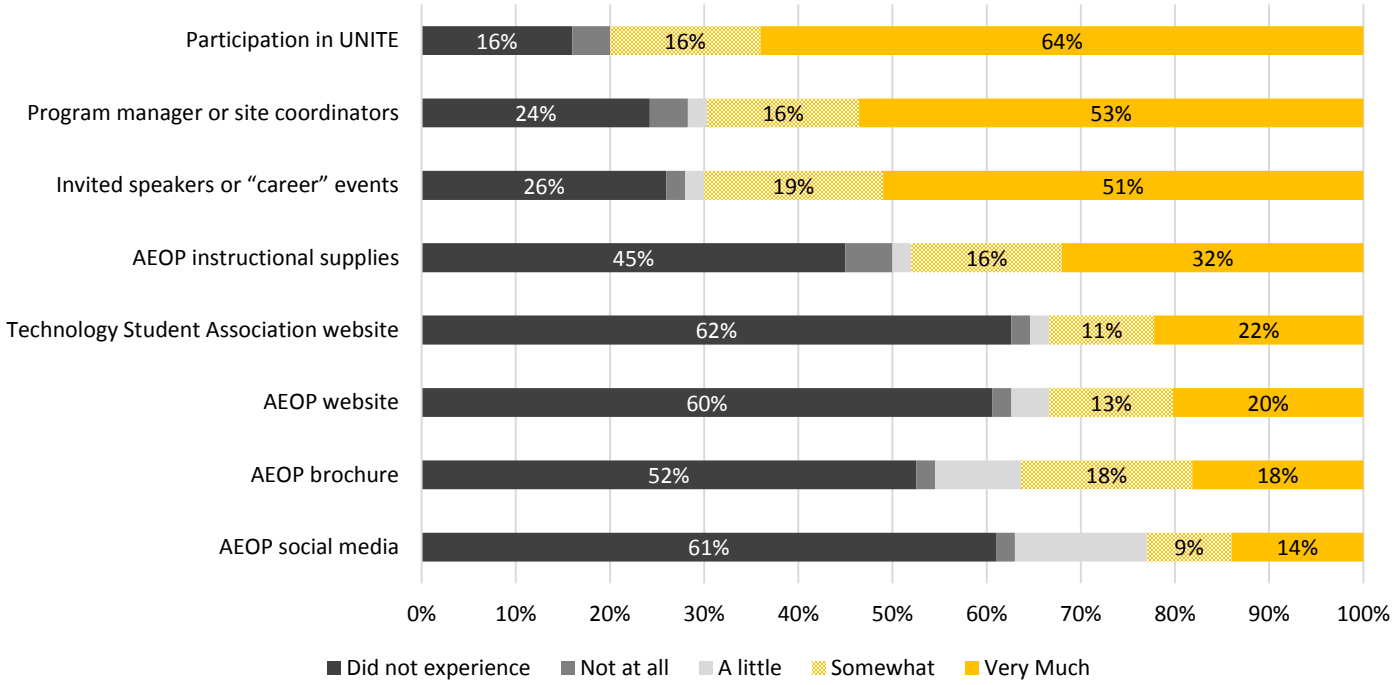
| Table 20. Mentors Using Strategies to Support Student STEM Educational and Career Pathways (n = 45-47) | |
|---|---|
| **Item** | **Questionnaire Respondents** |
| Asking about students' educational and career interests | 96% |
| Sharing personal experiences, attitudes, and values pertaining to STEM | 94% |
| Providing guidance about educational pathways that would prepare students for a STEM career | 89% |
| Recommending extracurricular programs that align with students' educational goals | 83% |
| Discussing non-technical aspects of a STEM career (economic, political, ethical, and/or social issues) | 71% |
| Recommending student and professional organizations in STEM | 70% |
| Highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM | 67% |
| Discussing STEM career opportunities outside of the DoD or other government agencies (private industry, academia) | 65% |
| Discussing STEM career opportunities with the DoD or other government agencies | 57% |
| Recommending Army Educational Outreach Programs that align with students' educational goals | 54% |
| Helping students build effective STEM networks | 52% |
| Critically reviewing students' résumé, application, or interview preparations | 33% |

A separate item on the mentor questionnaire asked which of the AEOP programs mentors explicitly discussed with their students during UNITE. Not surprisingly, the most frequently discussed program was UNITE (87%), as can be seen in Table 21. About two-thirds of the responding mentors indicated discussing at least one other AEOP with students, most commonly REAP (49%). Other programs discussed with students by a quarter or more of responding mentors were SEAP (29%), SMART (28%), GEMS (25%), and HSAP (25%).

| Table 21. Mentors Explicitly Discussing AEOPs with Students (n = 41-46) | |
|---|---|
| **Item** | **Questionnaire Respondents** |
| UNITE | 87% |
| Research & Engineering Apprenticeship Program (REAP) | 49% |
| Science & Engineering Apprenticeship Program (SEAP) | 29% |
| Science Mathematics, and Research for Transformation (SMART) College Scholarship | 28% |
| Gains in the Education of Mathematics and Science (GEMS) | 25% |
| High School Apprenticeship Program (HSAP) | 25% |
| Undergraduate Research Apprenticeship Program (URAP) | 20% |
| College Qualified Leaders (CQL) | 14% |
| National Defense Science & Engineering Graduate (NDSEG) Fellowship | 12% |
| Junior Science & Humanities Symposium (JSHS) | 5% |
| GEMS Near Peers | 2% |

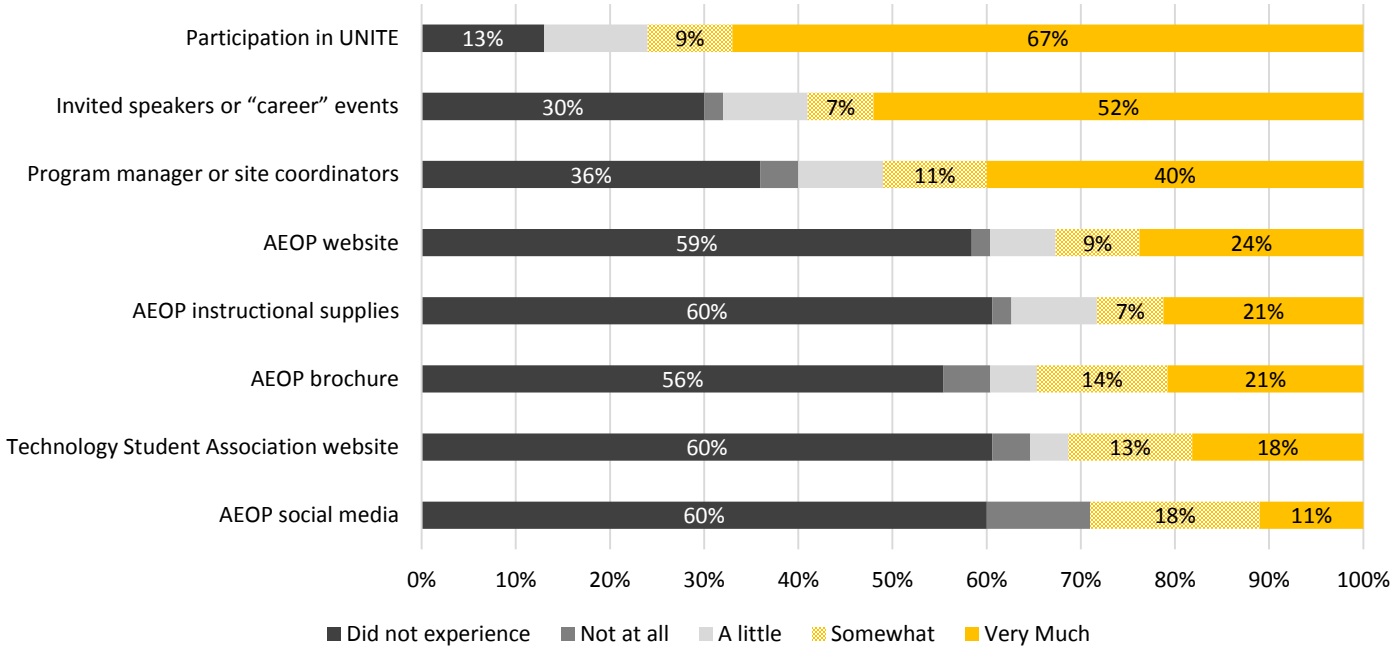
Mentors were also asked how useful various resources were in their efforts to expose students to the different AEOPs. As can be seen in Chart 8, participation in UNITE (64%), program managers or site coordinators (53%), and invited speakers or career events (51%) were most often rated as "very much" 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, 45% of responding mentors reported not experiencing AEOP instructional supplies (e.g., Rite in the Rain notebooks, lab coats), and only 32% rated them as "very much" useful. Similarly, about 60% of responding mentors did not experience the AEOP website, brochure, or social media; 14-20% found these resources very useful.

**Chart 8: Usefulness of Resources for Exposing Students to AEOPs (n = 43-45)**




Mentors were also asked how useful these resources were for exposing students to DoD STEM careers (see Chart 9). As with the previous item, mentors were most likely to rate participation in UNITE as useful, with 67% selecting "very much." Invited speakers or career events (52%), and program managers or site coordinators (40%) 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 11-24%), with about 60% of mentors indicating they did not experience these resources.

**Chart 9: Usefulness of Resources for Exposing Students to DoD STEM Careers (n = 43-46)**




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

> *We actually put together an industry professional panel and we brought in a lot of people that work in STEM careers that are related. They're either in the armed services themselves or they work for the DoD. I myself worked for the DoD in the past. And that was really interesting. WE talked about what we've done, how we got involved, and some of the careers that were available, and allowed the students to ask some questions. (UNITE Mentor)*

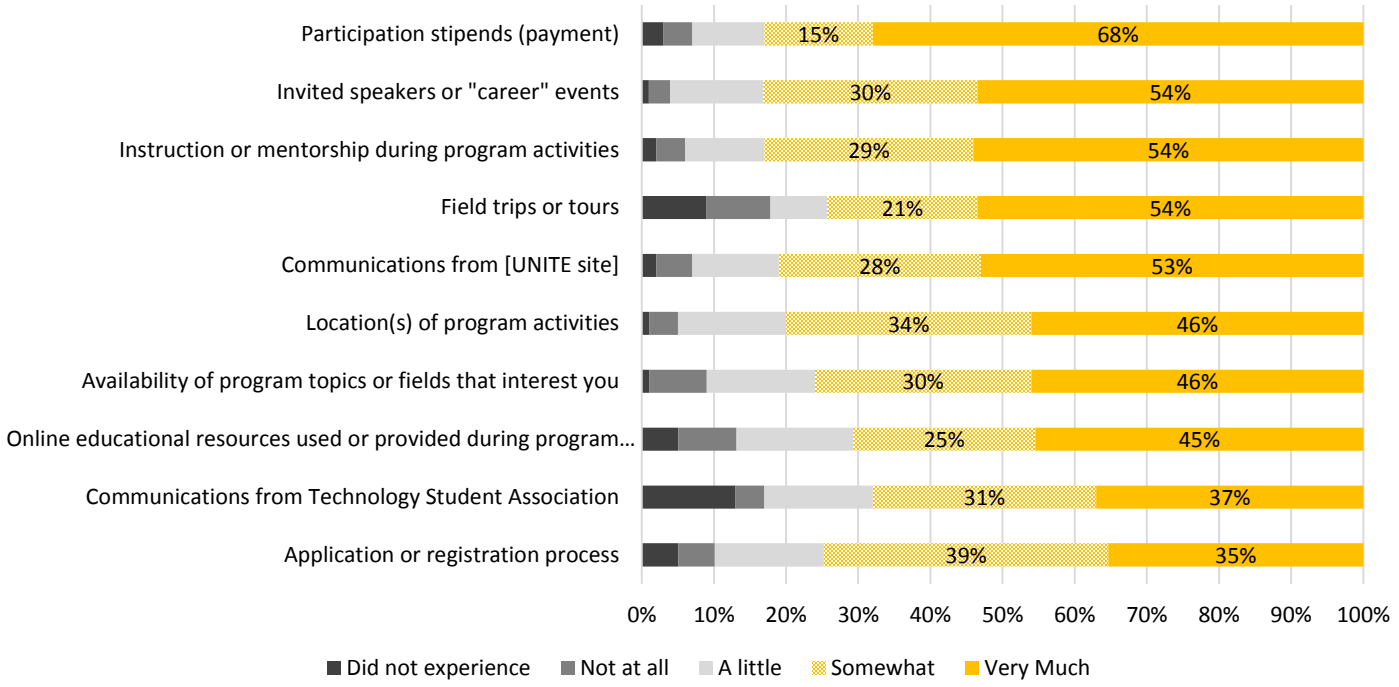
> *We brought in each branch of the military, as well as other doctors from our staff that worked within the STEM program, and we had them present different topics within their categories to pique the interest of students. And afterwards, students were able to go around and ask each one of them, individually, questions on whichever one they were interested in. (UNITE Mentor)*

### Satisfaction with UNITE

Students and mentors were asked how satisfied they were with a number of features of the UNITE program. As can be seen in Chart 10, the vast majority of responding students were somewhat or very much satisfied with each of the listed

program features. For example, 84% of students were at least somewhat satisfied with the invited speakers or career events, 83% with instruction or mentorship during program activities, and 83% with the stipend.

**Chart 10: Student Satisfaction with UNITE Program Features (n = 110-112)**




An open-ended item on the questionnaire asked student about their overall satisfaction with their UNITE experience. The responses were overwhelmingly positive. Of the 82 students who answered this question, 71 (87%) commented on only positive aspects of the program. These responses were sometimes as simple as, "Overall it was a good program and I would definitely recommend it to a friend." Other times, more detail about what they enjoyed about the program was provided, such as in the following examples:

> *This was an incredible experience for me. I learned many new facts about technology and engineering, and was able to work with forms of technology I can't [obtain] at school. I also learned about what types of futures there are in STEM-related fields and have decided to change my future career from law to engineering. It was really great to work with individuals in a new type of environment that allowed me to get the most out of this program. I would gladly participate in more programs like this in the future. (UNITE Student)*

*UNITE was a very informative program to participate in. It was an enjoyable experience overall. I got a chance to do many things here that I hadn't been able to do in school. (UNITE Student)*

*Overall, I really enjoyed the UNITE program. I loved the classes and fun, educational field trips that deal with science, technology, engineering, and mathematics careers. I also liked the other scholars in the program, my classmates. It was very interesting being around intelligent people like me. One of my favorite activities of the program was the opportunity to do engineering projects, such as building earthquake towers and roller coasters made out of paper, dealing with physics. I really enjoyed the program and I can't wait to come back next year. (UNITE Student)*

The 11 (13%) other responses included positive comments, but had some caveats. For example, one student indicated that it was fun to learn new things, but that the long lectures were sometimes boring. Another student wanted the opportunity to learn about all four of the STEM areas, not just one. In this student's words:

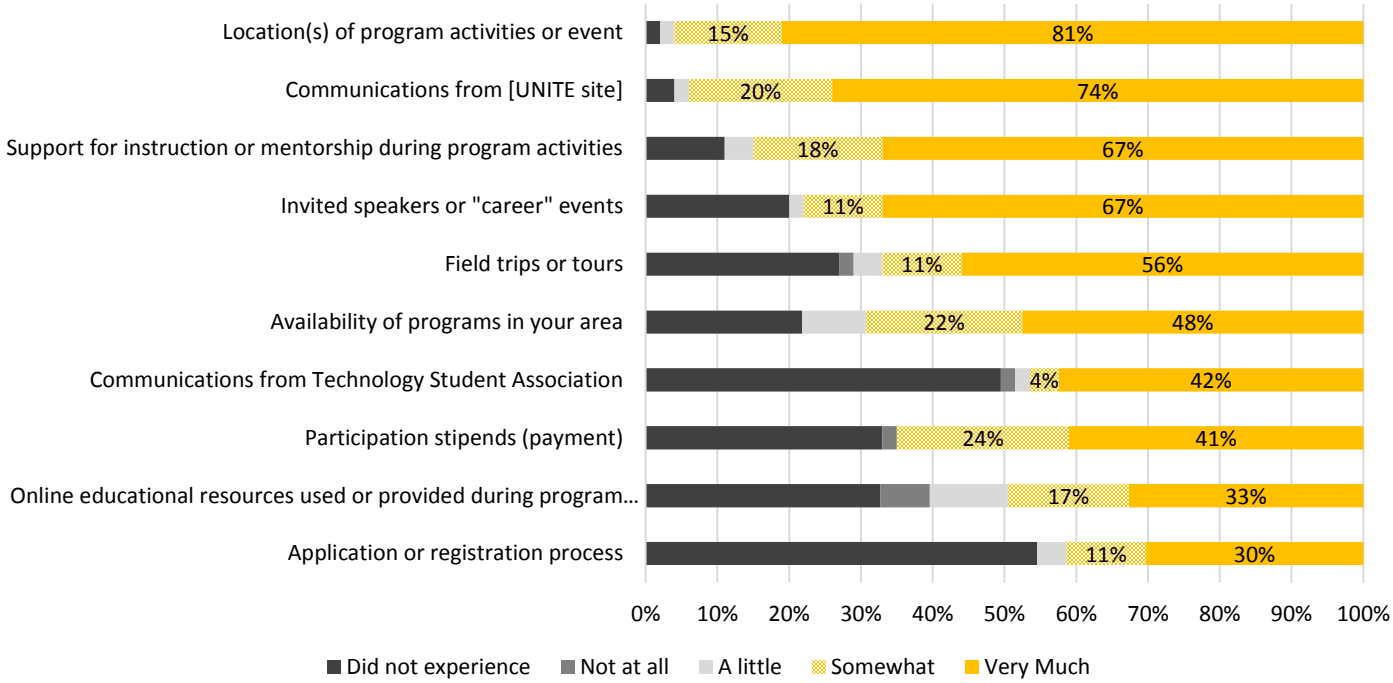
*I was fairly satisfied with this experience, but would have wished people do not simply focus in one area of STEM, but all four. I was expecting to engage in all areas of STEM over the 5 weeks, but instead I was simply put in the courses of engineering and leadership. This was without my consent and I wish to have a better say than not. I did enjoy the activities I was exposed to and the relationships I have gained as well. (UNITE Student)*

When asked how the program could be improved, 86 students answered, though 7 (8%) indicated that no improvements were necessary. The most common theme in the responses to this open-ended item, described by 44 (51%) related to the program's content, though the suggestions varied widely. For example, 11 students (13%) mentioned having less emphasis on engineering and more on other STEM fields; 6 students (7%) suggested covering the content of the program in greater depth; 5 students (6%) asked for a greater variety of courses to choose from. Other suggestions included improving the field trips (23%), having more hands-on and outdoor activities (21%), and increasing the length of the program or otherwise changing the schedule (17%). These comments are similar to sentiments expressed about the 2013 program.

Mentors also reported being somewhat or very much satisfied with the program components they experienced (see Chart 11). For example 96% were at least somewhat satisfied with the location of program activities, 94% with communications from the local UNITE site, and 85% with the support they received for instruction or mentorship.

*"This was an incredible experience for me…I also learned about what types of futures there are in STEM-related fields and have decided to change my future career from law to engineering."* -- UNITE Student

**Chart 11: Mentor Satisfaction with UNITE Program Features (n = 45-47)**




As with 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; 40 mentors responded to this question. Although several important aspects of the program were listed, the most frequently described was introducing students to the STEM subjects (23 mentors, or 58%). Mentors wrote things like "Showing how cool/fun STEM can be" and "gaining more awareness for STEM professions." This sentiment was echoed in the mentor focus group. As three mentors said:

> *I had a great experience teaching this class. The students made tremendous gains in their confidence, knowledge, and ability to solve difficult problems. (UNITE Mentor)*

*"I loved the classes and fun, educational field trips that deal with science, technology, engineering, and mathematics careers…I really enjoyed the program and can't wait to come back next year."* -- UNITE Student

*This year's program went exceptionally well…The students were glowing at the culminating banquet. This glow was not due to the end of the program, instead it was because they had the opportunity to share how they had benefited from the program. We look forward to continuing to make this experience available for future participants. (UNITE Mentor)*

*I love the UNITE program. This is my third year with it, and I enjoy working with the students. The career expo is a great opportunity for students to learn about STEM opportunities in college, the military, and as careers, while also getting cheered on from local and state dignitaries. I especially liked the student supplies in this year's batch: we've been able to get good use out of the notebooks, journal, and thumb drives. (UNITE Mentor)*

Other responses to the open-ended questionnaire item focused on UNITE's emphasis on teamwork (35%), the inclusion of diverse and/or underrepresented students (25%), real-world application of course content (18%), hands-on activities (15%), and academic rigor (13%). The program's use of state-certified teachers and STEM professionals was also seen as an important strength (each listed by 15% of respondents).

Mentors were also asked to note three ways in which UNITE should be improved for future participants. Of the 31 individuals who responded to this question, nearly half (45%) indicated the need for additional resources such as "additional funding to support more participants" or "more resources for projects." Like the students, several mentors suggested improvements to field trips (35%), either noting that there should be more field trips or that the type of field trips should be broadened. Recommendations regarding course content were also common (35%), though not as consistent. Some comments referred to the level of inclusion of STEM subjects, others how projects or presentations should be designed, and still others suggested having a recommended curriculum for courses. Other suggestions, though none made by a large number of mentors, included improving recruitment/advertising for the program (26%), increased Army involvement (19%), more hands-on activities (10%), clearer expectations for students (10%), and greater cooperation from parents (10%).

Lastly, mentors were asked to share their overall satisfaction with their UNITE experience. The responses were largely positive. Of the 31 individuals who responded to this question, 87% described having a positive experience. Nearly all of these responses included a positive comment about the program, along with listing one or more ways in which the program was beneficial to student participants. For example:

> *"I love the UNITE program…The career expo is a great opportunity for students to learn about STEM opportunities in college, the military, and as careers, while also getting cheered on from local and state dignitaries."* -- UNITE Mentor

*I know for my students, they get to try out the different STEM courses and get a taste of the different course and that lets them know if they're interested in that certain course. (UNITE Mentor)*

*I think the benefit that the students get from UNITE is very good and very dear. They have the ability to know what is going on outside of their school. They know exactly that there are a lot of specialties, more than they can get inside the high school like physics or math or any kind of computer science they take in the high school, they meet a lot of people from a lot of different majors, like computer science, like robotics, like math, like space centers. (UNITE Mentor)*

In summary, findings from the Actionable Program Evaluation indicate that the program is having increasing success in providing a program that actively engages students in authentic STEM experiences. The multi-faceted approach to marketing UNITE, as well as purposeful site selection, has allowed the program to recruit many students from underrepresented and underserved students.

Once in the UNITE program, students are learning about DoD or STEM job/careers, with most mentors crediting student participation in the program and invited speakers as useful in this process. In an attempt to catalyze continued student engagement in the AEOP programs, mentors are also discussing other AEOPs with students, with UNITE and REAP being the most commonly discussed AEOPs.

The UNITE program actively engages students in learning about STEM and in STEM practices, more than they would typically experience in school. As part of this engagement, large proportions of mentors employed 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 somewhat or 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.[20] STEM competencies are necessary for a STEM-literate

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

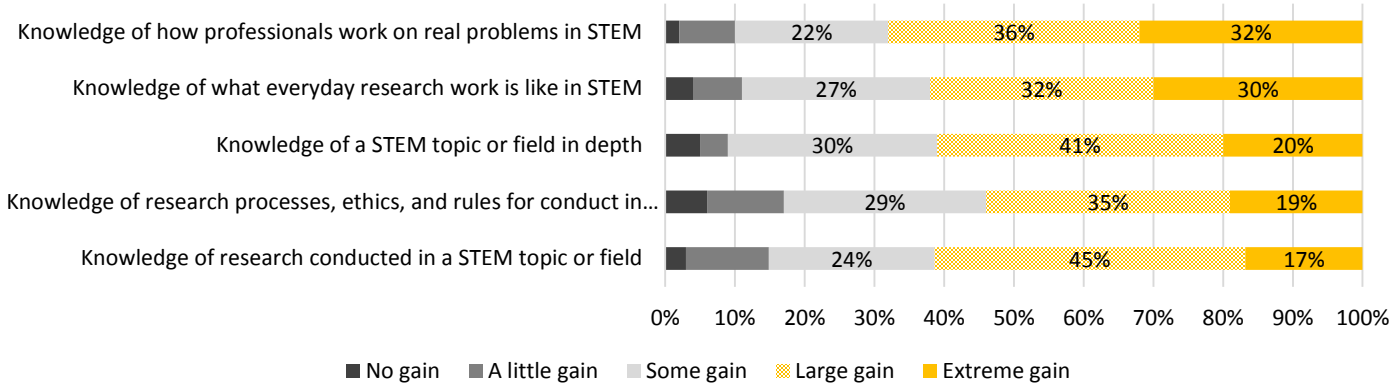
Committee on STEM Education. (2013*). Federal Science, Technology, Engineering, and Mathematics (STEM) education 5-year strategic plan: A report from the Committee on STEM Education, National Science and Technology Council.* Washington, DC: The White House, Office of Science and Technology Policy.

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

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 can be seen 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 68% of students on their knowledge of how professionals work on real problems in STEM, and 62% 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 (62%), knowledge of a STEM topic or field in depth (61%), and knowledge of research processes, ethics, and rules for conduct in STEM (54%). Mentors reported similar impacts on their students' STEM knowledge (see Appendix C).

**Chart 12: Student Report of Impacts on STEM Knoweldge (n = 108-109)**




These student questionnaire items were combined into a composite variable[21] to test for differential impacts across subgroups of students. Male students reported moderately greater gains in this area than female students (d = 0.542

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.

[21] The Cronbach's alpha reliability for these 5 items was 0.942.

standard deviations).[22] There were no significant differences between minority and non-minority students, or between students eligible for FRL and those not eligible; in other words, these subgroups of students reported similar impacts of the program on their STEM knowledge.

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 half of the responding students reported large or greater gains on their ability to support an explanation with data from investigations (55%), use mathematics to analyze numeric data (55%), consider different ways to analyze or interpret data (50%), design procedures for investigations (47%), and carry out an investigation (45%). Fewer responding students reported large gains on their ability to ask questions based on observations of real-world phenomena (34%), communicate information about their investigations and explanations in different formats (34%), make a model to represent the key features and functions of an observed phenomenon (29%), and use data to defend an argument that conveys how an explanation describes an observed phenomenon (29%).

[22] Two-tailed independent samples t-test, $t(100) = 2.62$, $p = 0.010$.

| Table 22. Students Reporting Large or Extreme Gains in their STEM Competencies – Science Practices (n = 19-21) | |
|---|---|
| **Item** | **Questionnaire Respondents** |
| Supporting a proposed explanation (for a phenomenon) with data from investigations | 55% |
| Using mathematics to analyze numeric data | 55% |
| Considering different ways to analyze or interpret data when answering a question | 50% |
| Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected | 47% |
| Carrying out procedures for an investigation and recording data accurately | 45% |
| Asking a question (about a phenomenon) that can be answered with one or more investigations | 43% |
| Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds | 43% |
| Supporting a proposed explanation with relevant scientific, mathematical, and/or engineering knowledge | 43% |
| Displaying numeric data from an investigation in charts or graphs to identify patterns and relationships | 42% |
| Testing how changing one variable affects another variable | 40% |
| Deciding what type of data to collect in order to answer a question | 39% |
| Applying knowledge, logic, and creativity to propose explanations that can be tested with investigations | 38% |
| Asking questions based on observations of real-world phenomena | 34% |
| Communicating information about your investigations and explanations in different formats (orally, written, graphically, mathematically) | 34% |
| Making a model to represent the key features and functions of an observed phenomenon | 29% |
| Using data from investigations to defend an argument that conveys how an explanation describes an observed phenomenon | 29% |

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. Two findings stand out from these data. First, a majority of responding students reported large or extreme gains in each of the engineering practices. For example, 73% indicated large or extreme gains on their ability to apply knowledge, logic, and creativity to propose solutions that can be tested with investigations. Second, the reported gains in the engineering practices, overall, are larger than those in the science practices. Interestingly, mentors' reports of student gains in these two areas varied substantially from students'. In some cases mentors reported greater gains than did students, and in other cases students'

reported gains were higher. These inconsistencies may be due to the data quality concerns described previously, or differences in perspectives between students and mentors.

| Table 23. Students Reporting Large or Extreme Gains in their STEM Competencies – Engineering Practices (n = 77-80) | |
|---|---|
| **Item** | **Questionnaire Respondents** |
| Applying knowledge, logic, and creativity to propose solutions that can be tested with investigations | 73% |
| Making a model that represents the key features or functions of a solution to a problem | 67% |
| Using mathematics or computers to analyze numeric data | 67% |
| Communicating information about your design processes and/or solutions in different formats (orally, written, graphically, mathematically) | 66% |
| Defining a problem that can be solved by developing a new or improved object, process, or system | 64% |
| Testing how changing one variable affects another variable | 64% |
| Deciding what type of data to collect in order to test if a solution functions as intended | 63% |
| Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected | 63% |
| Carrying out procedures for an investigation and recording data accurately | 62% |
| Supporting a proposed solution with relevant scientific, mathematical, and/or engineering knowledge | 62% |
| Using data from investigations to defend an argument that conveys how a solution meets design criteria | 59% |
| Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds | 58% |
| Considering different ways to analyze or interpret data | 57% |
| Identifying real-world problems based on social, technological, or environmental issues | 57% |
| Supporting a proposed solution (for a problem) with data from investigations | 57% |
| Displaying numeric data in charts or graphs to identify patterns and relationships | 52% |

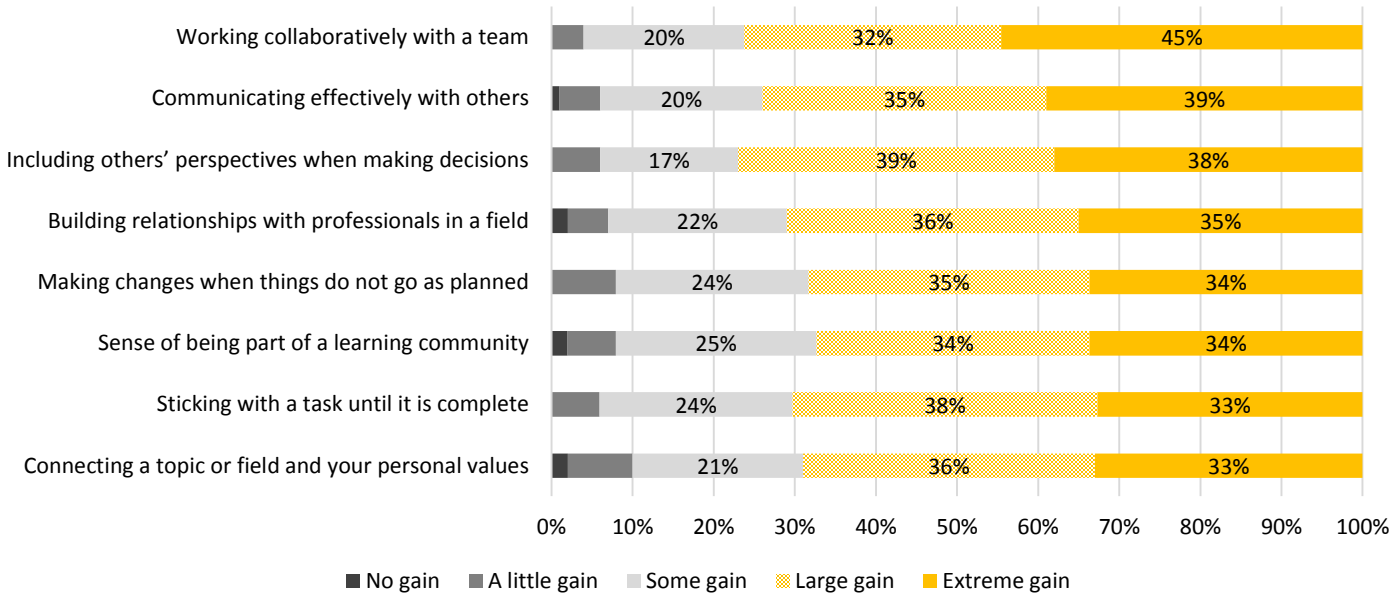
Composite scores were calculated for each set of practices items[23] on the student questionnaire to examine whether the UNITE program had differential impacts on subgroups of students. There were no significant differences between minority

[23] The science practices composite has a Cronbach's alpha reliability of 0.970; the engineering practices composite has a Cronbach's alpha reliability of 0.964.

and non-minority students or by FRL status on either composite. However, there were significant differences on both composites by gender. Males had much higher scores on the gains in science practices composite than did females (d = 2.342 standard deviations)[24] and moderately higher scores on the gains in engineering composite (d = 0.560 standard deviations).[25]

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 can be seen in Chart 13, more than two-thirds of responding students reported large or extreme gains on each of these skills, including working collaboratively with a team (77%), communicating effectively with others (74%), and including others' perspectives when making decisions (77%). Students reported similar gains regardless of gender, race/ethnicity, or FRL status. In addition, mentor reports of student gains in this area are generally similar to those of the students.

**Chart 13: Student Report of Impacts on 21st Century Skills (n = 108-110)**




**STEM Identity and Confidence.** Deepening students' STEM knowledge and skills are important for increasing the likelihood that they will pursue STEM further in their education and/or careers. However, they are unlikely to do so if they do not see themselves as capable of succeeding in STEM.[26] Consequently, the student questionnaire included a series of

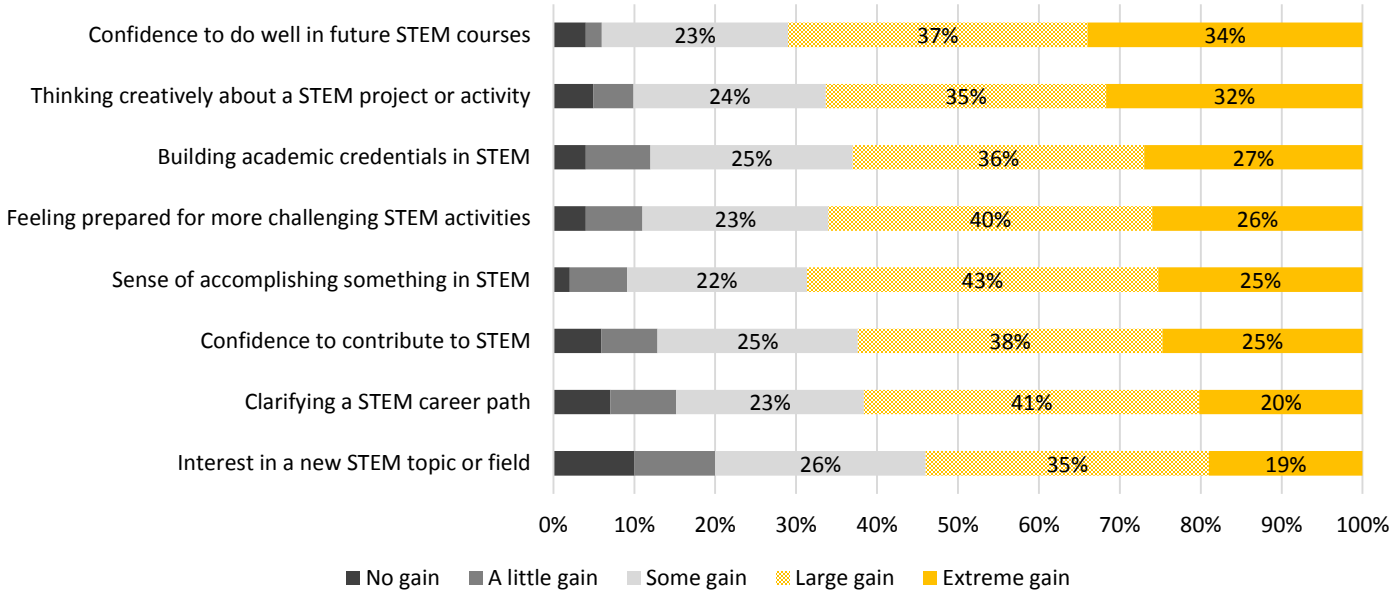
[24] Two-tailed independent samples t-test, $t(17) = 2.16$, $p = 0.046$.

[25] Two-tailed independent samples t-test, $t(75) = 2.41$, $p = 0.018$.

[26] 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.

items intended to measure the impact of UNITE on students' STEM identity. These data are shown in Chart 14 and strongly suggest that the program has had a positive impact in this area. For example, 71% of responding students reported a large or extreme gain in their confidence to do well in future STEM courses. Similarly, substantial proportions of students reported large or greater gain on their ability to think creatively about a STEM project or activity (67%), academic credentials in STEM (63%), and preparedness for more challenging STEM activities (66%). In addition, 63% reported increased confidence in their ability to contribute to STEM, 61% reported clarifying a STEM career path, and 54% reported increased interest in a new STEM topic or field. Comparing results on the composite created from these items,[27] males reported greater gains in STEM identity than females (a medium effect of d = 0.599 standard deviations).[28] There were no differences in impact based on race/ethnicity or FRL eligibility.

**Chart 14: Student Report of Impacts on STEM Identity (n = 106-108)**



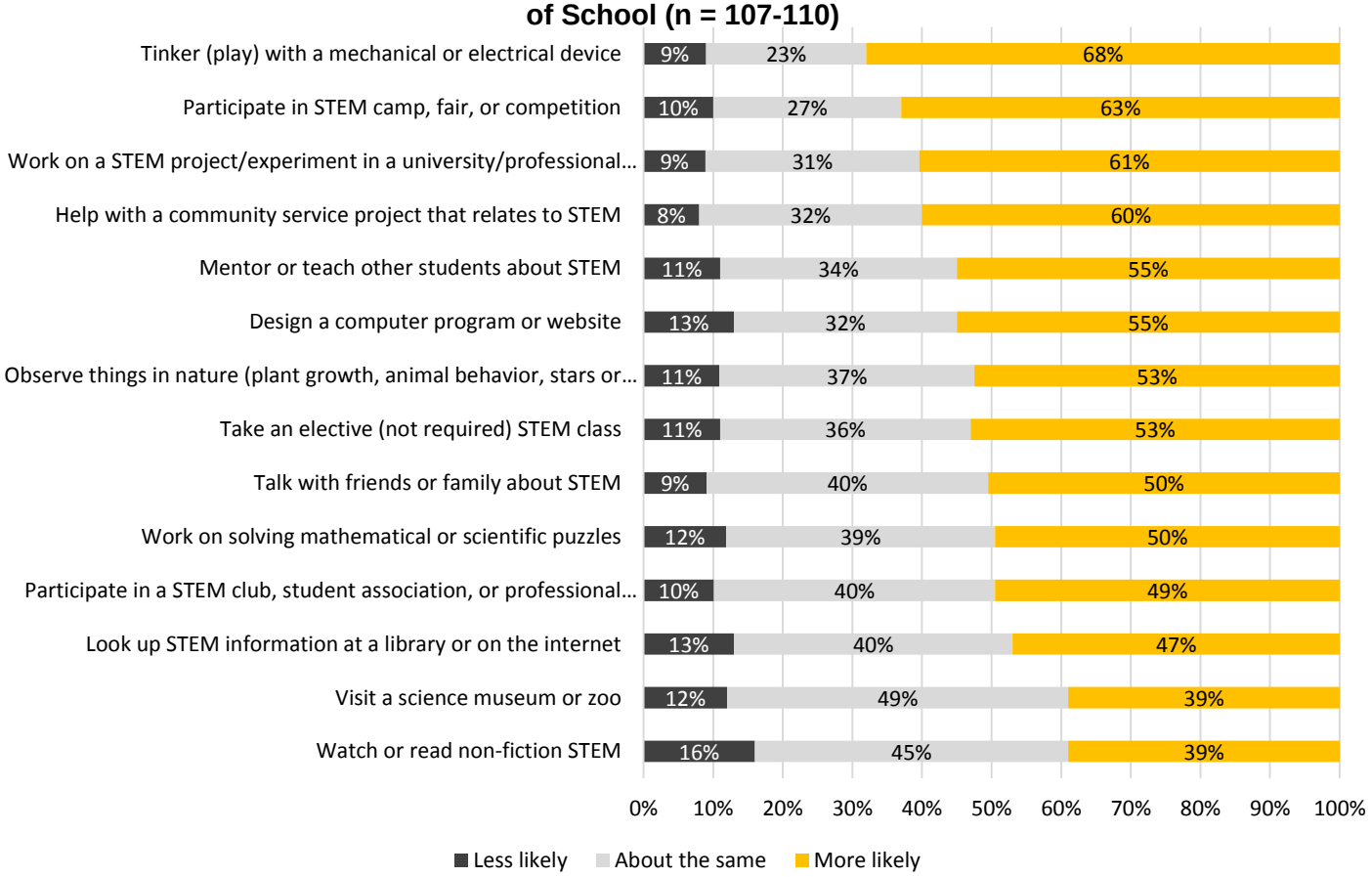

**Interest and Future Engagement in STEM.** A key goal of the AEOP program is to develop a STEM-literate citizenry. To do so, students need to be engaged in and out of school with high quality STEM activities. In order to examine the impact of UNITE on students' interest in future engagement in STEM, 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. As can be seen in Chart 15, students indicated they were more likely to engage in many of these activities as a result of UNITE. For example, 68% reported being more likely to tinker

[27] The Cronbach's alpha reliability for these 8 items was 0.961.

[28] Two-tailed independent samples t-test, $t(99) = 2.89$, $p = 0.005$.

with a mechanical or electrical device; 63% to participate in a STEM camp, fair, or competition; 61% to work on a STEM project or experiment in a university or professional setting; and 60% to help with a community service project related to STEM. A composite score was created from these items,[29] and composite scores were compared across subgroups of students. There were no statistically significant differences by gender, race/ethnicity, or FRL status.

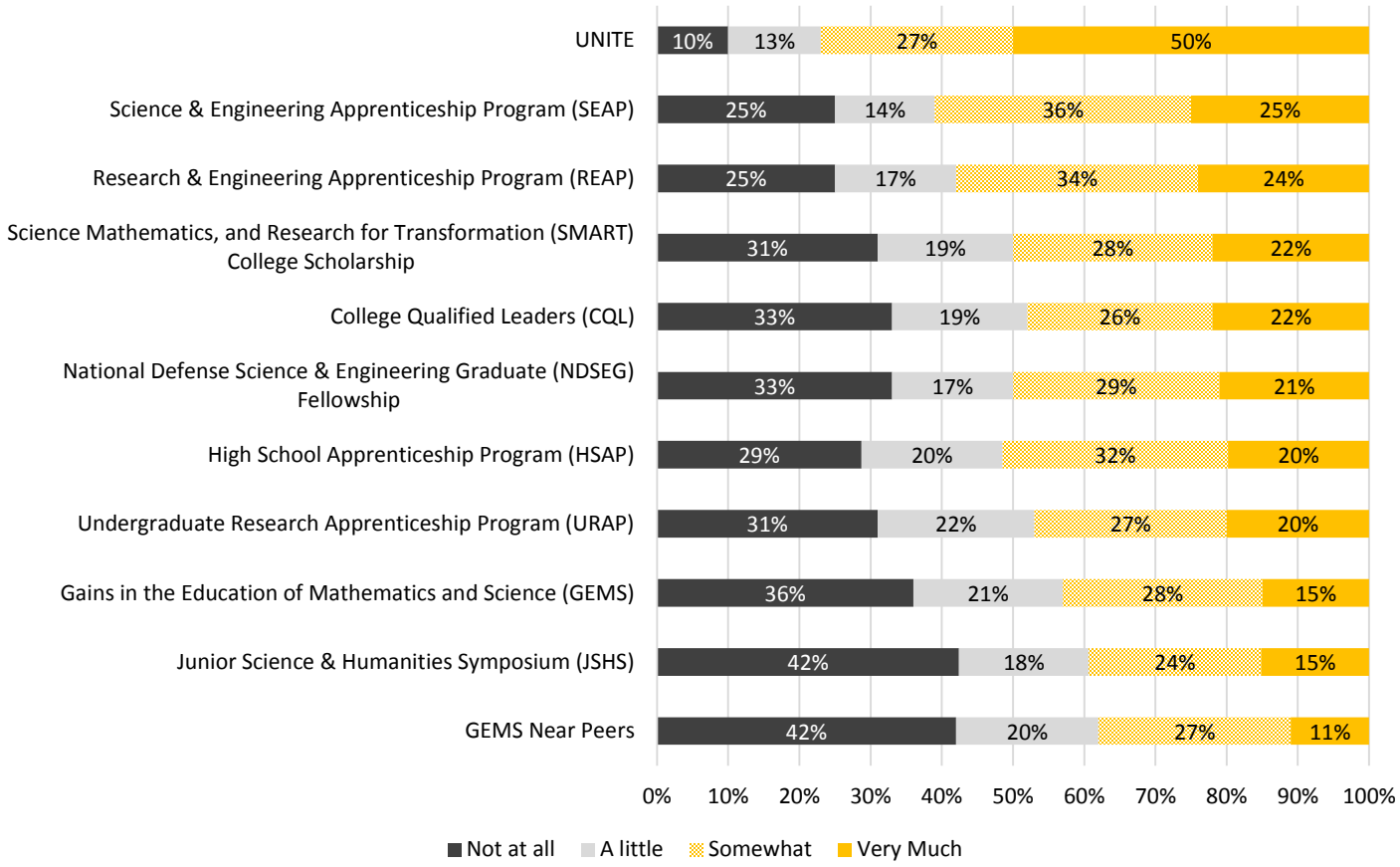
**Chart 15: Change in Likelihood Students Will Engage in STEM Activities Outside of School (n = 107-110)**




When asked how interested they are in participating in future AEOP programs, a large majority (77%) indicated being interested in participating in UNITE again; 61% in SEAP, and 58% in REAP (see Chart 16). These results are encouraging as REAP and SEAP were among the programs mentors most frequently discussed with their students. Roughly equal proportions expressed having no interest and at least some interest in JSHS and GEMS Near Peers.

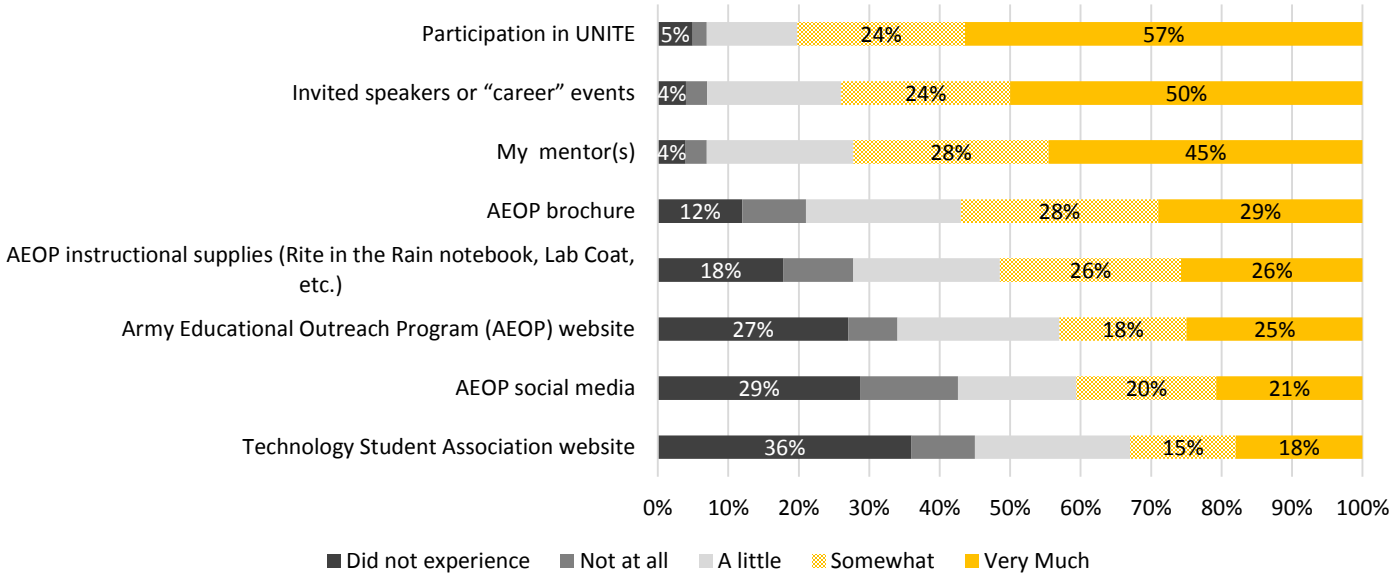
[29] These 15 items had a Cronbach's alpha reliability of 0.966.

**Chart 16: Student Interest in Future AEOP Programs (n = 104-108)**



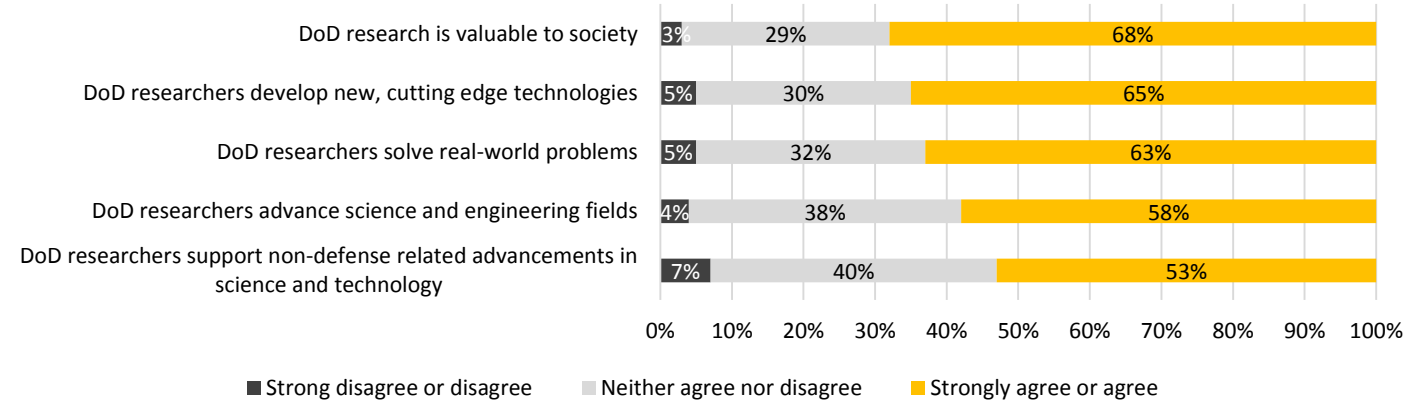

Students were asked which resources impacted their awareness of the various AEOPs. As can be seen in Chart 17, simply participating in UNITE was most likely to be rated as impacting their awareness "somewhat" or "very much" (81%). Invited speakers or career events (74%), their mentor (73%), the AEOP brochure (57%), and AEOP instructional supplies (52%) were also rated by a majority of students as having at least some impact on their awareness of AEOP programs.

**Chart 17: Impact of Resources on Student Awareness of AEOPs (n = 110-113)**




**Attitudes toward Research.** Students' attitudes about the importance of DoD research is an important prerequisite to their continued interest in the field and potential involvement in the future. 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. The data indicate that most responding students have favorable opinions (see Chart 18). For example, 68% agreed or strongly agreed that DoD research is valuable to society, 65% that DoD researchers develop cutting-edge technologies, and 63% that DoD researchers solve real-world problems.

**Chart 18: Student Opinions about DoD Researchers and Research (n = 105-106)**



**Education and Career Aspirations.** The evaluation also 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 can be seen in Table 24, when asked to think back on how far they wanted to go in school before participating in UNITE, 13% indicated graduating from high school, 40% finishing college, and 44% getting more education after college. In contrast, after UNITE, only 3% reported wanting to finish their education after high school, 34% wanted to finish college, and 59% wanted to get more education after college. This shift towards more education was statistically significant[30] and quite substantial in size (a very large effect size[31] ϕ= 0.917).

**Table 24. Student Education Aspirations (n = 109)**

| | Before UNITE | After UNITE |
|---|---|---|
| Graduate from high school | 13% | 3% |
| Go to a trade or vocational school | 1% | 2% |
| Go to college for a little while | 2% | 3% |
| Finish college (get a Bachelor's degree) | 40% | 34% |
| Get more education after college | 44% | 59% |

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 (see Table 25). A substantial portion of responding students expressed interest in STEM-related careers both before and after participating in UNITE. For example, 19% indicated aspiring to a career in engineering before UNITE, with another 19% interested in medicine. After UNITE, 25% of students expressed interest in engineering, and 16% in medicine. To examine whether the UNITE program increased student interest in STEM-related careers, each career option was coded as being STEM related or non-STEM related. Although some students switched their aspirations from a non-STEM field to a STEM field, a similar proportion switched from STEM to non-STEM. Thus, there was not a statistically significant increase in the proportion of students aspiring to a STEM-related career.

[30] Chi-square test of independence, $\chi^2(2) = 91.67$, $p < 0.001$.

[31] The effect size for a chi-square test of independence is calculated as $\varphi = \sqrt{\frac{\chi^2}{n}}$. With 2 degrees of freedom, ϕ of 0.07 is considered small, 0.21 medium, and 0.35 large.

| Table 25. Student Career Aspirations (n = 108) | | |
|---|---|---|
| | Before UNITE | After UNITE |
| Engineering | 19% | 25% |
| Medicine (e.g., doctor, dentist, veterinarian, etc.) | 19% | 16% |
| Health (e.g., nursing, pharmacy, technician, etc.) | 6% | 6% |
| Social science (e.g., psychologist, sociologist) | 5% | 6% |
| Military, police, or security | 4% | 6% |
| Art (e.g., writing, dancing, painting, etc.) | 6% | 5% |
| Computer science | 5% | 5% |
| Science (no specific subject) | 4% | 4% |
| Technology | 2% | 3% |
| Law | 7% | 2% |
| Business | 4% | 2% |
| Mathematics or statistics | 3% | 2% |
| English/language arts | 0% | 1% |
| Physical science (e.g., physics, chemistry, astronomy, materials science) | 1% | 0% |
| Earth, atmospheric or oceanic science | 0% | 0% |
| Environmental science | 0% | 0% |
| Farming | 0% | 0% |
| Skilled trade (carpenter, electrician, plumber, etc.) | 0% | 0% |
| Teaching, non-STEM | 0% | 0% |
| Teaching, STEM | 0% | 0% |
| Undecided | 8% | 7% |
| Other[†] | 7% | 10% |

[†] Before, other includes "Animal Rehabilitation," "Architecture," "Fashion Designer and Modeling," "Film," "Forensic science," "Marketing," "Photography," and "Physical therapy." After, other includes "Animal Rehabilitation," "Architecture," "Art, criminal justice, business," "Fashion Designer and Modeling," "Film," "Marketing," "Orthodontist and join national guard," "Photography," "Physical therapy," "Robotics," and "Theoretical Quantum Physicist."

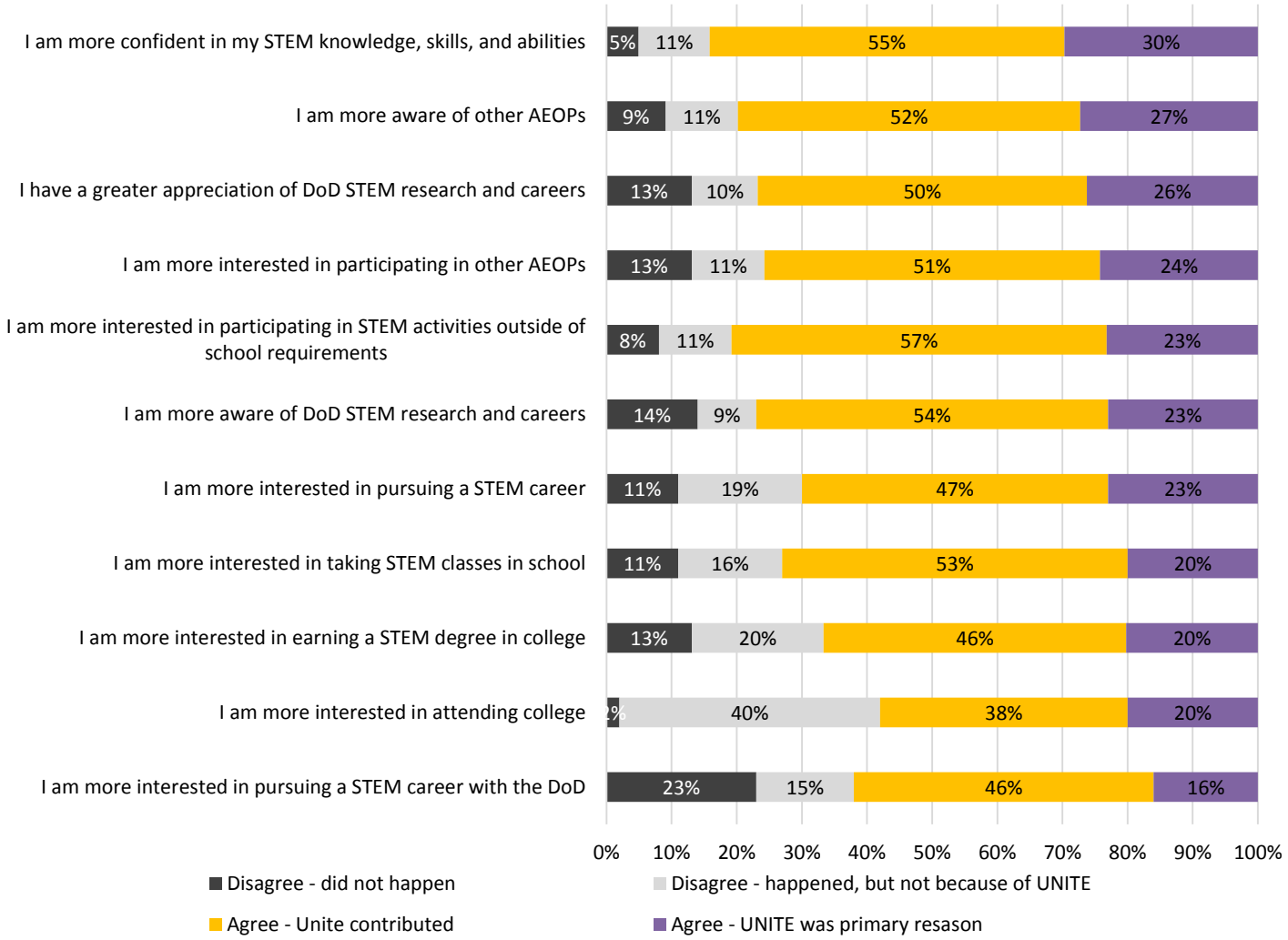
Students were also asked the extent to which they expect to use their STEM knowledge, skills, and/or abilities in their work when they are age 30. As can be seen in Table 26, all students expect to use STEM somewhat in their career. A majority (55%) expect to use STEM 76-100% of the time in their work, 22% expect to use STEM 51-75% of the time, and 19% expect to use STEM 26-50% of the time.

| Table 26. Students Expecting to use STEM in Their Work at Age 30 (n = 103) | |
|---|---|
| | **Questionnaire Respondents** |
| Not at all | 0% |
| Less than 25% of the time | 6% |
| 26% to 50% of the time | 19% |
| 51% to 75% of the time | 21% |
| 75% to 100% of the time | 55% |

**Overall Impact.** Lastly, students were asked about impacts of participating in UNITE more broadly. From these data, it is clear that students thought the program had a substantial impact on them (see Chart 19). For example, a large majority of responding students indicated being more confident in their STEM knowledge, skills, and abilities after participation, with 55% reporting that UNITE contributed to this impact and another 30% reporting that UNITE was the primary reason for this impact. Similarly, students indicated increased awareness of other AEOPs (52% reporting that UNITE contributed, 27% reporting that UNITE was primary reason) and more interest in participating in other AEOPs (51% and 24%). Students also reported greater appreciation of DoD STEM research and careers (50% and 26%), awareness of DoD STEM research and careers (54% and 23%), and interest in pursuing a STEM career with the DoD (46% and 16%). These items were combined into a composite variable[32] 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.

[32] The Cronbach's alpha reliability for these 11 items was 0.921.

**Chart 19: Student Opinions of UNITE Impacts (n = 105-108)**




An open-ended item on the questionnaire asked students to list the three most important ways they benefited from the program; 98 students provided at least one answer to the question. Student responses addressed a variety of themes. More than half of the responding students (57%) wrote about learning, either in general or about a specific subject or idea they learned (e.g., "How submarines were made"). One-third of the responding students listed career-related benefits of the program, usually citing being introduced to STEM careers. Several referred to academic benefits (24%), such as feeling more prepared for the upcoming school year and/or college, or having a better idea about potential majors. Other benefits, each described by only a small number of students, included Interpersonal interactions with teachers/mentors or other students, teamwork, having fun, having new experiences, and problem-solving.

*"I thought engineering, you know, just dealt with mechanics and electronics and things of that nature and computers. There is so much more to engineering...That kind of just opened up my entire field of what I wanted to do and maybe what career I wanted to pursue later on."* -- UNITE Student

Student comments from the focus group interviews expand on some of these impacts. As two said:

> *In the end, yes I'm happy that I participated in the UNITE program. I feel like it opened my eyes to how many careers there are in engineering. And how open the field is because not a lot of people are interested in engineering. Which is something that I do think needs to change because the world is so innovative now, we depend on technology so much…I didn't know what career I wanted to go into but now I feel like I've narrowed it down a lot and I know what I want to do for my career.* (UNITE Student)

> *I think that this program was really good for me. Coming into it I was a little skeptical, but for the past three weeks going on four weeks I've kind of understood what it takes to be an engineer and what different engineering fields there are. I thought engineering, you know, just dealt with like mechanics and electronics and things of that nature and computers. But, it is so much bigger than that, even though it is incorporated into a lot of engineering. There is so much more to engineering, and what you can do with it, and…what engineering is actually dealing with. That kind of just opened up my entire field of what I wanted to do and maybe what career I wanted to pursue later on.* (UNITE Student)

## Summary of Findings

The FY14 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. 2014 UNITE Evaluation Findings | |
|---|---|
| **Participant Profiles** | |
| UNITE continues to have success at serving students of historically underrepresented and underserved populations. | • UNITE was successful in attracting female participants—a population that is historically underrepresented in engineering fields. Enrollment data indicate that 65% of participants were female. |
| | • UNITE had success in providing outreach to students from historically underrepresented and underserved minority race/ethnicity and low-income |

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| | groups. Enrollment data indicate that 55% of participating students identified as Native American or Alaskan Native, 22% as Black or African American, and 17% as Hispanic or Latino. A majority of students responding to the questionnaire reported qualifying for free or reduced-price lunch (53%). |
| | • UNITE served students across a range of school contexts. Most student questionnaire respondents attended public schools (78%) and schools in urban settings (55%) or frontier/tribal schools (16%), which tend to have higher numbers or proportions of underserved groups. |
| UNITE engages a diverse group of adult participants as STEM mentors. | • In total, 162 adults, including university faculty, high school and university students, local teachers, and industry STEM professionals served as program mentors. Additional STEM professionals from a range of business sectors participated in career day activities. |
| **Actionable Program Evaluation** | |
| UNITE is strongly marketed to schools and teachers serving historically underrepresented and underserved groups. | • Many UNITE sites employed multi-pronged efforts to market programs to and recruit students from schools and school networks identified as serving large populations of traditionally underrepresented and underserved students. These efforts included university press releases distributed to area media, printed promotional materials, university websites, social media (Facebook), and marketing at existing programs at the site (e.g., Upward Bound). |
| | • Students most frequently learned about the local UNITE program from school or university newsletters, emails, or websites (34%); teachers/professors (21%); mentors from the UNITE program (21%); immediate family members (16%); and the AEOP website (16%). |
| UNITE students are motivated by opportunities to learn about STEM in ways not possible in school. | • Students were most frequently motivated to participate in UNITE by the desire to learn something new or interesting (66%), because of their interest in STEM (62%), to have fun (62%), and to learn in ways not possible in school (61%). |
| UNITE engages students in meaningful STEM learning, through team-based and hands-on activities. | • Most students (54-83%) report learning about STEM topics, applications of STEM to real-life situations, STEM careers, and cutting-edge STEM research on most days or every day of their UNITE experience. |
| | • Most students had opportunities to engage in a variety of STEM practices during their UNITE experience. For example, 85% reported working as part of a team, 76% participating in hands-on activities, 70% building or simulating something, and 67% coming up with creative explanations/solutions on most days or every day. |

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|---|---|
| | • Students reported greater opportunities to learn about STEM and greater engagement in STEM practices in their UNITE experience than they typically have in school. |
| | • Large proportions of mentors report using strategies to help make learning activities to students relevant, support the needs of diverse learners, develop students' collaboration and interpersonal skills, and engage students in "authentic" STEM activities. |
| UNITE promotes DoD STEM research and careers but can improve marketing of other AEOP opportunities. | • Most mentors had no awareness of or past participation in an AEOP initiative beyond UNITE. In addition, although most students reported an increase in awareness of other AEOPs, a substantial proportion reported never hearing about any of the other programs. However, a substantial portion of students were made aware of, and expressed interest in the REAP program, indicating that the effort to cross-market these programs is having the desired results. |
| | • 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. Six of the 10 UNITE sites engaged Army engineers as speakers, or went to Army facilities in career day events. |
| The UNITE experience is greatly valued by students and mentors. | • All responding students indicated being satisfied with their UNITE experience, highlighting the opportunity to learn about STEM fields and career opportunities. Students also commented on how UNITE provided opportunities they do not get in school and would not otherwise have. |
| | • The vast majority of responding mentors indicated having a positive experience. Further, many commented on the benefits the program provides students, including deepening their knowledge about and confidence in STEM. |
| **Outcomes Evaluation** | |
| UNITE had positive impacts on students' STEM knowledge and competencies. | • A majority of 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. These impacts were identified across all student groups. |
| | • Many students also reported impacts on their abilities to do STEM, including such things as applying knowledge, logic, and creativity to propose solutions that can be tested, making a model that represents the key features or functions of a solution to a problem, communicating information about their design processes and/or solutions in different formats, supporting a proposed |

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| | explanation with data from investigations, and using mathematics to analyze numeric data. |
| UNITE had positive impacts on students' 21st Century Skills. | • A large majority of students reported large or extreme gains on their ability to work collaboratively with a team, communicate effectively with others, include others' perspectives when making decisions, sticking with a task until it is complete, and connecting a topic or field and their personal values. |
| UNITE positively impacted students' confidence and identity in STEM, as well as their interest in future STEM engagement. | • Many students reported a large or extreme gain on their confidence to do well in future STEM courses (71%), ability to think creatively about a STEM project or activity (67%), academic credentials in STEM (63%), and preparedness for more challenging STEM activities (66%). In addition, 63% reported increased confidence in their ability to contribute to STEM, 61% reported clarifying a STEM career path, and 54% increased interest in a new STEM topic or field. |
| | • Students also reported on the likelihood that they would engage in additional STEM activities outside of school. A majority of students indicated that as a result of UNITE, they were more likely to tinker with mechanical or electrical devices, participate in a STEM camp, fair, or competition, work on a STEM project in a university or professional setting, help with a community service project related to STEM, or mentor other students about STEM. |
| UNITE succeeded in raising students education aspirations, but did not change their career aspirations. | • 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 (44% before UNITE, 59% 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. Although many students indicated interest in a STEM-related career, there was not a statistically significant difference from before UNITE to after. This result is likely due to the requirement for students to demonstrate interest in STEM in order to be selected for the program. |
| UNITE students are largely unaware of AEOP initiatives, but students show substantial interest in future AEOP opportunities. | • With the exception of REAP, students and mentors were largely unaware of other AEOP initiatives. However, 79% of students indicated that UNITE made them more aware of other AEOPs, and 75% credited UNITE with increasing their interest in participating in other programs. |
| UNITE raised student awareness and appreciation of DoD STEM research and careers, as well as their | • A majority of students reported that they had a greater awareness (77%) and appreciation (76%) of DoD STEM research and careers. In addition, 62% indicated that UNITE raised their interest in pursuing a STEM career with the DoD. |

| | |
|---|---|
| interest in pursuing a STEM career with the DoD. | |

## Recommendations

1. The UNITE program has the goal of broadening the talent pool in STEM fields, and, overall, the program has been successful at attracting students from groups historically underrepresented and underserved in these fields. However, the program may want to consider doing more to increase the likelihood that the program has a long-term impact on the number of students who pursue STEM. Strategies that have been shown to be effective in this area include providing role models for students, exposing them to different education and career possibilities, providing guidance on how to pursue specific education and career paths (e.g., what courses they need to take in school, how to navigate the college application process), and providing coaching on the "soft skills" (e.g., time management, communication skills) needed to be successful in STEM careers. Although many mentors reported using a number of these strategies (e.g., highlighting the under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM), substantive proportions did not. The program should consider ways to ensure that these areas are addressed systematically. For example, the program may want to work with each site to see how these areas could be built into their schedules, or provide more guidance to mentors for how and when to address these issues.

2. Similarly, given the goal of having students progress from UNITE into other AEOP programs, particularly REAP and JSHS, the program may want to work with sites to increase students' exposure to AEOP. Only about half of mentors recommended other AEOPs to students, typically REAP. Further, although many students expressed interest in participating in other AEOP programs, a substantial proportion indicated having no interest. Given the proportion of students who reported learning about other AEOPs from invited speakers, career events, or their mentors, the program may want to work with each site to ensure that all students have access to structured opportunities that both describe the other AEOPs and provide information to students on how they can apply to them. In addition, given the limited use of the program website, print materials, and social media, the program should consider how these materials could be adjusted to provide students with more information and facilitate their enrollment in other AEOPs.

3. A number of students suggested the UNITE program could be improved by changes to the content. For example, some students wanted opportunities to engage in a broader range of STEM topics, others wanted more field experiences. Mentors also expressed a need for more resources for engaging students in hands-on, authentic STEM experiences. To help ensure a high-quality experience across sites, the program should consider creating a "library" of activities and resources for individual sites and mentors to draw upon. These resources could range from suggested curricula for the entire UNITE experience to specific activities in different topic areas that mentors

could use with their students. To start building this library, sites and mentors could be asked to submit their most successful activities, which could be vetted, edited as necessary, and then made available to all sites and mentors.

4. For a number of outcomes (impacts on students' STEM abilities and STEM identity), there were significant differences in reported impacts between female and male students; in each case, males reported greater impacts. These types of results might raise concerns about whether there were inequities in how males and females were being served by the program. However, the majority of survey respondents identified themselves as Black or African American, and previous research has shown that males from this group often have worse education outcomes than other students, including their female counterparts.[33] Thus, it will be important to monitor this issue in future years, and if sample sizes allow, disaggregate results into more specific subgroups (e.g., Black/African-American males, Black/African-American females, White males, White females) to ensure the program is serving all students equitably.

5. Efforts should be undertaken to improve participation in evaluation activities, as the low response rates for both the student and mentor questionnaires raise questions about the representativeness of the results. Improved communication with the individual program sites about expectations for the evaluation may help. In addition, the evaluation instruments may need to be streamlined as perceived response burden can affect participation. In particular, consideration should be given to whether the parallel nature of the student and mentor questionnaires is necessary, with items being asked only of the most appropriate data source.

[33] Pollard, D.S. (1993). Gender, achievement and African American students' perceptions of their school experience. Education Psychologist, 28(4), 341-356.

# Appendices

# Appendix A

# FY14 UNITE Evaluation Plan

**Questionnaires**

**Purpose:**
As per the approved FY14 AEOP APP, the external evaluation of UNITE conducted by VT includes two post-program questionnaires:

1. AEOP Youth Questionnaire to be completed by student participants; and
2. AEOP Mentor Questionnaire to be completed by University/Industry/Army S&Es, near-peer mentors (university or graduate students), and/or resource teachers that facilitate, assist, or support students during UNITE educational activities.

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.

The questionnaires have been revised for FY14 to align 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., inclusive of implementation and outcomes evaluation, and outcomes of STEM-specific competencies, transferrable competencies, attitudes about/identifying with STEM, future engagement in STEM-related activities, and educational/career pathways);
- Best practices and published assessment tools in STEM education, STEM informal/outreach, and the evaluation/ research communities; and
- AEOP's vision to improve the quality of the data collected, focusing on changes in intended student outcomes and contributions of AEOPs like CQL effecting those changes.

The use of common questionnaires and sets of items that are appropriate across programs will allow for comparisons across AEOP programs and, if administered in successive years, longitudinal studies of students as they advance through pipelines within the AEOP. Because the questionnaires incorporate batteries of items from existing tools that have been validated in published research, external comparisons may also be possible.

All AEOPs are expected to administer the Youth and Mentor questionnaires provided for their program. Both the Youth and Mentor questionnaires have two versions, an "advanced" version (JSHS and studentship programs) or a "basic" version (all other programs). The same basic set of items is used in both, with slightly modified items and/or additional items used in the advanced version. Additionally, the surveys are customized to gather information specific structures, resources, and activities of programs.

**Online Focus Groups**

**Purpose:**
As per the approved FY14 AEOP APP, the external evaluation of UNITE conducted by VT includes three or four online focus groups, with each focus group including a sample of participants assembled from multiple sites:

- three 45 minute focus group with a total of 6-8 students who are assembled from 3-4 sites; and
- one 45-minute focus group with a total of 6-8 mentors who are assembled from 6 sites.

Focus groups provide the VT evaluation team with first-hand opportunities to speak with students and their mentors. The information gleaned from these focus groups helps us in illustrating and more deeply understanding the findings of other data collected (from questionnaires). In total, VT's findings are used to highlight program successes and inform program changes so that the AEOPs can be even better in the future. *Although VT will coordinate the online focus groups, we encourage TSA to alert ALL participants to the possibility that they may be invited by VT evaluators to join an online focus and to encourage their participation.*

**Site and Participant Selection:**
Each site should identify one or two participants from their site to invite to participate in the focus groups designated for their site, as summarized in the Scheduling and Technology table. Focus group participants can be selected by the coordinator, recommended by other mentors or students, randomly selected, or express interest learning about the opportunity. Focus group participants must agree to participate voluntarily and not be penalized should they decline.

We are attempting to assemble a diverse group of focus group participants who can provide information about a range of experiences possible in the UNITE. Ideally, each student focus group will be inclusive of

- male and female students (equal representation if possible),
- range of race/ethnicities of students served by the program, and
- range of STEM content studied/researched.

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

Evaluators conducted inferential statistics to study any differences among participant groups (e.g., by gender or race/ethnicity) that could indicate inequities in the 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

## FY14 UNITE Student Questionnaire and Data Summaries

**2014 UNITE: UNITE Youth Survey**

Virginia Tech conducts program evaluation on behalf of Technology Student Association (TSA) and U.S. Army to determine how well the Army Educational Outreach Programs (AEOP) is achieving its goals of promoting student interest and engagement in science, technology, engineering, and mathematics (STEM). As part of this study Virginia Tech is surveying students (like you) who have participated in an AEOP program. The survey will collect information about you, your experiences in school, and your experiences in the AEOP program you just completed or will soon complete.

**About this survey**:

- While this survey is not anonymous, your responses are CONFIDENTIAL. When analyzing data and reporting results, your name will not be linked to any item responses or any comments you make.
- Responding to this survey is VOLUNTARY. You are not required to participate, although we hope you do because your responses will provide valuable information for meaningful and continuous improvement.
- If you provide your email address, the AEOP may contact you in the future to ask about your academic and career success.

**If you have any additional questions or concerns, please contact one of the following people:**

**Tanner Bateman, Virginia Tech**
Senior Project Associate, AEOPCA
(540) 231-4540, tbateman@vt.edu

**Rebecca Kruse, Virginia Tech**
Evaluation Director, AEOPCA
(703) 336-7922, rkruse75@vt.edu

**If you are 17 and under, your parent/guardian provided permission for you to participate in the evaluation study when they authorized your participation in the AEOP program you just completed or will soon complete.**

**Q1. Do you agree to participate in this survey? (required)**

❍ Yes, I agree to participate in this survey
❍ No, I do not wish to participate in this survey **If selected, respondent will be directed to the end of the survey**

**Q2. Please provide your personal information below:**

First Name: _____
Last Name: _____

**Q3. What is your email address? (optional)**

Email: _____

**Q4. 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)**

- ❍ 4th
- ❍ 5th
- ❍ 6th
- ❍ 7th
- ❍ 8th
- ❍ 9th
- ❍ 10th
- ❍ 11th
- ❍ 12th
- ❍ College freshman
- ❍ College sophomore
- ❍ College junior
- ❍ College senior
- ❍ Graduate program
- ❍ Other (specify): _____
- ❍ Choose not to report

**Q5. What is your gender?**

- ❍ Male
- ❍ Female
- ❍ Choose not to report

**Q6. What is your race or ethnicity?**

- ❍ Hispanic or Latino
- ❍ Asian
- ❍ Black or African American
- ❍ Native American or Alaska Native
- ❍ Native Hawaiian or Other Pacific Islander
- ❍ White
- ❍ Other race or ethnicity (specify): _____
- ❍ Choose not to report

**Q7. Do you qualify for free or reduced lunches at school?**

- ❍ Yes
- ❍ No
- ❍ Choose not to report

**Q8. Which best describes the location of your school?**

- ❍ Frontier or tribal school
- ❍ Rural (country)
- ❍ Suburban
- ❍ Urban (city)

**Q9. What kind of school do you attend?**

- ❍ Public school
- ❍ Private school
- ❍ Home school
- ❍ Online school
- ❍ Department of Defense school (DoDDS or DoDEA)

**Q10. Where was the UNITE program located? (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

**Q11. How did you learn about UNITE? (Check all that apply)**

- ❑ Technology Student Association website
- ❑ Army Educational Outreach Program (AEOP) website
- ❑ Facebook, Twitter, Pinterest, or other social media
- ❑ School or university newsletter or email
- ❑ News story or other media coverage
- ❑ Past participant of UNITE
- ❑ Friend
- ❑ Immediate family member (e.g., mother, father, siblings)
- ❑ Extended family member (e.g., grandparents, aunts, uncles, cousins)
- ❑ Friend of the family
- ❑ Teacher or professor
- ❑ Guidance counselor
- ❑ Mentor from UNITE

- ❑ Someone who works at an Army laboratory
- ❑ Someone who works with the Department of Defense
- ❑ Other (specify): _____

**Q12. How motivating were the following factors in your decision to participate in UNITE?**

| | Not at all | A little | Somewhat | Very Much |
|---|---|---|---|---|
| Teacher or professor encouragement | ❍ | ❍ | ❍ | ❍ |
| An academic requirement or school grade | ❍ | ❍ | ❍ | ❍ |
| Desire to learn something new or interesting | ❍ | ❍ | ❍ | ❍ |
| The program mentor(s) | ❍ | ❍ | ❍ | ❍ |
| Building college application or résumé | ❍ | ❍ | ❍ | ❍ |
| Networking opportunities | ❍ | ❍ | ❍ | ❍ |
| Interest in science, technology, engineering, or mathematics (STEM) | ❍ | ❍ | ❍ | ❍ |
| Interest in STEM careers with the Army | ❍ | ❍ | ❍ | ❍ |
| Having fun | ❍ | ❍ | ❍ | ❍ |
| Earning stipend or award while doing STEM | ❍ | ❍ | ❍ | ❍ |
| Opportunity to do something with friends | ❍ | ❍ | ❍ | ❍ |
| Opportunity to use advanced laboratory technology | ❍ | ❍ | ❍ | ❍ |
| Desire to expand laboratory or research skills | ❍ | ❍ | ❍ | ❍ |
| Learning in ways that are not possible in school | ❍ | ❍ | ❍ | ❍ |
| Serving the community or country | ❍ | ❍ | ❍ | ❍ |
| Parent encouragement | ❍ | ❍ | ❍ | ❍ |
| Exploring a unique work environment | ❍ | ❍ | ❍ | ❍ |
| Other, (specify) | ❍ | ❍ | ❍ | ❍ |

**Q13. 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 |
|---|---|---|---|---|---|
| Learn about new science, technology, engineering, or mathematics (STEM) topics | ❍ | ❍ | ❍ | ❍ | ❍ |
| Apply STEM knowledge to real life situations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Learn about cutting-edge STEM research | ❍ | ❍ | ❍ | ❍ | ❍ |
| Learn about different STEM careers | ❍ | ❍ | ❍ | ❍ | ❍ |
| Interact with STEM professionals | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q14. How often did you do each of the following in UNITE this year?**

| | Not at all | At least once | A few times | Most days | Every day |
|---|---|---|---|---|---|
| Learn about new science, technology, engineering, or mathematics (STEM) topics | ❍ | ❍ | ❍ | ❍ | ❍ |
| Apply STEM knowledge to real life situations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Learn about cutting-edge STEM research | ❍ | ❍ | ❍ | ❍ | ❍ |
| Learn about different STEM careers | ❍ | ❍ | ❍ | ❍ | ❍ |
| Interact with STEM professionals | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q15. 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 |
|---|---|---|---|---|---|
| Practice using laboratory or field techniques, procedures, and tools | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participate in hands-on STEM activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Work as part of a team | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicate with other students about STEM | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q16. How often did you do each of the following in UNITE this year?**

| | Not at all | At least once | A few times | Most days | Every day |
|---|---|---|---|---|---|
| Practice using laboratory or field techniques, procedures, and tools | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participate in hands-on STEM activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Work as part of a team | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicate with other students about STEM | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q17. 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 |
|---|---|---|---|---|---|
| Pose questions or problems to investigate | ❍ | ❍ | ❍ | ❍ | ❍ |
| Design an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Carry out an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Analyze and interpret data or information | ❍ | ❍ | ❍ | ❍ | ❍ |
| Draw conclusions from an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Come up with creative explanations or solutions | ❍ | ❍ | ❍ | ❍ | ❍ |
| Build (or simulate) something | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q18. How often did you do each of the following in UNITE this year?**

| | Not at all | At least once | A few times | Most days | Every day |
|---|---|---|---|---|---|
| Pose questions or problems to investigate | ❍ | ❍ | ❍ | ❍ | ❍ |
| Design an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Carry out an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Analyze and interpret data or information | ❍ | ❍ | ❍ | ❍ | ❍ |
| Draw conclusions from an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Come up with creative explanations or solutions | ❍ | ❍ | ❍ | ❍ | ❍ |
| Build (or simulate) something | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q19. The list below describes mentoring strategies that are effective ways to support STEM learners. From the list below, please indicate which strategies that your mentor(s) used when working directly with you in UNITE:**

| | No - my mentor did not use this strategy with me | Yes - my mentor used this strategy with me |
|---|---|---|
| Helped me become aware of the roles STEM play in my everyday life | ❍ | ❍ |
| Helped me understand how STEM can help me improve my community | ❍ | ❍ |
| Used teaching/mentoring activities that addressed my learning style | ❍ | ❍ |
| Provided me with extra support when I needed it | ❍ | ❍ |
| Encouraged me to exchange ideas with others whose backgrounds or viewpoints are different from mine | ❍ | ❍ |
| Allowed me to work on a collaborative project as a member of a team | ❍ | ❍ |
| Helped me practice a variety of STEM skills with supervision | ❍ | ❍ |
| Gave me constructive feedback to improve my STEM knowledge, skills, or abilities | ❍ | ❍ |
| Gave me guidance about educational pathways that would prepare me for a STEM career | ❍ | ❍ |
| Recommended Army Educational Outreach Programs that match my interests | ❍ | ❍ |
| Discussed STEM career opportunities with DoD or other government agencies | ❍ | ❍ |

**Q20. Rate how the following items impacted your awareness of Army Educational Outreach Programs (AEOPs) during UNITE:**

| | Did not experience | Not at all | A little | Somewhat | Very much |
|---|---|---|---|---|---|
| Technology Student Association website | ❍ | ❍ | ❍ | ❍ | ❍ |
| Army Educational Outreach Program (AEOP) website | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP social media | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP brochure | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP instructional supplies (Rite in the Rain notebook, Lab Coat, etc.) | ❍ | ❍ | ❍ | ❍ | ❍ |
| My mentor(s) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Invited speakers or "career" events | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participation in UNITE | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q21. Rate how the following items impacted your awareness of Department of Defense (DoD) STEM careers during UNITE:**

| | Did not experience | Not at all | A little | Somewhat | Very much |
|---|---|---|---|---|---|
| Technology Student Association website | ❍ | ❍ | ❍ | ❍ | ❍ |
| Army Educational Outreach Program (AEOP) website | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP social media | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP brochure | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP instructional supplies (Rite in the Rain notebook, Lab Coat, etc.) | ❍ | ❍ | ❍ | ❍ | ❍ |
| My mentor(s) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Invited speakers or "career" events | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participation in UNITE | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q22. How SATISFIED were you with each of the following UNITE program features?**

| | Did not experience | Not at all | A little | Somewhat | Very much |
|---|---|---|---|---|---|
| Application or registration process | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communications from Technology Student Association | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communications from [site personnel] | ❍ | ❍ | ❍ | ❍ | ❍ |
| Location(s) of program activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Availability of program topics or fields that interest you | ❍ | ❍ | ❍ | ❍ | ❍ |
| Instruction or mentorship during program activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participation stipends (payment) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Online educational resources used or provided during program activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Invited speakers or "career" events | ❍ | ❍ | ❍ | ❍ | ❍ |
| Field trips or tours | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q23. Which category best describes the focus of your UNITE experience?**

❍ Science
❍ Technology
❍ Engineering
❍ Mathematics

**Q24. 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 |
|---|---|---|---|---|---|
| Knowledge of a STEM topic or field in depth | ❍ | ❍ | ❍ | ❍ | ❍ |
| 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 | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q25. AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas? **Only presented to respondents who selected "science" in Q23****

| | No gain | A little gain | Some gain | Large gain | Extreme gain |
|---|---|---|---|---|---|
| Asking questions based on observations of real-world phenomena | ❍ | ❍ | ❍ | ❍ | ❍ |
| Asking a question (about a phenomenon) that can be answered with one or more investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Applying knowledge, logic, and creativity to propose explanations that can be tested with investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Making a model to represent the key features and functions of an observed phenomenon | ❍ | ❍ | ❍ | ❍ | ❍ |
| Deciding what type of data to collect in order to answer a question | ❍ | ❍ | ❍ | ❍ | ❍ |
| Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected | ❍ | ❍ | ❍ | ❍ | ❍ |
| Carrying out procedures for an investigation and recording data accurately | ❍ | ❍ | ❍ | ❍ | ❍ |
| Testing how changing one variable affects another variable | ❍ | ❍ | ❍ | ❍ | ❍ |
| Considering different ways to analyze or interpret data when answering a question | ❍ | ❍ | ❍ | ❍ | ❍ |
| Displaying numeric data from an investigation in charts or graphs to identify patterns and relationships | ❍ | ❍ | ❍ | ❍ | ❍ |
| Using mathematics to analyze numeric data | ❍ | ❍ | ❍ | ❍ | ❍ |
| Supporting a proposed explanation (for a phenomenon) with data from investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Supporting a proposed explanation with relevant scientific, mathematical, and/or engineering knowledge | ❍ | ❍ | ❍ | ❍ | ❍ |
| Using data from investigations to defend an argument that conveys how an explanation describes an observed phenomenon | ❍ | ❍ | ❍ | ❍ | ❍ |
| Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicating information about your investigations and explanations in different formats (orally, written, graphically, mathematically) | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q26. AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas? **Only presented to respondents who selected "technology," "engineering," or "mathematics" in Q23****

| | No gain | A little gain | Some gain | Large gain | Extreme gain |
|---|---|---|---|---|---|
| Identifying real-world problems based on social, technological, or environmental issues | ❍ | ❍ | ❍ | ❍ | ❍ |
| Defining a problem that can be solved by developing a new or improved object, process, or system | ❍ | ❍ | ❍ | ❍ | ❍ |
| Applying knowledge, logic, and creativity to propose solutions that can be tested with investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Making a model that represents the key features or functions of a solution to a problem | ❍ | ❍ | ❍ | ❍ | ❍ |
| Deciding what type of data to collect in order to test if a solution functions as intended | ❍ | ❍ | ❍ | ❍ | ❍ |
| Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected | ❍ | ❍ | ❍ | ❍ | ❍ |
| Carrying out procedures for an investigation and recording data accurately | ❍ | ❍ | ❍ | ❍ | ❍ |
| Testing how changing one variable affects another variable | ❍ | ❍ | ❍ | ❍ | ❍ |
| Considering different ways to analyze or interpret data | ❍ | ❍ | ❍ | ❍ | ❍ |
| Displaying numeric data in charts or graphs to identify patterns and relationships | ❍ | ❍ | ❍ | ❍ | ❍ |
| Using mathematics or computers to analyze numeric data | ❍ | ❍ | ❍ | ❍ | ❍ |
| Supporting a proposed solution (for a problem) with data from investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Supporting a proposed solution with relevant scientific, mathematical, and/or engineering knowledge | ❍ | ❍ | ❍ | ❍ | ❍ |
| Using data from investigations to defend an argument that conveys how a solution meets design criteria | ❍ | ❍ | ❍ | ❍ | ❍ |
| Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicating information about your design processes and/or solutions in different formats (orally, written, graphically, mathematically) | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q27. 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 |
|---|---|---|---|---|---|
| Sticking with a task until it is complete | ❍ | ❍ | ❍ | ❍ | ❍ |
| Making changes when things do not go as planned | ❍ | ❍ | ❍ | ❍ | ❍ |
| Working collaboratively with a team | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicating effectively with others | ❍ | ❍ | ❍ | ❍ | ❍ |
| Including others' perspectives when making decisions | ❍ | ❍ | ❍ | ❍ | ❍ |
| Sense of being part of a learning community | ❍ | ❍ | ❍ | ❍ | ❍ |
| Building relationships with professionals in a field | ❍ | ❍ | ❍ | ❍ | ❍ |
| Connecting a topic or field and your personal values | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q28. 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 |
|---|---|---|---|---|---|
| Interest in a new STEM topic or field | ❍ | ❍ | ❍ | ❍ | ❍ |
| Clarifying a STEM career path | ❍ | ❍ | ❍ | ❍ | ❍ |
| Sense of accomplishing something in STEM | ❍ | ❍ | ❍ | ❍ | ❍ |
| Building academic credentials in STEM | ❍ | ❍ | ❍ | ❍ | ❍ |
| Feeling prepared for more challenging STEM activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Confidence to do well in future STEM courses | ❍ | ❍ | ❍ | ❍ | ❍ |
| Confidence to contribute to STEM | ❍ | ❍ | ❍ | ❍ | ❍ |
| Thinking creatively about a STEM project or activity | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q29. 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 |
|---|---|---|---|---|---|
| Visit a science museum or zoo | ❍ | ❍ | ❍ | ❍ | ❍ |
| Watch or read non-fiction STEM | ❍ | ❍ | ❍ | ❍ | ❍ |
| Look up STEM information at a library or on the internet | ❍ | ❍ | ❍ | ❍ | ❍ |
| Tinker (play) with a mechanical or electrical device | ❍ | ❍ | ❍ | ❍ | ❍ |
| Work on solving mathematical or scientific puzzles | ❍ | ❍ | ❍ | ❍ | ❍ |
| Design a computer program or website | ❍ | ❍ | ❍ | ❍ | ❍ |
| Observe things in nature (plant growth, animal behavior, stars or planets, etc.) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Talk with friends or family about STEM | ❍ | ❍ | ❍ | ❍ | ❍ |
| Mentor or teach other students about STEM | ❍ | ❍ | ❍ | ❍ | ❍ |
| Help with a community service project that relates to STEM | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participate in a STEM club, student association, or professional organization | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participate in STEM camp, fair, or competition | ❍ | ❍ | ❍ | ❍ | ❍ |
| Take an elective (not required) STEM class | ❍ | ❍ | ❍ | ❍ | ❍ |
| Work on a STEM project or experiment in a university or professional setting | ❍ | ❍ | ❍ | ❍ | ❍ |
| Receive an award or special recognition for STEM accomplishments | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q30. How far did you want to go in school BEFORE participating in UNITE?**

❍ 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

**Q31. How far do you want to go in school AFTER participating in UNITE?**

- ❍ 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

**Q32. 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)**

- ❍ Undecided
- ❍ Science (no specific subject)
- ❍ Physical science (e.g., physics, chemistry, astronomy, materials science)
- ❍ Biological science
- ❍ Earth, atmospheric or oceanic science
- ❍ Agricultural science
- ❍ Environmental science
- ❍ Computer science
- ❍ Technology
- ❍ Engineering
- ❍ Mathematics or statistics
- ❍ Teaching, STEM
- ❍ Teaching, non-STEM
- ❍ Medicine (e.g., doctor, dentist, veterinarian, etc.)
- ❍ Health (e.g., nursing, pharmacy, technician, etc.)
- ❍ Social science (e.g., psychologist, sociologist)
- ❍ Business
- ❍ Law
- ❍ English/language arts
- ❍ Farming
- ❍ Military, police, or security
- ❍ Art (e.g., writing, dancing, painting, etc.)
- ❍ Skilled trade (carpenter, electrician, plumber, etc.)

Other _____

**Q33. 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 AFTER UNITE)**

- ❍ Undecided
- ❍ Science (no specific subject)
- ❍ Physical science (e.g., physics, chemistry, astronomy, materials science)
- ❍ Biological science
- ❍ Earth, atmospheric or oceanic science
- ❍ Agricultural science
- ❍ Environmental science
- ❍ Computer science
- ❍ Technology
- ❍ Engineering
- ❍ Mathematics or statistics
- ❍ Teaching, STEM
- ❍ Teaching, non-STEM
- ❍ Medicine (e.g., doctor, dentist, veterinarian, etc.)
- ❍ Health (e.g., nursing, pharmacy, technician, etc.)
- ❍ Social science (e.g., psychologist, sociologist)
- ❍ Business
- ❍ Law
- ❍ English/language arts
- ❍ Farming
- ❍ Military, police, or security
- ❍ Art (e.g., writing, dancing, painting, etc.)
- ❍ Skilled trade (carpenter, electrician, plumber, etc.)

Other _____

**Q34. When you are 30, to what extent do you expect to use your STEM knowledge, skills, and/or abilities in your work?**

- ❍ 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

**Q35. How many times have you participated in any of the following Army Educational Outreach Programs (AEOPs)?**
**If you have heard of an AEOP but never participated select "Never". If you have not heard of an AEOP select "Never heard of it".**

| | Never | Once | Twice | Three or more times | Never heard of it |
|---|---|---|---|---|---|
| Camp Invention | ❍ | ❍ | ❍ | ❍ | ❍ |
| eCYBERMISSION | ❍ | ❍ | ❍ | ❍ | ❍ |
| Junior Solar Sprint (JSS) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Engineering Encounters Bridge Design Contest (EEBDC)-formerly West Point Bridge Design Contest | ❍ | ❍ | ❍ | ❍ | ❍ |
| Junior Science & Humanities Symposium | ❍ | ❍ | ❍ | ❍ | ❍ |
| Gains in the Education of Mathematics and Science (GEMS) | ❍ | ❍ | ❍ | ❍ | ❍ |
| GEMS Near Peers | ❍ | ❍ | ❍ | ❍ | ❍ |
| UNITE | ❍ | ❍ | ❍ | ❍ | ❍ |
| Science & Engineering Apprenticeship Program (SEAP) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Research & Engineering Apprenticeship Program (REAP) | ❍ | ❍ | ❍ | ❍ | ❍ |
| High School Apprenticeship Program (HSAP) | ❍ | ❍ | ❍ | ❍ | ❍ |
| College Qualified Leaders (CQL) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Undergraduate Research Apprenticeship Program (URAP) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Science Mathematics, and Research for Transformation (SMART) College Scholarship | ❍ | ❍ | ❍ | ❍ | ❍ |
| National Defense Science & Engineering Graduate (NDSEG) Fellowship | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q36. How interested are you in participating in the following programs in the future?**

| | Not at all | A little | Somewhat | Very much |
|---|---|---|---|---|
| Camp Invention | ❍ | ❍ | ❍ | ❍ |
| eCYBERMISSION | ❍ | ❍ | ❍ | ❍ |
| Junior Solar Sprint (JSS) | ❍ | ❍ | ❍ | ❍ |
| Engineering Encounters Bridge Design Contest (EEBDC)-formerly West Point Bridge Design Contest | ❍ | ❍ | ❍ | ❍ |
| Junior Science & Humanities Symposium | ❍ | ❍ | ❍ | ❍ |
| Gains in the Education of Mathematics and Science (GEMS) | ❍ | ❍ | ❍ | ❍ |
| GEMS Near Peers | ❍ | ❍ | ❍ | ❍ |
| UNITE | ❍ | ❍ | ❍ | ❍ |
| Science & Engineering Apprenticeship Program (SEAP) | ❍ | ❍ | ❍ | ❍ |
| Research & Engineering Apprenticeship Program (REAP) | ❍ | ❍ | ❍ | ❍ |
| High School Apprenticeship Program (HSAP) | ❍ | ❍ | ❍ | ❍ |
| College Qualified Leaders (CQL) | ❍ | ❍ | ❍ | ❍ |
| Undergraduate Research Apprenticeship Program (URAP) | ❍ | ❍ | ❍ | ❍ |
| Science Mathematics, and Research for Transformation (SMART) College Scholarship | ❍ | ❍ | ❍ | ❍ |
| National Defense Science & Engineering Graduate (NDSEG) Fellowship | ❍ | ❍ | ❍ | ❍ |

**Q37. How many jobs/careers in science, technology, engineering, or math (STEM) did you learn about during UNITE?**

❍ None
❍ 1
❍ 2
❍ 3
❍ 4
❍ 5 or more

**Q38. How many Department of Defense (DoD) STEM jobs/careers did you learn about during UNITE?**

- ❍ None
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5 or more

**Q39. Rate 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 |
|---|---|---|---|---|---|
| DoD researchers advance science and engineering fields | ❍ | ❍ | ❍ | ❍ | ❍ |
| DoD researchers develop new, cutting edge technologies | ❍ | ❍ | ❍ | ❍ | ❍ |
| DoD researchers support non-defense related advancements in science and technology | ❍ | ❍ | ❍ | ❍ | ❍ |
| DoD researchers solve real-world problems | ❍ | ❍ | ❍ | ❍ | ❍ |
| DoD research is valuable to society | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q40. Which of the following statements describe you after participating in UNITE?**

| | 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 attending college | ❍ | ❍ | ❍ | ❍ |
| I am more interested in earning a STEM degree in college | ❍ | ❍ | ❍ | ❍ |
| I am more interested in pursuing a STEM career | ❍ | ❍ | ❍ | ❍ |
| I am more aware of DoD STEM research and careers | ❍ | ❍ | ❍ | ❍ |
| I have a greater appreciation of DoD STEM research and careers | ❍ | ❍ | ❍ | ❍ |
| I am more interested in pursuing a STEM career with the DoD | ❍ | ❍ | ❍ | ❍ |

**Q41. What are the three most important ways that you have benefited from UNITE?**

Benefit #1:

Benefit #2:

Benefit #3:

**Q42. What are the three ways that UNITE should be improved for future participants?**

Improvement #1:

Improvement #2:

Improvement #3:

**Q43. Tell us about your overall satisfaction with your UNITE experience.**

| 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) (Avg. = 10.19, SD = 0.40) | | |
|---|---|---|
| | **Freq.** | **%** |
| **4th** | 0 | 0% |
| **5th** | 0 | 0% |
| **6th** | 0 | 0% |
| **7th** | 0 | 0% |
| **8th** | 0 | 0% |
| **9th** | 0 | 0% |
| **10th** | 92 | 80% |
| **11th** | 22 | 19% |
| **12th** | 0 | 0% |
| **College freshman** | 0 | 0% |
| **College sophomore** | 0 | 0% |
| **College junior** | 0 | 0% |
| **College senior** | 0 | 0% |
| **Graduate program** | 0 | 0% |
| **Other, (specify):** | 0 | 0% |
| **Choose not to report** | 1 | 1% |
| **Total** | **115** | **100%** |

| What is your gender? | | |
|---|---|---|
| | **Freq.** | **%** |
| **Male** | 40 | 35% |
| **Female** | 69 | 61% |
| **Choose not to report** | 5 | 4% |
| **Total** | **114** | **100%** |

| What is your race or ethnicity? | | |
|---|---|---|
| | **Freq.** | **%** |
| **Hispanic or Latino** | 21 | 18% |
| **Asian** | 5 | 4% |

| | | |
|---|---|---|
| **Black or African American** | 61 | 53% |
| **Native American or Alaska Native** | 20 | 17% |
| **Native Hawaiian or Other Pacific Islander** | 0 | 0% |
| **White** | 6 | 5% |
| **Other race or ethnicity, (specify):** | 2 | 2% |
| **Choose not to report** | 1 | 1% |
| **Total** | **116** | **100%** |

**Note.** Other = "Black & Haitian", and "Jewish/Middle Eastern".

| **Do you qualify for free or reduced lunches at school?** | | |
|---|---|---|
| | **Freq.** | **%** |
| **Yes** | 62 | 53% |
| **No** | 43 | 37% |
| **Choose not to report** | 11 | 9% |
| **Total** | **116** | **100%** |

| **Which best describes the location of your school?** | | |
|---|---|---|
| | **Freq.** | **%** |
| **Frontier or tribal school** | 18 | 16% |
| **Rural (country)** | 6 | 5% |
| **Suburban** | 28 | 24% |
| **Urban (city)** | 64 | 55% |
| **Total** | **116** | **100%** |

| **What kind of school do you attend?** | | |
|---|---|---|
| | **Freq.** | **%** |
| **Public school** | 91 | 78% |
| **Private school** | 24 | 21% |
| **Home school** | 1 | 1% |
| **Online school** | 0 | 0% |
| **Department of Defense school (DoDDS or DoDEA)** | 0 | 0% |
| **Total** | **116** | **100%** |

| Where was the UNITE program located? | | |
|---|---|---|
| | Freq. | % |
| Alabama State University | 8 | 7% |
| Florida International University | 0 | 0% |
| Jackson State University | 10 | 9% |
| New Jersey Institute of Technology | 20 | 17% |
| Savannah State University | 11 | 9% |
| South Dakota School of Mines and Technology | 21 | 18% |
| University of Colorado, Colorado Springs | 12 | 10% |
| University of New Mexico | 2 | 2% |
| University of Pennsylvania | 12 | 10% |
| Xavier University of Louisiana | 20 | 17% |
| Total | 116 | 100% |

| How did you learn about UNITE? (Check all that apply) | | | | | | |
|---|---|---|---|---|---|---|
| | Freq. | % | | | Freq. | % |
| Technology Student Association website | 7 | 6% | | Extended family member (grandparents, aunts, uncles, cousins) | 3 | 3% |
| Army Educational Outreach Program (AEOP) website | 19 | 16% | | Friend of the family | 8 | 7% |
| Facebook, Twitter, Pinterest, or other social media | 2 | 2% | | Teacher or professor | 24 | 21% |
| School or university newsletter, email, or website | 40 | 34% | | Guidance counselor | 6 | 5% |
| News story or other media coverage | 0 | 0% | | Mentor from UNITE | 24 | 21% |
| Past participant of UNITE | 12 | 10% | | Someone who works at an Army laboratory | 0 | 0% |
| Friend | 15 | 13% | | Someone who works with the Department of Defense | 0 | 0% |
| Immediate family member (mother, father, siblings) | 18 | 16% | | Other, (specify): | 15 | 13% |

**Note.** Other = “Pre-Collegiate Development Program” (n=3), “Gear up program” (n = 3), “Upward Bound” (n = 2), “through the summer mentor ship program” (n = 2), "My Godmother”, “Principle”, “I was chosen to participate through my summer program, LEAP”, and “camp”.

| How motivating were the following factors in your decision to participate in UNITE? | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | n | Avg. | SD |
| **Teacher or professor encouragement** | 19 (17%) | 12 (10%) | 32 (28%) | 52 (45%) | 115 | **3.02** | 1.11 |
| **An academic requirement or school grade** | 39 (34%) | 11 (9%) | 27 (23%) | 39 (34%) | 116 | **2.57** | 1.27 |
| **Desire to learn something new or interesting** | 6 (5%) | 6 (5%) | 27 (23%) | 76 (66%) | 115 | **3.50** | 0.82 |
| **The program mentor(s)** | 19 (17%) | 21 (18%) | 38 (33%) | 37 (32%) | 115 | **2.81** | 1.07 |
| **Building college application or résumé** | 11 (9%) | 16 (14%) | 30 (26%) | 59 (51%) | 116 | **3.18** | 1.00 |
| **Networking opportunities** | 13 (11%) | 15 (13%) | 44 (38%) | 44 (38%) | 116 | **3.03** | 0.98 |
| **Interest in science, technology, engineering, or mathematics (STEM)** | 7 (6%) | 9 (8%) | 28 (24%) | 72 (62%) | 116 | **3.42** | 0.88 |
| **Interest in STEM careers with the Army** | 29 (25%) | 24 (21%) | 40 (34%) | 23 (20%) | 116 | **2.49** | 1.08 |
| **Having fun** | 4 (3%) | 11 (9%) | 29 (25%) | 72 (62%) | 116 | **3.46** | 0.81 |
| **Earning stipend or award while doing STEM** | 18 (16%) | 15 (13%) | 27 (23%) | 55 (48%) | 115 | **3.03** | 1.12 |
| **Opportunity to do something with friends** | 15 (13%) | 12 (10%) | 28 (24%) | 60 (52%) | 115 | **3.16** | 1.06 |
| **Opportunity to use advanced laboratory technology** | 8 (7%) | 20 (17%) | 30 (26%) | 57 (50%) | 115 | **3.18** | 0.96 |
| **Desire to expand laboratory or research skills** | 9 (8%) | 24 (21%) | 30 (26%) | 52 (45%) | 115 | **3.09** | 0.99 |
| **Learning in ways that are not possible in school** | 5 (4%) | 12 (10%) | 28 (24%) | 70 (61%) | 115 | **3.42** | 0.85 |
| **Serving the community or country** | 21 (18%) | 25 (22%) | 35 (30%) | 35 (30%) | 116 | **2.72** | 1.08 |
| **Parent encouragement** | 7 (6%) | 16 (14%) | 32 (28%) | 59 (52%) | 114 | **3.25** | 0.92 |
| **Exploring a unique work environment** | 7 (6%) | 16 (14%) | 38 (33%) | 55 (47%) | 116 | **3.22** | 0.90 |
| **Other, (specify)** | 8 (24%) | 1 (3%) | 9 (27%) | 15 (45%) | 33 | **2.94** | 1.22 |

**Note.** Response scale: **1** = "Not at all," **2** = "A little," **3** = "Somewhat," **4** = "Very much". Other = "college preparation", "Experience", "Focusing on one subject", "getting a college campus experience", "My mother made me", "New Experience with fields never introduced before", "nothing better to do", and "to be prepared for the following school year".

| How often do you do each of the following in STEM classes at school this year? | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | n | Avg. | SD |
| **Learn about new science, technology, engineering, or mathematics (STEM) topics** | 9 (8%) | 5 (4%) | 25 (22%) | 32 (28%) | 44 (38%) | 115 | **3.84** | 1.21 |
| **Apply STEM knowledge to real life situations** | 14 (12%) | 11 (10%) | 30 (26%) | 33 (29%) | 27 (23%) | 115 | **3.42** | 1.28 |
| **Learn about cutting-edge STEM research** | 19 (17%) | 20 (18%) | 32 (28%) | 29 (26%) | 13 (12%) | 113 | **2.97** | 1.26 |
| **Learn about different STEM careers** | 17 (15%) | 13 (11%) | 30 (26%) | 31 (27%) | 24 (21%) | 115 | **3.28** | 1.32 |
| **Interact with STEM professionals** | 29 (25%) | 20 (17%) | 21 (18%) | 22 (19%) | 23 (20%) | 115 | **2.91** | 1.48 |

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

| How often do you do each of the following in UNITE this year? | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | n | Avg. | SD |
| **Learn about new science, technology, engineering, or mathematics (STEM) topics** | 2 (2%) | 6 (5%) | 11 (10%) | 38 (33%) | 57 (50%) | 114 | **4.25** | 0.96 |
| **Apply STEM knowledge to real life situations** | 4 (4%) | 12 (11%) | 24 (21%) | 40 (36%) | 32 (29%) | 112 | **3.75** | 1.09 |
| **Learn about cutting-edge STEM research** | 3 (3%) | 15 (13%) | 33 (29%) | 33 (29%) | 28 (25%) | 112 | **3.61** | 1.09 |
| **Learn about different STEM careers** | 3 (3%) | 10 (9%) | 28 (25%) | 41 (36%) | 32 (28%) | 114 | **3.78** | 1.04 |
| **Interact with STEM professionals** | 2 (2%) | 14 (12%) | 28 (25%) | 27 (24%) | 42 (37%) | 113 | **3.82** | 1.12 |

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

| How often do you do each of the following in STEM classes at school this year? | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | n | Avg. | SD |
| **Practice using laboratory or field techniques, procedures, and tools** | 20 (18%) | 13 (11%) | 42 (37%) | 20 (18%) | 20 (18%) | 114 | **3.04** | 1.29 |
| **Participate in hands-on STEM activities** | 20 (18%) | 14 (12%) | 34 (30%) | 30 (26%) | 20 (18%) | 114 | **3.07** | 1.29 |
| **Work as part of a team** | 11 (10%) | 7 (6%) | 24 (21%) | 35 (31%) | 11 (10%) | 114 | **3.70** | 1.25 |
| **Communicate with other students about STEM** | 19 (17%) | 16 (14%) | 23 (20%) | 32 (28%) | 19 (17%) | 114 | **3.23** | 1.38 |

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

| How often do you do each of the following in UNITE this year? | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | n | Avg. | SD |
| **Practice using laboratory or field techniques, procedures, and tools** | 4 (4%) | 8 (7%) | 26 (23%) | 34 (30%) | 42 (37%) | 114 | **3.89** | 1.09 |
| **Participate in hands-on STEM activities** | 3 (3%) | 7 (6%) | 17 (15%) | 31 (27%) | 56 (49%) | 114 | **4.14** | 1.05 |
| **Work as part of a team** | 3 (3%) | 3 (3%) | 12 (11%) | 28 (25%) | 68 (60%) | 114 | **4.36** | 0.96 |
| **Communicate with other students about STEM** | 3 (3%) | 8 (7%) | 15 (13%) | 32 (28%) | 56 (49%) | 114 | **4.14** | 1.06 |

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

| How often do you do each of the following in STEM classes at school this year? | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | n | Avg. | SD |
| **Pose questions or problems to investigate** | 14 (13%) | 16 (14%) | 39 (35%) | 24 (21%) | 19 (17%) | 112 | **3.16** | 1.23 |
| **Design an investigation** | 19 (17%) | 24 (21%) | 35 (31%) | 19 (17%) | 16 (14%) | 113 | **2.90** | 1.27 |
| **Carry out an investigation** | 19 (17%) | 20 (18%) | 34 (30%) | 21 (19%) | 19 (17%) | 113 | **3.01** | 1.31 |
| **Analyze and interpret data or information** | 13 (12%) | 15 (13%) | 34 (30%) | 27 (24%) | 24 (21%) | 113 | **3.30** | 1.27 |
| **Draw conclusions from an investigation** | 18 (16%) | 14 (12%) | 32 (28%) | 30 (27%) | 19 (17%) | 113 | **3.16** | 1.30 |
| **Come up with creative explanations or solutions** | 12 (11%) | 14 (12%) | 38 (34%) | 23 (20%) | 26 (23%) | 113 | **3.33** | 1.26 |
| **Build (or simulate) something** | 17 (15%) | 24 (21%) | 25 (22%) | 22 (20%) | 24 (21%) | 112 | **3.11** | 1.37 |

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

| How often do you do each of the following in UNITE this year? | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | n | Avg. | SD |
| **Pose questions or problems to investigate** | 5 (4%) | 15 (13%) | 20 (18%) | 38 (34%) | 35 (31%) | 113 | **3.73** | 1.17 |
| **Design an investigation** | 7 (6%) | 17 (15%) | 21 (19%) | 33 (29%) | 34 (30%) | 112 | **3.63** | 1.24 |
| **Carry out an investigation** | 7 (6%) | 14 (12%) | 22 (19%) | 34 (30%) | 36 (32%) | 113 | **3.69** | 1.22 |
| **Analyze and interpret data or information** | 5 (4%) | 18 (16%) | 19 (17%) | 35 (31%) | 36 (32%) | 113 | **3.70** | 1.20 |
| **Draw conclusions from an investigation** | 5 (4%) | 14 (12%) | 22 (19%) | 32 (28%) | 40 (35%) | 113 | **3.78** | 1.19 |
| **Come up with creative explanations or solutions** | 4 (4%) | 17 (15%) | 16 (14%) | 33 (29%) | 42 (38%) | 112 | **3.82** | 1.19 |
| **Build (or simulate) something** | 3 (3%) | 15 (13%) | 15 (13%) | 26 (23%) | 53 (47%) | 112 | **3.99** | 1.18 |

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

| The list below describes instructional and mentoring strategies that are effective ways to support STEM learners. From the list below, please indicate which strategies your mentor(s) used when working directly with you in UNITE: | | | | | |
|---|---|---|---|---|---|
| | | Yes - my mentor(s) used this strategy with me | | No - my mentor(s) did not use this strategy with me | |
| | n | Freq. | % | Freq. | % |
| **Helped me become aware of the roles STEM play in my everyday life** | 112 | 96 | 86% | 16 | 14% |
| **Helped me understand how STEM can help me improve my community** | 112 | 97 | 87% | 15 | 13% |

| | | | | | |
|---|---|---|---|---|---|
| **Used teaching/mentoring activities that addressed my learning style** | 111 | 86 | 77% | 25 | 23% |
| **Provided me with extra support when I needed it** | 112 | 100 | 89% | 12 | 11% |
| **Encouraged me to exchange ideas with others whose backgrounds or viewpoints are different from mine** | 112 | 96 | 86% | 16 | 14% |
| **Allowed me to work on a collaborative project as a member of a team** | 111 | 108 | 97% | 3 | 3% |
| **Helped me practice a variety of STEM skills with supervision** | 112 | 97 | 87% | 15 | 13% |
| **Gave me constructive feedback to improve my STEM knowledge, skills, or abilities** | 112 | 94 | 84% | 18 | 16% |
| **Gave me guidance about educational pathways that would prepare me for a STEM career** | 112 | 97 | 87% | 15 | 13% |
| **Recommended Army Educational Outreach Programs that match my interests** | 113 | 78 | 70% | 33 | 30% |
| **Discussed STEM career opportunities with DoD or other government agencies** | 112 | 82 | 73% | 30 | 27% |

| **Rate how the following items impacted your awareness of Army Educational Outreach Programs (AEOPs) during UNITE:** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **n** | **Avg.** | **SD** |
| **Technology Student Association website** | 41 (36%) | 10 (9%) | 25 (22%) | 17 (15%) | 20 (18%) | 113 | **2.65** | 1.04 |
| **Army Educational Outreach Program (AEOP) website** | 30 (27%) | 8 (7%) | 25 (23%) | 20 (18%) | 28 (25%) | 111 | **2.84** | 1.02 |
| **AEOP social media** | 32 (29%) | 16 (14%) | 19 (17%) | 22 (20%) | 23 (21%) | 112 | **2.65** | 1.10 |
| **AEOP brochure** | 13 (12%) | 10 (9%) | 25 (22%) | 31 (28%) | 33 (29%) | 112 | **2.88** | 0.99 |
| **AEOP instructional supplies (Rite in the Rain notebook, Lab Coat, etc.)** | 20 (18%) | 11 (10%) | 24 (21%) | 29 (26%) | 29 (26%) | 113 | **2.82** | 1.01 |
| **My mentor(s)** | 5 (4%) | 3 (3%) | 23 (21%) | 31 (28%) | 50 (45%) | 112 | **3.20** | 0.87 |
| **Invited speakers or "career" events** | 5 (4%) | 3 (3%) | 22 (19%) | 27 (24%) | 56 (50%) | 113 | **3.26** | 0.88 |
| **Participation in UNITE** | 5 (5%) | 2 (2%) | 14 (13%) | 26 (24%) | 63 (57%) | 110 | **3.43** | 0.79 |

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

| Rate how the following items impacted your awareness of Department of Defense (DoD) STEM careers during UNITE: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | n | Avg. | SD |
| **Technology Student Association website** | 42 (37%) | 13 (12%) | 22 (19%) | 14 (12%) | 22 (19%) | 113 | **2.63** | 1.11 |
| **Army Educational Outreach Program (AEOP) website** | 36 (32%) | 10 (9%) | 25 (22%) | 23 (20%) | 19 (17%) | 113 | **2.66** | 0.99 |
| **AEOP social media** | 35 (31%) | 15 (13%) | 22 (19%) | 23 (20%) | 18 (16%) | 113 | **2.56** | 1.05 |
| **AEOP brochure** | 27 (24%) | 13 (12%) | 22 (19%) | 27 (24%) | 24 (21%) | 113 | **2.72** | 1.04 |
| **AEOP instructional supplies (Rite in the Rain notebook, Lab Coat, etc.)** | 29 (26%) | 14 (13%) | 22 (20%) | 28 (25%) | 19 (17%) | 112 | **2.63** | 1.02 |
| **My mentor(s)** | 20 (18%) | 9 (8%) | 13 (12%) | 30 (27%) | 41 (36%) | 113 | **3.11** | 0.98 |
| **Invited speakers or "career" events** | 17 (15%) | 6 (5%) | 20 (18%) | 25 (22%) | 45 (40%) | 113 | **3.14** | 0.96 |
| **Participation in UNITE** | 16 (14%) | 5 (4%) | 13 (12%) | 23 (21%) | 55 (49%) | 112 | **3.33** | 0.90 |

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

| How SATISFIED were you with each of the following UNITE program features? | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | n | Avg. | SD |
| **Application or registration process** | 5 (5%) | 6 (5%) | 17 (15%) | 43 (39%) | 39 (35%) | 110 | **3.10** | 0.87 |
| **Communications from Technology Student Association** | 15 (13%) | 4 (4%) | 17 (15%) | 35 (31%) | 41 (37%) | 112 | **3.16** | 0.86 |
| **Communications from [UNITE site]** | 2 (2%) | 6 (5%) | 13 (12%) | 31 (28%) | 59 (53%) | 111 | **3.31** | 0.89 |
| **Location(s) of program activities** | 1 (1%) | 4 (4%) | 17 (15%) | 38 (34%) | 52 (46%) | 112 | **3.24** | 0.84 |
| **Availability of program topics or fields that interest you** | 1 (1%) | 9 (8%) | 17 (15%) | 34 (30%) | 51 (46%) | 112 | **3.14** | 0.96 |
| **Instruction or mentorship during program activities** | 2 (2%) | 4 (4%) | 12 (11%) | 33 (29%) | 61 (54%) | 112 | **3.37** | 0.82 |
| **Participation stipends (payment)** | 3 (3%) | 4 (4%) | 11 (10%) | 17 (15%) | 76 (68%) | 111 | **3.53** | 0.83 |
| **Online educational resources used or provided during program activities** | 6 (5%) | 9 (8%) | 18 (16%) | 28 (25%) | 50 (45%) | 111 | **3.13** | 0.99 |
| **Invited speakers or "career" events** | 1 (1%) | 3 (3%) | 14 (13%) | 34 (30%) | 60 (54%) | 112 | **3.36** | 0.81 |
| **Field trips or tours** | 10 (9%) | 10 (9%) | 9 (8%) | 23 (21%) | 60 (54%) | 112 | **3.30** | 0.99 |

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

| Which category best describes the focus of your UNITE experience? | | |
|---|---|---|
| | Freq. | % |
| **Science** | 22 | 22% |
| **Technology** | 21 | 21% |

| | | |
|---|---|---|
| **Engineering** | 46 | 45% |
| **Mathematics** | 13 | 13% |
| **Total** | **102** | **100%** |

| **AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **n** | **Avg.** | **SD** |
| **Knowledge of a STEM topic or field in depth** | 5 (5%) | 4 (4%) | 33 (30%) | 45 (41%) | 22 (20%) | 109 | **3.69** | 0.99 |
| **Knowledge of research conducted in a STEM topic or field** | 3 (3%) | 13 (12%) | 26 (24%) | 49 (45%) | 18 (17%) | 109 | **3.61** | 0.99 |
| **Knowledge of research processes, ethics, and rules for conduct in STEM** | 6 (6%) | 12 (11%) | 31 (29%) | 38 (35%) | 21 (19%) | 108 | **3.52** | 1.10 |
| **Knowledge of how professionals work on real problems in STEM** | 2 (2%) | 9 (8%) | 24 (22%) | 39 (36%) | 35 (32%) | 109 | **3.88** | 1.02 |
| **Knowledge of what everyday research work is like in STEM** | 4 (4%) | 8 (7%) | 29 (27%) | 35 (32%) | 32 (30%) | 108 | **3.77** | 1.07 |

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

| **AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **n** | **Avg.** | **SD** |
| **Asking questions based on observations of real-world phenomena** | 2 (10%) | 5 (24%) | 7 (33%) | 6 (29%) | 1 (5%) | 21 | **2.95** | 1.07 |
| **Asking a question (about a phenomenon) that can be answered with one or more investigations** | 2 (10%) | 2 (10%) | 8 (38%) | 6 (29%) | 3 (14%) | 21 | **3.29** | 1.15 |
| **Applying knowledge, logic, and creativity to propose explanations that can be tested with investigations** | 1 (5%) | 3 (14%) | 9 (43%) | 5 (24%) | 3 (14%) | 21 | **3.29** | 1.06 |
| **Making a model to represent the key features and functions of an observed phenomenon** | 2 (10%) | 2 (10%) | 11 (52%) | 5 (24%) | 1 (5%) | 21 | **3.05** | 0.97 |
| **Deciding what type of data to collect in order to answer a question** | 1 (5%) | 3 (14%) | 9 (43%) | 6 (29%) | 2 (10%) | 21 | **3.24** | 1.00 |
| **Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected** | 1 (5%) | 4 (19%) | 6 (29%) | 7 (33%) | 3 (14%) | 21 | **3.33** | 1.11 |
| **Carrying out procedures for an investigation and recording data accurately** | 1 (5%) | 3 (15%) | 7 (35%) | 6 (30%) | 3 (15%) | 20 | **3.35** | 1.09 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Testing how changing one variable affects another variable** | 2 (10%) | 2 (10%) | 8 (40%) | 4 (20%) | 4 (20%) | 20 | **3.30** | 1.22 |
| **Considering different ways to analyze or interpret data when answering a question** | 2 (10%) | 4 (20%) | 4 (20%) | 5 (25%) | 5 (25%) | 20 | **3.35** | 1.35 |
| **Displaying numeric data from an investigation in charts or graphs to identify patterns and relationships** | 2 (11%) | 3 (16%) | 6 (32%) | 4 (21%) | 4 (21%) | 19 | **3.26** | 1.28 |
| **Using mathematics to analyze numeric data** | 1 (5%) | 4 (20%) | 6 (30%) | 5 (25%) | 4 (20%) | 20 | **3.35** | 1.18 |
| **Supporting a proposed explanation (for a phenomenon) with data from investigations** | 3 (15%) | 3 (15%) | 3 (15%) | 7 (35%) | 4 (20%) | 20 | **3.30** | 1.38 |
| **Supporting a proposed explanation with relevant scientific, mathematical, and/or engineering knowledge** | 1 (5%) | 3 (14%) | 8 (38%) | 7 (33%) | 2 (10%) | 21 | **3.29** | 1.01 |
| **Using data from investigations to defend an argument that conveys how an explanation describes an observed phenomenon** | 3 (14%) | 4 (19%) | 8 (38%) | 2 (10%) | 4 (19%) | 21 | **3.00** | 1.30 |
| **Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds** | 4 (19%) | 2 (10%) | 6 (29%) | 8 (38%) | 1 (5%) | 21 | **3.00** | 1.22 |
| **Communicating information about your investigations and explanations in different formats (orally, written, graphically, mathematically)** | 2 (10%) | 2 (10%) | 9 (45%) | 4 (20%) | 3 (15%) | 20 | **3.20** | 1.15 |

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

| **AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **n** | **Avg.** | **SD** |
| **Identifying real-world problems based on social, technological, or environmental issues** | 1 (1%) | 13 (16%) | 20 (25%) | 35 (44%) | 10 (13%) | 79 | **3.51** | 0.96 |
| **Defining a problem that can be solved by developing a new or improved object, process, or system** | 1 (1%) | 12 (15%) | 16 (20%) | 34 (43%) | 17 (21%) | 80 | **3.68** | 1.02 |
| **Applying knowledge, logic, and creativity to propose solutions that can be tested with investigations** | 2 (3%) | 7 (9%) | 13 (16%) | 37 (47%) | 20 (25%) | 79 | **3.84** | 0.99 |
| **Making a model that represents the key features or functions of a solution to a problem** | 0 (0%) | 5 (6%) | 21 (27%) | 28 (35%) | 25 (32%) | 79 | **3.92** | 0.92 |
| **Deciding what type of data to collect in order to test if a solution functions as intended** | 1 (1%) | 9 (11%) | 20 (25%) | 38 (48%) | 12 (15%) | 80 | **3.64** | 0.92 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected** | 2 (3%) | 7 (9%) | 21 (26%) | 34 (43%) | 16 (20%) | 80 | **3.69** | 0.98 |
| **Carrying out procedures for an investigation and recording data accurately** | 1 (1%) | 8 (10%) | 22 (28%) | 34 (43%) | 15 (19%) | 80 | **3.68** | 0.94 |
| **Testing how changing one variable affects another variable** | 1 (1%) | 5 (6%) | 23 (29%) | 32 (41%) | 18 (23%) | 79 | **3.77** | 0.92 |
| **Considering different ways to analyze or interpret data** | 1 (1%) | 11 (14%) | 21 (27%) | 26 (33%) | 19 (24%) | 78 | **3.65** | 1.04 |
| **Displaying numeric data in charts or graphs to identify patterns and relationships** | 4 (5%) | 12 (15%) | 22 (28%) | 30 (38%) | 11 (14%) | 79 | **3.41** | 1.07 |
| **Using mathematics or computers to analyze numeric data** | 2 (3%) | 8 (10%) | 15 (19%) | 37 (48%) | 15 (19%) | 77 | **3.71** | 0.98 |
| **Supporting a proposed solution (for a problem) with data from investigations** | 2 (3%) | 15 (19%) | 17 (22%) | 27 (35%) | 17 (22%) | 78 | **3.54** | 1.11 |
| **Supporting a proposed solution with relevant scientific, mathematical, and/or engineering knowledge** | 2 (3%) | 9 (11%) | 19 (24%) | 34 (43%) | 15 (19%) | 79 | **3.65** | 1.00 |
| **Using data from investigations to defend an argument that conveys how a solution meets design criteria** | 2 (3%) | 9 (11%) | 22 (28%) | 30 (38%) | 17 (21%) | 80 | **3.64** | 1.02 |
| **Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds** | 3 (4%) | 11 (14%) | 20 (25%) | 32 (40%) | 14 (18%) | 80 | **3.54** | 1.05 |
| **Communicating information about your design processes and/or solutions in different formats (orally, written, graphically, mathematically)** | 3 (4%) | 5 (6%) | 19 (24%) | 31 (40%) | 20 (26%) | 78 | **3.77** | 1.03 |

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

| **AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **n** | **Avg.** | **SD** |
| **Sticking with a task until it is complete** | 0 (0%) | 6 (6%) | 26 (24%) | 41 (38%) | 36 (33%) | 109 | **3.98** | 0.89 |
| **Making changes when things do not go as planned** | 0 (0%) | 9 (8%) | 26 (24%) | 38 (35%) | 37 (34%) | 110 | **3.94** | 0.95 |
| **Working collaboratively with a team** | 0 (0%) | 4 (4%) | 22 (20%) | 35 (32%) | 49 (45%) | 110 | **4.17** | 0.88 |
| **Communicating effectively with others** | 1 (1%) | 6 (5%) | 22 (20%) | 38 (35%) | 43 (39%) | 110 | **4.05** | 0.95 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Including others' perspectives when making decisions** | 0 (0%) | 7 (6%) | 18 (17%) | 42 (39%) | 41 (38%) | 108 | **4.08** | 0.90 |
| **Sense of being part of a learning community** | 2 (2%) | 7 (6%) | 27 (25%) | 37 (34%) | 37 (34%) | 110 | **3.91** | 1.00 |
| **Building relationships with professionals in a field** | 2 (2%) | 6 (5%) | 24 (22%) | 40 (36%) | 38 (35%) | 110 | **3.96** | 0.98 |
| **Connecting a topic or field and your personal values** | 2 (2%) | 9 (8%) | 23 (21%) | 39 (36%) | 36 (33%) | 109 | **3.90** | 1.02 |

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

| **AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **n** | **Avg.** | **SD** |
| **Interest in a new STEM topic or field** | 11 (10%) | 11 (10%) | 28 (26%) | 37 (35%) | 20 (19%) | 107 | **3.41** | 1.20 |
| **Clarifying a STEM career path** | 8 (7%) | 9 (8%) | 25 (23%) | 44 (41%) | 22 (20%) | 108 | **3.58** | 1.13 |
| **Sense of accomplishing something in STEM** | 2 (2%) | 8 (7%) | 24 (22%) | 46 (43%) | 27 (25%) | 107 | **3.82** | 0.96 |
| **Building academic credentials in STEM** | 4 (4%) | 9 (8%) | 27 (25%) | 39 (36%) | 29 (27%) | 108 | **3.74** | 1.06 |
| **Feeling prepared for more challenging STEM activities** | 4 (4%) | 8 (7%) | 25 (23%) | 43 (40%) | 28 (26%) | 108 | **3.77** | 1.04 |
| **Confidence to do well in future STEM courses** | 4 (4%) | 2 (2%) | 25 (23%) | 40 (37%) | 37 (34%) | 108 | **3.96** | 0.99 |
| **Confidence to contribute to STEM** | 6 (6%) | 7 (7%) | 27 (25%) | 40 (38%) | 26 (25%) | 106 | **3.69** | 1.09 |
| **Thinking creatively about a STEM project or activity** | 5 (5%) | 5 (5%) | 25 (24%) | 37 (35%) | 34 (32%) | 106 | **3.85** | 1.08 |

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

| **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?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **n** | **Avg.** | **SD** |
| **Visit a science museum or zoo** | 10 (9%) | 3 (3%) | 54 (49%) | 25 (23%) | 18 (16%) | 110 | **3.35** | 1.08 |
| **Watch or read non-fiction STEM** | 10 (9%) | 7 (7%) | 48 (45%) | 32 (30%) | 10 (9%) | 107 | **3.23** | 1.03 |
| **Look up STEM information at a library or on the internet** | 8 (7%) | 6 (6%) | 43 (40%) | 36 (34%) | 14 (13%) | 107 | **3.39** | 1.03 |
| **Tinker (play) with a mechanical or electrical device** | 5 (5%) | 4 (4%) | 25 (23%) | 46 (43%) | 27 (25%) | 107 | **3.80** | 1.01 |
| **Work on solving mathematical or scientific puzzles** | 6 (6%) | 6 (6%) | 42 (39%) | 35 (32%) | 20 (18%) | 109 | **3.52** | 1.03 |
| **Design a computer program or website** | 4 (4%) | 10 (9%) | 35 (32%) | 33 (30%) | 27 (25%) | 109 | **3.63** | 1.07 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Observe things in nature (plant growth, animal behavior, stars or planets, etc.)** | 4 (4%) | 8 (7%) | 40 (37%) | 39 (36%) | 18 (17%) | 109 | **3.54** | 0.98 |
| **Talk with friends or family about STEM** | 1 (1%) | 9 (8%) | 44 (40%) | 34 (31%) | 21 (19%) | 109 | **3.60** | 0.92 |
| **Mentor or teach other students about STEM** | 2 (2%) | 10 (9%) | 37 (34%) | 36 (33%) | 24 (22%) | 109 | **3.64** | 0.99 |
| **Help with a community service project that relates to STEM** | 2 (2%) | 7 (6%) | 35 (32%) | 37 (34%) | 28 (26%) | 109 | **3.75** | 0.97 |
| **Participate in a STEM club, student association, or professional organization** | 3 (3%) | 8 (7%) | 44 (40%) | 32 (29%) | 22 (20%) | 109 | **3.57** | 0.98 |
| **Participate in STEM camp, fair, or competition** | 4 (4%) | 7 (6%) | 29 (27%) | 43 (39%) | 26 (24%) | 109 | **3.73** | 1.02 |
| **Take an elective (not required) STEM class** | 5 (5%) | 6 (6%) | 39 (36%) | 34 (31%) | 24 (22%) | 108 | **3.61** | 1.04 |
| **Work on a STEM project or experiment in a university or professional setting** | 4 (4%) | 5 (5%) | 34 (31%) | 39 (36%) | 27 (25%) | 109 | **3.73** | 1.01 |
| **Receive an award or special recognition for STEM accomplishments** | 2 (2%) | 6 (6%) | 32 (30%) | 33 (31%) | 35 (32%) | 108 | **3.86** | 1.00 |

**Note.** Response scale: **1** = "Much less likely," **2** = "Less likely," **3** = "About the same before and after," **4** = "More likely," **5** = "Much more likely".

| **How far did you want to go in school BEFORE participating in UNITE?** | | |
|---|---|---|
| | **Freq.** | **%** |
| **Graduate from high school** | 14 | 13% |
| **Go to a trade or vocational school** | 1 | 1% |
| **Go to college for a little while** | 2 | 2% |
| **Finish college (get a Bachelor's degree)** | 44 | 40% |
| **Get more education after college** | 48 | 44% |
| **Total** | **109** | **100%** |

| **How far did you want to go in school AFTER participating in UNITE?** | | |
|---|---|---|
| | **Freq.** | **%** |
| **Graduate from high school** | 3 | 3% |
| **Go to a trade or vocational school** | 2 | 2% |
| **Go to college for a little while** | 3 | 3% |
| **Finish college (get a Bachelor's degree)** | 37 | 34% |
| **Get more education after college** | 65 | 59% |
| **Total** | **110** | **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** | 10 | 9% | | **Teaching, non-STEM** | 0 | 0% |
| **Science (no specific subject)** | 4 | 4% | | **Medicine (doctor, dentist, veterinarian, etc.)** | 21 | 19% |
| **Physical science (physics, chemistry, astronomy, materials science, etc.)** | 1 | 1% | | **Health (nursing, pharmacy, technician, etc.)** | 7 | 6% |
| **Biological science** | 0 | 0% | | **Social science (psychologist, sociologist)** | 5 | 5% |
| **Earth, atmospheric or oceanic science** | 0 | 0% | | **Business** | 4 | 4% |
| **Agricultural science** | 1 | 1% | | **Law** | 8 | 7% |
| **Environmental science** | 0 | 0% | | **English/language arts** | 0 | 0% |
| **Computer science** | 5 | 5% | | **Farming** | 0 | 0% |
| **Technology** | 3 | 3% | | **Military, police, or security** | 4 | 4% |
| **Engineering** | 20 | 18% | | **Art (writing, dancing, painting, etc.)** | 6 | 5% |
| **Mathematics or statistics** | 3 | 3% | | **Skilled trade (carpenter, electrician, plumber, etc.)** | 0 | 0% |
| **Teaching, STEM** | 0 | 0% | | **Other, (specify):** | 8 | 7% |
| | | | | **Total** | **110** | **100%** |

**Note.** Other = "Animal Rehabilitation", "Architecture", "Fashion Designer and Modeling", "Film", "Forensic science", "Marketing", "Photography", and "Physical therapy".

| 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** | 8 | 7% | | **Teaching, non-STEM** | 0 | 0% |
| **Science (no specific subject)** | 4 | 4% | | **Medicine (doctor, dentist, veterinarian, etc.)** | 17 | 16% |
| **Physical science (physics, chemistry, astronomy, materials science, etc.)** | 0 | 0% | | **Health (nursing, pharmacy, technician, etc.)** | 7 | 6% |
| **Biological science** | 1 | 1% | | **Social science (psychologist, sociologist)** | 6 | 6% |
| **Earth, atmospheric or oceanic science** | 0 | 0% | | **Business** | 2 | 2% |
| **Agricultural science** | 1 | 1% | | **Law** | 2 | 2% |
| **Environmental science** | 0 | 0% | | **English/language arts** | 1 | 1% |
| **Computer science** | 5 | 5% | | **Farming** | 0 | 0% |
| **Technology** | 3 | 3% | | **Military, police, or security** | 6 | 6% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Engineering** | 27 | 25% | | **Art (writing, dancing, painting, etc.)** | 5 | 5% |
| **Mathematics or statistics** | 2 | 2% | | **Skilled trade (carpenter, electrician, plumber, etc.)** | 0 | 0% |
| **Teaching, STEM** | 0 | 0% | | **Other, (specify):** | 11 | 10% |
| | | | | **Total** | **108** | **100%** |

**Note.** Other = "Animal Rehabilitation ", "Architecture ", "Art, criminal justice, business", "Fashion Designer and Modeling", "Film", "Marketing", "Orthodontist and join national guard", "Photography", "Physical therapy ", "Robotics", and "Theoretical Quantum Physicist".

**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** | 0 | 0% |
| **less than 25% of the time** | 6 | 6% |
| **26% to 50% of the time** | 20 | 19% |
| **51% to 75% of the time** | 22 | 21% |
| **76% to 100% of the time** | 58 | 55% |
| **Total** | **106** | **100%** |

**How many times have you participated in any of the following Army Educational Outreach Programs? If you have not heard of an AEOP, select "Never heard of it." If you have heard of an AEOP but never participated, select "Never."**

| | 0 | 1 | 2 | 3 | 4 | n | Avg. | SD |
|---|---|---|---|---|---|---|---|---|
| **Camp Invention** | 54 (50%) | 41 (38%) | 4 (4%) | 5 (5%) | 4 (4%) | 108 | **1.48** | 0.95 |
| **eCYBERMISSION** | 55 (51%) | 39 (36%) | 4 (4%) | 5 (5%) | 4 (4%) | 107 | **1.50** | 0.96 |
| **Junior Solar Sprint (JSS)** | 54 (50%) | 40 (37%) | 4 (4%) | 5 (5%) | 5 (5%) | 108 | **1.54** | 1.00 |
| **West Point Bridge Design Contest (WPBDC)** | 51 (47%) | 40 (37%) | 6 (6%) | 9 (8%) | 2 (2%) | 108 | **1.53** | 0.89 |
| **Junior Science & Humanities Symposium (JSHS)** | 52 (49%) | 38 (36%) | 7 (7%) | 6 (6%) | 3 (3%) | 106 | **1.52** | 0.91 |
| **Gains in the Education of Mathematics and Science (GEMS)** | 45 (42%) | 41 (38%) | 9 (8%) | 5 (5%) | 7 (7%) | 107 | **1.65** | 1.04 |
| **GEMS Near Peers** | 47 (44%) | 43 (40%) | 3 (3%) | 5 (5%) | 9 (8%) | 107 | **1.67** | 1.14 |
| **UNITE** | 10 (9%) | 11 (10%) | 53 (50%) | 11 (10%) | 22 (21%) | 107 | **2.45** | 0.97 |
| **Science & Engineering Apprenticeship Program (SEAP)** | 37 (35%) | 48 (45%) | 4 (4%) | 8 (7%) | 10 (9%) | 107 | **1.71** | 1.14 |
| **Research & Engineering Apprenticeship Program (REAP)** | 39 (36%) | 48 (44%) | 6 (6%) | 9 (8%) | 6 (6%) | 108 | **1.61** | 1.02 |
| **High School Apprenticeship Program (HSAP)** | 47 (44%) | 46 (43%) | 4 (4%) | 7 (6%) | 4 (4%) | 108 | **1.49** | 0.94 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **College Qualified Leaders (CQL)** | 52 (48%) | 40 (37%) | 4 (4%) | 6 (6%) | 6 (6%) | 108 | **1.61** | 1.06 |
| **Undergraduate Research Apprenticeship Program (URAP)** | 51 (47%) | 42 (39%) | 4 (4%) | 4 (4%) | 7 (6%) | 108 | **1.58** | 1.07 |
| **Science Mathematics, and Research for Transformation (SMART) College Scholarship** | 43 (40%) | 43 (40%) | 9 (8%) | 5 (5%) | 8 (7%) | 108 | **1.66** | 1.06 |
| **National Defense Science & Engineering Graduate (NDSEG) Fellowship** | 53 (50%) | 41 (38%) | 3 (3%) | 5 (5%) | 5 (5%) | 107 | **1.52** | 1.00 |

**Note.** Response scale: **0** = "Never heard of it," **1** = "Never," **2** = "Once," **3**= "Twice," **4** = "Three or more times".

**How interested are you in participating in the following programs in the future?**

| | 1 | 2 | 3 | 4 | n | Avg. | SD |
|---|---|---|---|---|---|---|---|
| **Camp Invention** | 41 (38%) | 23 (21%) | 31 (29%) | 12 (11%) | 107 | 2.13 | 1.06 |
| **eCYBERMISSION** | 44 (42%) | 22 (21%) | 30 (28%) | 10 (9%) | 106 | 2.06 | 1.04 |
| **Junior Solar Sprint (JSS)** | 40 (38%) | 18 (17%) | 34 (32%) | 13 (12%) | 105 | 2.19 | 1.08 |
| **West Point Bridge Design Contest (WPBDC)** | 45 (42%) | 20 (19%) | 30 (28%) | 12 (11%) | 107 | 2.08 | 1.07 |
| **Junior Science & Humanities Symposium (JSHS)** | 44 (42%) | 19 (18%) | 25 (24%) | 16 (15%) | 104 | 2.13 | 1.13 |
| **Gains in the Education of Mathematics and Science (GEMS)** | 38 (36%) | 22 (21%) | 29 (28%) | 16 (15%) | 105 | 2.22 | 1.10 |
| **GEMS Near Peers** | 44 (42%) | 21 (20%) | 29 (27%) | 12 (11%) | 106 | 2.08 | 1.07 |
| **UNITE** | 11 (10%) | 14 (13%) | 28 (27%) | 52 (50%) | 105 | 3.15 | 1.02 |
| **Science & Engineering Apprenticeship Program (SEAP)** | 26 (25%) | 15 (14%) | 38 (36%) | 26 (25%) | 105 | 2.61 | 1.11 |
| **Research & Engineering Apprenticeship Program (REAP)** | 27 (25%) | 18 (17%) | 37 (34%) | 26 (24%) | 108 | 2.57 | 1.11 |
| **High School Apprenticeship Program (HSAP)** | 31 (29%) | 21 (20%) | 34 (32%) | 21 (20%) | 107 | 2.42 | 1.11 |
| **College Qualified Leaders (CQL)** | 35 (33%) | 20 (19%) | 28 (26%) | 23 (22%) | 106 | 2.37 | 1.16 |
| **Undergraduate Research Apprenticeship Program (URAP)** | 32 (31%) | 23 (22%) | 28 (27%) | 21 (20%) | 104 | 2.37 | 1.12 |
| **Science Mathematics, and Research for Transformation (SMART) College Scholarship** | 32 (31%) | 20 (19%) | 29 (28%) | 23 (22%) | 104 | 2.41 | 1.15 |
| **National Defense Science & Engineering Graduate (NDSEG) Fellowship** | 35 (33%) | 18 (17%) | 31 (29%) | 22 (21%) | 106 | 2.38 | 1.15 |

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

**How many jobs/careers in science, technology, engineering, or math (STEM) did you learn about during UNITE?**

| | Freq. | % |
|---|---|---|
| **None** | 3 | 3% |
| **1** | 1 | 1% |
| **2** | 8 | 7% |

| | | |
|---|---|---|
| **3** | 20 | 18% |
| **4** | 16 | 15% |
| **5 or more** | 61 | 56% |
| **Total** | **109** | **100%** |

**How many Department of Defense (DoD) STEM jobs/careers did you learn about during UNITE?**

| | Freq. | % |
|---|---|---|
| **None** | 22 | 20% |
| **1** | 15 | 14% |
| **2** | 16 | 15% |
| **3** | 23 | 21% |
| **4** | 6 | 6% |
| **5 or more** | 26 | 24% |
| **Total** | **108** | **100%** |

**Rate how much you agree or disagree with each of the following statements about Department of Defense (DoD) researchers and research:**

| | 1 | 2 | 3 | 4 | 5 | n | Avg. | SD |
|---|---|---|---|---|---|---|---|---|
| **DoD researchers advance science and engineering fields** | 4 (4%) | 0 (0%) | 40 (38%) | 43 (41%) | 18 (17%) | 105 | **3.68** | 0.89 |
| **DoD researchers develop new, cutting edge technologies** | 3 (3%) | 2 (2%) | 32 (30%) | 48 (46%) | 20 (19%) | 105 | **3.76** | 0.88 |
| **DoD researchers support non-defense related advancements in science and technology** | 3 (3%) | 4 (4%) | 42 (40%) | 36 (34%) | 20 (19%) | 105 | **3.63** | 0.93 |
| **DoD researchers solve real-world problems** | 3 (3%) | 2 (2%) | 34 (32%) | 39 (37%) | 28 (26%) | 106 | **3.82** | 0.94 |
| **DoD research is valuable to society** | 3 (3%) | 0 (0%) | 31 (29%) | 42 (40%) | 30 (28%) | 106 | **3.91** | 0.91 |

**Note.** Response scale: **1** = "Strongly Disagree," **2** = "Disagree," **3** = "Neither Agree nor Disagree," **4** = "Agree," **5** = "Strongly Agree".

**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** | 5 (5%) | 12 (11%) | 59 (55%) | 32 (30%) | 108 | **3.09** | 0.77 |
| **I am more interested in participating in STEM activities outside of school requirements** | 9 (8%) | 12 (11%) | 61 (57%) | 25 (23%) | 107 | **2.95** | 0.83 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **I am more aware of other AEOPs** | 10 (9%) | 12 (11%) | 56 (52%) | 29 (27%) | 107 | **2.97** | 0.87 |
| **I am more interested in participating in other AEOPs** | 14 (13%) | 12 (11%) | 55 (51%) | 26 (24%) | 107 | **2.87** | 0.93 |
| **I am more interested in taking STEM classes in school** | 12 (11%) | 17 (16%) | 57 (53%) | 22 (20%) | 108 | **2.82** | 0.88 |
| **I am more interested in attending college** | 2 (2%) | 43 (40%) | 41 (38%) | 21 (20%) | 107 | **2.76** | 0.79 |
| **I am more interested in earning a STEM degree in college** | 14 (13%) | 22 (20%) | 50 (46%) | 22 (20%) | 108 | **2.74** | 0.93 |
| **I am more interested in pursuing a STEM career** | 12 (11%) | 20 (19%) | 49 (47%) | 24 (23%) | 105 | **2.81** | 0.92 |
| **I am more aware of DoD STEM research and careers** | 15 (14%) | 10 (9%) | 57 (54%) | 24 (23%) | 106 | **2.85** | 0.93 |
| **I have a greater appreciation of DoD STEM research and careers** | 14 (13%) | 11 (10%) | 54 (50%) | 28 (26%) | 107 | **2.90** | 0.94 |
| **I am more interested in pursuing a STEM career with the DoD** | 25 (23%) | 16 (15%) | 49 (46%) | 17 (16%) | 107 | **2.54** | 1.02 |

**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 primary reason".

# Appendix C

## FY14 UNITE Mentor Questionnaire and Data Summaries

**2014 UNITE: UNITE Mentor Survey**

Virginia Tech is conducting an evaluation study on behalf of the Academy of Applied Science and the U.S. Army to determine how well JSHS is achieving its goals of promoting student interest and engagement in science, technology, engineering, and mathematics (STEM). As part of this study Virginia Tech is surveying adults who participate in JSHS in the capacity of STEM mentors (e.g., instructors, research mentors, or competition advisors). The questionnaire will collect information about you, your experiences in school, and your experiences in JSHS. The results of this survey will be used to help us improve JSHS and to report to the organizations that support JSHS.

**About this survey**:

- This research protocol has been approved for use with human subjects by the Virginia Tech IRB office.
- Although this questionnaire is not anonymous, it is CONFIDENTIAL. Prior to analysis and reporting responses will be de-identified and no one will be able to connect your responses to you or your apprentice's name.
- Only AEOP evaluation personnel will have access to completed questionnaires and personal information will be stored securely.
- Responding to this survey is VOLUNTARY. You are not required to participate, although we hope you do because your responses will provide valuable information for meaningful and continuous improvement.
- If you provide your email address, the AEOP may contact you in the future to ask about you or your students.

**If you have any additional questions or concerns, please contact one of the following people:**

**Tanner Bateman, Virginia Tech**
Senior Project Associate, AEOPCA
(540) 231-4540, tbateman@vt.edu

**Rebecca Kruse, Virginia Tech**
Evaluation Director, AEOPCA
(540) 315-5807, rkruse75@vt.edu

**Q1 Do you agree to participate in this survey? (required)**

❍ Yes, I agree to participate in this survey
❍ No, I do not wish to participate in this survey **If selected, respondent will be directed to the end of the survey**

**Q2 Please provide your personal information below: (required)**

First Name _____
Last Name _____

**Q3 Please provide your email address: (optional)**

Email _____

**Q4 What is your gender?**

- ❍ Male
- ❍ Female
- ❍ Choose not to report

**Q5 What is your race or ethnicity?**

- ❍ Hispanic or Latino
- ❍ Asian
- ❍ Black or African American
- ❍ Native American or Alaska Native
- ❍ Native Hawaiian or Other Pacific Islander
- ❍ White
- ❍ Other race or ethnicity, (specify): _____
- ❍ Choose not to report

**Q6 Which of the following BEST describes your current occupation (select ONE)**

- ❍ Teacher
- ❍ Other school staff
- ❍ University educator
- ❍ Scientist, Engineer, or Mathematician in training (undergraduate or graduate student, etc.)
- ❍ Scientist, Engineer, or Mathematics professional
- ❍ Other, (specify): _____

**Q7 Which of the following BEST describes your organization? (select ONE)**

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

Answer If Which of the following BEST describes your current occupation (select ONE) Teacher Is Selected Or Which of the following BEST describes your current occupation (select ONE) Other school staff Is Selected

**Q8 What grade level(s) do you teach? (Select all that apply)**

- ❑ Upper elementary school
- ❑ Middle school
- ❑ High school

Answer If Which of the following BEST describes your current occupation (select ONE) Teacher Is Selected Or Which of the following BEST describes your current occupation (select ONE) Other school staff Is Selected

**Q9 Which best describes the location of your school?**

- ❍ Frontier or tribal school
- ❍ Rural (country)
- ❍ Suburban
- ❍ Urban (city)

Answer If Which of the following BEST describes your current occupation (select ONE) Teacher Is Selected Or Which of the following BEST describes your current occupation (select ONE) Other school staff Is Selected

**Q10 At what kind of school do you work?**

- ❍ Public school
- ❍ Private school
- ❍ Home school
- ❍ Online school
- ❍ Department of Defense school (DoDDS, DoDEA)

Answer If Which of the following BEST describes your current occupation (select ONE) Teacher Is Selected Or Which of the following BEST describes your current occupation (select ONE) Other school staff Is Selected

**Q11 Do you work at a "Title-I" school?**

- ❍ Yes
- ❍ No
- ❍ I am not sure

Answer If Which of the following BEST describes your current occupation (select ONE) Teacher Is Selected Or Which of the following BEST describes your current occupation (select ONE) Other school staff Is Selected

**Q12 Which of the following subjects do you teach? (Select all that apply)**

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

Answer If Which of the following BEST describes your current occupation (select ONE) Scientist, Engineer, or Mathematician in training (undergraduate or graduate student, etc.) Is Selected Or Which of the following BEST describes your current occupation (select ONE) Scientist, Engineer, or Mathematics professional Is Selected

**Q13 Which of the following best describes your primary area of research?**

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

**Q14 Where was the UNITE program located?**

- ❍ 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

**Q15 Which of the following BEST describes your role during UNITE?**

- ❍ Instructor (typically a University or Army Scientist or Engineer)
- ❍ Resource teacher
- ❍ Classroom assistant
- ❍ Other, (specify) _____

**Q16 How many UNITE students did you work with this year?**

**Q17 How did you learn about UNITE? (Check all that apply)**

- ❑ Technology Student Association website
- ❑ Army Educational Outreach Program (AEOP) website
- ❑ Facebook, Twitter, Pinterest, or other social media
- ❑ State or national educator conference
- ❑ STEM conference
- ❑ School, university, or professional organization newsletter, email or website
- ❑ A news story or other media coverage
- ❑ Past UNITE participant
- ❑ A student
- ❑ A colleague
- ❑ A supervisor or superior
- ❑ UNITE event or site host/director
- ❑ Workplace communications
- ❑ Someone who works at an Army laboratory
- ❑ Someone who works with the Department of Defense
- ❑ Other, (specify): _____

**Q18 How many times have YOU PARTICIPATED in any of the following Army Educational Outreach Programs (AEOPs) in any capacity? If you have heard of an AEOP but never participated select "Never." If you have not heard of an AEOP select "Never heard of it."**

| | Never | Once | Twice | Three or more times | Never heard of it |
|---|---|---|---|---|---|
| Camp Invention | ❍ | ❍ | ❍ | ❍ | ❍ |
| eCYBERMISSION | ❍ | ❍ | ❍ | ❍ | ❍ |
| Junior Solar Sprint (JSS) | ❍ | ❍ | ❍ | ❍ | ❍ |
| West Point Bridge Design Contest (WPBDC) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Junior Science & Humanities Symposium (JSHS) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Gains in the Education of Mathematics and Science (GEMS) | ❍ | ❍ | ❍ | ❍ | ❍ |
| GEMS Near Peers | ❍ | ❍ | ❍ | ❍ | ❍ |
| UNITE | ❍ | ❍ | ❍ | ❍ | ❍ |
| Science & Engineering Apprenticeship Program (SEAP) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Research & Engineering Apprenticeship Program (REAP) | ❍ | ❍ | ❍ | ❍ | ❍ |
| High School Apprenticeship Program (HSAP) | ❍ | ❍ | ❍ | ❍ | ❍ |
| College Qualified Leaders (CQL) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Undergraduate Research Apprenticeship Program (URAP) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Science Mathematics, and Research for Transformation (SMART) College Scholarship | ❍ | ❍ | ❍ | ❍ | ❍ |
| National Defense Science & Engineering Graduate (NDSEG) Fellowship | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q19 How SATISFIED were you with each of the following UNITE features?**

| | Did not experience | Not at all | A little | Somewhat | Very much |
|---|---|---|---|---|---|
| Application or registration process | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communications from Technology Student Association | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communications from [UNITE site] | ❍ | ❍ | ❍ | ❍ | ❍ |
| Location(s) of program activities or event | ❍ | ❍ | ❍ | ❍ | ❍ |
| Availability of programs in your area | ❍ | ❍ | ❍ | ❍ | ❍ |
| Support for instruction or mentorship during program activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participation stipends (payment) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Online educational resources used or provided during program activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Invited speakers or "career" events | ❍ | ❍ | ❍ | ❍ | ❍ |
| Field trips or tours | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q20 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 |
|---|---|---|
| Finding out about students' backgrounds and interests at the beginning of the program | ❍ | ❍ |
| Giving students real-life problems to investigate or solve | ❍ | ❍ |
| Asking students to relate outside events or activities to topics covered in the program | ❍ | ❍ |
| Selecting readings or activities that relate to students' backgrounds | ❍ | ❍ |
| Encouraging students to suggest new readings, activities, or projects | ❍ | ❍ |
| Making explicit provisions for students who wish to carry out independent studies | ❍ | ❍ |
| Helping students become aware of the roles STEM plays in their everyday lives | ❍ | ❍ |
| Helping students understand how STEM can help them improve their communities | ❍ | ❍ |
| Other, (specify): | ❍ | ❍ |

**Q21 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 |
|---|---|---|
| Finding out about students' learning styles at the beginning of the program | ❍ | ❍ |
| Interacting with all students in the same way regardless of their gender or race and ethnicity | ❍ | ❍ |
| Using gender neutral language | ❍ | ❍ |
| Using diverse teaching/mentoring activities to address a broad spectrum of students | ❍ | ❍ |
| Integrating ideas from the literature on pedagogical activities for women and underrepresented students | ❍ | ❍ |
| Providing extra readings, activities, or other support for students who lack essential background knowledge or skills | ❍ | ❍ |
| Directing students to other individuals or programs if I can only provide limited support | ❍ | ❍ |
| Other, (specify): | ❍ | ❍ |

**Q22 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 |
|---|---|---|
| Having students tell others about their backgrounds and interests | ❍ | ❍ |
| Having students explain difficult ideas to others | ❍ | ❍ |
| Having students exchange ideas with others whose backgrounds or viewpoints are different from their own | ❍ | ❍ |
| Having students participate in giving and receiving feedback | ❍ | ❍ |
| Having students work on collaborative activities or projects as a member of a team | ❍ | ❍ |
| Having students listen to the ideas of others with an open mind | ❍ | ❍ |
| Having students pay attention to the feelings of all team members | ❍ | ❍ |
| Having students develop ways to resolve conflict and reach agreement among the team | ❍ | ❍ |
| Other, (specify): | ❍ | ❍ |

**Q23 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 |
|---|---|---|
| Teaching (or assigning readings) about specific STEM subject matter | ❍ | ❍ |
| Having students access and critically review technical texts or media to support their work | ❍ | ❍ |
| Demonstrating the use of laboratory or field techniques, procedures, and tools students are expected to use | ❍ | ❍ |
| Helping students practice STEM skills with supervision | ❍ | ❍ |
| Giving constructive feedback to improve students' STEM competencies | ❍ | ❍ |
| Allowing students to work independently as appropriate for their self-management abilities and STEM competencies | ❍ | ❍ |
| Encouraging students to seek support from other team members | ❍ | ❍ |
| Encouraging opportunities in which students could learn from others (team projects, team meetings, journal clubs) | ❍ | ❍ |
| Other, (specify): | ❍ | ❍ |

**Q24 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 |
|---|---|---|
| Asking about students' educational and career interests | ❍ | ❍ |
| Recommending extracurricular programs that align with students' educational goals | ❍ | ❍ |
| Recommending Army Educational Outreach Programs that align with students' educational goals | ❍ | ❍ |
| Providing guidance about educational pathways that would prepare students for a STEM career | ❍ | ❍ |
| Sharing personal experiences, attitudes, and values pertaining to STEM | ❍ | ❍ |
| Discussing STEM career opportunities with the DoD or other government agencies | ❍ | ❍ |
| Discussing STEM career opportunities outside of the DoD or other government agencies (private industry, academia) | ❍ | ❍ |
| Discussing non-technical aspects of a STEM career (economic, political, ethical, and/or social issues) | ❍ | ❍ |
| Highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM | ❍ | ❍ |
| Recommending student and professional organizations in STEM | ❍ | ❍ |
| Helping students build effective STEM networks | ❍ | ❍ |
| Critically reviewing students' résumé, application, or interview preparations | ❍ | ❍ |
| Other, (specify): | ❍ | ❍ |

**Q25 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 |
|---|---|---|---|---|---|
| Technology Student Association website | ❍ | ❍ | ❍ | ❍ | ❍ |
| Army Educational Outreach Program (AEOP) website | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP social media | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP brochure | ❍ | ❍ | ❍ | ❍ | ❍ |
| Program manager or site coordinators | ❍ | ❍ | ❍ | ❍ | ❍ |
| Invited speakers or “career” events | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participation in UNITE | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP instructional supplies (Rite in the Rain notebook, Lab coats, etc.) | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q26 Which of the following AEOPs did YOU EXPLICITLY DISCUSS with your student(s) during UNITE? (check ALL that apply)**

| | Yes - I discussed this program with my student(s) | No - I did not discuss this program with my student(s) |
|---|---|---|
| Camp Invention | ❍ | ❍ |
| eCYBERMISSION | ❍ | ❍ |
| Junior Solar Sprint (JSS) | ❍ | ❍ |
| West Point Bridge Design Contest (WPBDC) | ❍ | ❍ |
| Junior Science & Humanities Symposium (JSHS) | ❍ | ❍ |
| Gains in the Education of Mathematics and Science (GEMS) | ❍ | ❍ |
| GEMS Near Peers | ❍ | ❍ |
| UNITE | ❍ | ❍ |
| Science & Engineering Apprenticeship Program (SEAP) | ❍ | ❍ |
| Research & Engineering Apprenticeship Program (REAP) | ❍ | ❍ |
| High School Apprenticeship Program (HSAP) | ❍ | ❍ |
| College Qualified Leaders (CQL) | ❍ | ❍ |
| 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 | ❍ | ❍ |

**Q27 How USEFUL were each of the following in your efforts to expose your student(s) to Department of Defense (DoD) STEM careers during UNITE?**

| | Did not experience | Not at all | A little | Somewhat | Very much |
|---|---|---|---|---|---|
| Technology Student Association website | ❍ | ❍ | ❍ | ❍ | ❍ |
| Army Educational Outreach Program (AEOP) website | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP social media | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP brochure | ❍ | ❍ | ❍ | ❍ | ❍ |
| Program manager or site coordinator | ❍ | ❍ | ❍ | ❍ | ❍ |
| Invited speakers or "career" events | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participation in UNITE | ❍ | ❍ | ❍ | ❍ | ❍ |
| AEOP instructional supplies (Rite in the Rain notebook, Lab coats, etc.) | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q28 Rate 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 |
|---|---|---|---|---|---|
| DoD researchers advance science and engineering fields | ❍ | ❍ | ❍ | ❍ | ❍ |
| DoD researchers develop new, cutting edge technologies | ❍ | ❍ | ❍ | ❍ | ❍ |
| DoD researchers support non-defense related advancements in science and technology | ❍ | ❍ | ❍ | ❍ | ❍ |
| DoD researchers solve real-world problems | ❍ | ❍ | ❍ | ❍ | ❍ |
| DoD research is valuable to society | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q29 How often did YOUR STUDENT(S) have opportunities do each of the following in UNITE?**

| | 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 cutting-edge STEM research | ❍ | ❍ | ❍ | ❍ | ❍ |
| Learn about different STEM careers | ❍ | ❍ | ❍ | ❍ | ❍ |
| Interact with STEM professionals | ❍ | ❍ | ❍ | ❍ | ❍ |
| Practice using laboratory or field techniques, procedures, and tools | ❍ | ❍ | ❍ | ❍ | ❍ |
| Participate in hands-on STEM activities | ❍ | ❍ | ❍ | ❍ | ❍ |
| Work as part of a team | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicate with other students about STEM | ❍ | ❍ | ❍ | ❍ | ❍ |
| Draw conclusions from an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Build (or simulate) something | ❍ | ❍ | ❍ | ❍ | ❍ |
| Pose questions or problems to investigate | ❍ | ❍ | ❍ | ❍ | ❍ |
| Design an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Carry out an investigation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Analyze and interpret data or information | ❍ | ❍ | ❍ | ❍ | ❍ |
| Come up with creative explanations or solutions | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q30 Which category best describes the focus of your student(s)' UNITE experience?**

- ❍ Science
- ❍ Technology
- ❍ Engineering
- ❍ Mathematics

**Q31 AS A RESULT OF THE UNITE EXPERIENCE, how much did your student(s) GAIN in the following areas?**

| | No gain | A little gain | Some gain | Large gain | Extreme gain |
|---|---|---|---|---|---|
| Knowledge of a STEM topic or field in depth | ❍ | ❍ | ❍ | ❍ | ❍ |
| 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 | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q32 AS A RESULT OF THE UNITE EXPERIENCE, how much did your student(s) GAIN in the following areas? **Only presented to respondents who selected "science" in Q30****

| | No gain | A little gain | Some gain | Large gain | Extreme gain |
|---|---|---|---|---|---|
| Asking questions based on observations of real-world phenomena | ❍ | ❍ | ❍ | ❍ | ❍ |
| Asking a question (about a phenomenon ) that can be answered with one or more investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Applying knowledge, logic, and creativity to propose explanations that can be tested with investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Making a model to represent the key features and functions of an observed phenomenon | ❍ | ❍ | ❍ | ❍ | ❍ |
| Deciding what type of data to collect in order to answer a question | ❍ | ❍ | ❍ | ❍ | ❍ |
| Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected | ❍ | ❍ | ❍ | ❍ | ❍ |
| Carrying out procedures for an investigation and recording data accurately | ❍ | ❍ | ❍ | ❍ | ❍ |
| Testing how changing one variable affects another variable | ❍ | ❍ | ❍ | ❍ | ❍ |
| Considering different ways to analyze or interpret data when answering a question | ❍ | ❍ | ❍ | ❍ | ❍ |
| Displaying numeric data from an investigation in charts or graphs to identify patterns and relationships | ❍ | ❍ | ❍ | ❍ | ❍ |
| Using mathematics or computers to analyze numeric data | ❍ | ❍ | ❍ | ❍ | ❍ |
| Supporting a proposed explanation (for a phenomenon) with data from investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Supporting a proposed explanation with relevant scientific, mathematical, and/or engineering knowledge | ❍ | ❍ | ❍ | ❍ | ❍ |
| Using data from investigations to defend an argument that conveys how an explanation describes an observed phenomenon | ❍ | ❍ | ❍ | ❍ | ❍ |
| Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicating information about your investigations and explanations in different formats (orally, written, graphically, mathematically) | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q33 AS A RESULT OF THE UNITE EXPERIENCE, how much did your student(s) GAIN in the following areas? **Only presented to respondents who selected "technology," "engineering," or "mathematics" in Q30****

| | No gain | A little gain | Some gain | Large gain | Extreme gain |
|---|---|---|---|---|---|
| Identifying real-world problems based on social, technological, or environmental issues | ❍ | ❍ | ❍ | ❍ | ❍ |
| Defining a problem that can be solved by developing a new or improved object, process, or system | ❍ | ❍ | ❍ | ❍ | ❍ |
| Applying knowledge, logic, and creativity to propose solutions that can be tested with investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Making a model that represents the key features or functions of a solution to a problem | ❍ | ❍ | ❍ | ❍ | ❍ |
| Deciding what type of data to collect in order to test if a solution functions as intended | ❍ | ❍ | ❍ | ❍ | ❍ |
| Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected | ❍ | ❍ | ❍ | ❍ | ❍ |
| Carrying out procedures for an investigation and recording data accurately | ❍ | ❍ | ❍ | ❍ | ❍ |
| Testing how changing one variable affects another variable | ❍ | ❍ | ❍ | ❍ | ❍ |
| Considering different ways to analyze or interpret data | ❍ | ❍ | ❍ | ❍ | ❍ |
| Displaying numeric data in charts or graphs to identify patterns and relationships | ❍ | ❍ | ❍ | ❍ | ❍ |
| Using mathematics or computers to analyze numeric data | ❍ | ❍ | ❍ | ❍ | ❍ |
| Supporting a proposed solution (for a problem) with data from investigations | ❍ | ❍ | ❍ | ❍ | ❍ |
| Supporting a proposed solution with relevant scientific, mathematical, and/or engineering knowledge | ❍ | ❍ | ❍ | ❍ | ❍ |
| Using data from investigations to defend an argument that conveys how a solution meets design criteria | ❍ | ❍ | ❍ | ❍ | ❍ |
| Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicating information about your design processes and/or solutions in different formats (orally, written, graphically, mathematically) | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q34 AS A RESULT OF THE UNITE EXPERIENCE, how much did your student(s) GAIN (on average) in the following areas?**

| | No gain | A little gain | Some gain | Large gain | Extreme gain |
|---|---|---|---|---|---|
| Sticking with a task until it is complete | ❍ | ❍ | ❍ | ❍ | ❍ |
| Making changes when things do not go as planned | ❍ | ❍ | ❍ | ❍ | ❍ |
| Working collaboratively with a team | ❍ | ❍ | ❍ | ❍ | ❍ |
| Communicating effectively with others | ❍ | ❍ | ❍ | ❍ | ❍ |
| Including others' perspectives when making decisions | ❍ | ❍ | ❍ | ❍ | ❍ |
| Sense of being part of a learning community | ❍ | ❍ | ❍ | ❍ | ❍ |
| Building relationships with professionals in a field | ❍ | ❍ | ❍ | ❍ | ❍ |
| Connecting a topic or field and their personal values | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q35 Which of the following statements describe YOUR STUDENT(S) after participating in the UNITE program?**

| | 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 attending college | ❍ | ❍ | ❍ | ❍ |
| More interested in earning a STEM degree in college | ❍ | ❍ | ❍ | ❍ |
| More interested in pursuing a STEM career | ❍ | ❍ | ❍ | ❍ |
| More aware of Department of Defense (DoD) STEM research and careers | ❍ | ❍ | ❍ | ❍ |
| Greater appreciation of DoD STEM research and careers | ❍ | ❍ | ❍ | ❍ |
| More interested in pursuing a STEM career with the DoD | ❍ | ❍ | ❍ | ❍ |

**Q36 What are the three most important strengths of UNITE?**

Strength #1

Strength #2

Strength #3

**Q37 What are the three ways UNITE should be improved for future participants?**

Improvement #1

Improvement #2

Improvement #3

**Q38 Tell us about your overall satisfaction with your UNITE experience.**

**UNITE Mentor Data Summary**

| What is your gender? | | |
|---|---|---|
| | **Freq.** | **%** |
| **Male** | 26 | 54% |
| **Female** | 22 | 46% |
| **Choose not to report** | 0 | 0% |
| **Total** | **48** | **100%** |

| What is your race or ethnicity? | | |
|---|---|---|
| | **Freq.** | **%** |
| **Hispanic or Latino** | 0 | 0% |
| **Asian** | 4 | 8% |
| **Black or African American** | 25 | 52% |
| **Native American or Alaska Native** | 0 | 0% |
| **Native Hawaiian or Other Pacific Islander** | 1 | 2% |
| **White** | 15 | 31% |
| **Other race or ethnicity, (specify):** | 1 | 2% |
| **Choose not to report** | 2 | 4% |
| **Total** | **48** | **100%** |

**Note.** Other = "British Jamaican".

| Which of the following BEST describes your current occupation? (select ONE) | | |
|---|---|---|
| | **Freq.** | **%** |
| **Teacher** | 13 | 27% |
| **Other school staff** | 2 | 4% |
| **University educator** | 6 | 13% |
| **Scientist, Engineer, or Mathematician in training (undergraduate or graduate student, etc.)** | 8 | 17% |
| **Scientist, Engineer, or Mathematics professional** | 6 | 13% |
| **Other, (specify):** | 13 | 27% |
| **Total** | **48** | **100%** |

**Note.** Other = "Student" (n = 3), "Team/Group Leader" (n = 3), "Teacher Aide/Assistant" (n = 2), "University Staff" (n = 2), "Educational Research and Writing", "Volunteer", and "Workshop Coordinator".

| Which of the following BEST describes your organization? (select ONE) | | |
|---|---|---|
| | **Freq.** | **%** |
| **No organization** | 2 | 4% |
| **School or district (K-12)** | 16 | 33% |
| **State educational agency** | 1 | 2% |
| **Institution of higher education (vocational school, junior college, college, or university)** | 21 | 44% |
| **Industry** | 2 | 4% |
| **Department of Defense or other government agency** | 0 | 0% |
| **Non-profit** | 4 | 8% |
| **Other, (specify):** | 2 | 4% |
| **Total** | **48** | **100%** |

**Note.** "BC Kuhn, LLC", and "Summer LEAP Program".

| What grade level(s) do you teach? (Select all that apply) (n = 15) | | |
|---|---|---|
| | **Freq.** | **%** |
| **Upper elementary** | 1 | 7% |
| **Middle school** | 4 | 27% |
| **High school** | 11 | 73% |

| Which best describes the location of your school? | | |
|---|---|---|
| | **Freq.** | **%** |
| **Frontier or tribal school** | 0 | 0% |
| **Rural (country)** | 0 | 0% |
| **Suburban** | 3 | 20% |
| **Urban (city)** | 12 | 80% |
| **Total** | **15** | **100%** |

| At what kind of school do you work? | | |
|---|---|---|
| | **Freq.** | **%** |
| **Public school** | 13 | 87% |
| **Private school** | 2 | 13% |
| **Home school** | 0 | 0% |

| | | |
|---|---|---|
| **Online school** | 0 | 0% |
| **Department of Defense school (DoDDS or DoDEA)** | 0 | 0% |
| **Total** | **15** | **100%** |

| **Do you work at a "Title-I" school?** | | |
|---|---|---|
| | **Freq.** | **%** |
| **Yes** | 4 | 29% |
| **No** | 7 | 50% |
| **I am not sure** | 3 | 21% |
| **Total** | **14** | **100%** |

**Which of the following subjects do you teach? (Select all that apply) (n = 15)**

| | Freq. | % | | | Freq. | % |
|---|---|---|---|---|---|---|
| **Physical science (physics, chemistry, astronomy, materials science)** | 5 | 33% | | **Technology** | 1 | 7% |
| **Biological science** | 5 | 33% | | **Engineering** | 0 | 0% |
| **Earth, atmospheric, or oceanic science** | 3 | 20% | | **Mathematics or statistics** | 5 | 33% |
| **Agricultural science** | 0 | 0% | | **Medical, health, or behavioral science** | 0 | 0% |
| **Environmental science** | 2 | 13% | | **Social science (psychology, sociology, anthropology, etc.)** | 0 | 0% |
| **Computer science** | 0 | 0% | | **Other, (specify):** | 4 | 27% |

**Note.** Other = "English Language Arts", "Literacy", "English", and "pre K".

**Which of the following best describes your primary area of research?**

| | Freq. | % | | | Freq. | % |
|---|---|---|---|---|---|---|
| **Physical science (physics, chemistry, astronomy, materials science)** | 1 | 7% | | **Technology** | 0 | 0% |
| **Biological science** | 0 | 0% | | **Engineering** | 8 | 57% |
| **Earth, atmospheric, or oceanic science** | 1 | 7% | | **Mathematics or statistics** | 2 | 14% |
| **Agricultural science** | 0 | 0% | | **Medical, health, or behavioral science** | 0 | 0% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Environmental science** | **0** | **0%** | | Social science (psychology, sociology, anthropology, etc.) | **0** | **0%** |
| **Computer science** | 2 | 14% | | **Other, (specify):** | 0 | 0% |
| | | | | **Total** | **14** | **100%** |

| **Where was the UNITE program located?** | | |
|---|---|---|
| | **Freq.** | **%** |
| **Alabama State University** | 12 | 26% |
| **Florida International University** | 1 | 2% |
| **Jackson State University** | 4 | 9% |
| **New Jersey Institute of Technology** | 5 | 11% |
| **Savannah State University** | 0 | 0% |
| **South Dakota School of Mines and Technology** | 4 | 9% |
| **University of Colorado, Colorado Springs** | 4 | 9% |
| **University of New Mexico** | 0 | 0% |
| **University of Pennsylvania** | 6 | 13% |
| **Xavier University of Louisiana** | 11 | 23% |
| **Total** | **47** | **100%** |

| **Which of the following BEST describes your role during UNITE?** | | |
|---|---|---|
| | **Freq.** | **%** |
| **Instructor (typically a University or Army Scientist or Engineer)** | 26 | 55% |
| **Resource teacher** | 1 | 2% |
| **Classroom assistant** | 14 | 30% |
| **Other, (specify)** | 6 | 13% |
| **Total** | **47** | **100%** |

**Note.** Other = "PI", "Staff Supervisor", "Program Coordinator", "Instructor and program leader", "Mentor", and "Group Leader".

| How many UNITE students did you work with this year? (Avg. = 20.20, SD = 13.71) | | |
|---|---|---|
| **# of Students** | **Freq.** | **%** |
| **10 – 15 students** | 22 | |
| **16 – 20 students** | 13 | |
| **21 – 25 students** | 6 | |
| **More than 25 students** | 5 | |
| **Total** | **46** | **100%** |

| How did you learn about UNITE? (Check all that apply) (n = 48) | | | | | | |
|---|---|---|---|---|---|---|
| | **Freq.** | **%** | | | **Freq.** | **%** |
| **Technology Student Association website** | 2 | 4% | | **A student** | 1 | 2% |
| **Army Educational Outreach Program (AEOP) website** | 2 | 4% | | **A colleague** | 20 | 42% |
| **Facebook, Twitter, Pinterest, or other social media** | 0 | 0% | | **A supervisor or superior** | 18 | 38% |
| **State or national educator conference** | 0 | 0% | | **UNITE event or site host/director** | 11 | 23% |
| **STEM conference** | 2 | 4% | | **Workplace communications** | 4 | 8% |
| **School, university, or professional organization newsletter, email or website** | 10 | 21% | | **Someone who works at an Army laboratory** | 0 | 0% |
| **A news story or other media coverage** | 0 | 0% | | **Someone who works with the Department of Defense** | 0 | 0% |
| **Past UNITE participant** | 5 | 10% | | **Other, (specify):** | 2 | 4% |

**Note.** Other = "…Summer Mentorship Program at University of Pennsylvania" (n = 2).

| How many times have YOU PARTICIPATED in any of the following Army Educational Outreach Programs in any capacity? If you have not heard of an AEOP, select "Never heard of it." If you have heard of an AEOP but never participated, select "Never." | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **n** | **Avg.** | **SD** |
| **Camp Invention** | 29 (66%) | 13 (30%) | 1 (2%) | 0 (0%) | 1 (2%) | 44 | **1.27** | 0.80 |
| **eCYBERMISSION** | 30 (68%) | 11 (25%) | 2 (5%) | 0 (0%) | 1 (2%) | 44 | **1.36** | 0.84 |
| **Junior Solar Sprint (JSS)** | 31 (70%) | 12 (27%) | 0 (0%) | 0 (0%) | 1 (2%) | 44 | **1.23** | 0.83 |
| **West Point Bridge Design Contest (WPBDC)** | 30 (65%) | 13 (28%) | 1 (2%) | 0 (0%) | 2 (4%) | 46 | **1.44** | 1.03 |
| **Junior Science & Humanities Symposium (JSHS)** | 32 (70%) | 11 (24%) | 0 (0%) | 2 (4%) | 1 (2%) | 46 | **1.50** | 1.02 |
| **Gains in the Education of Mathematics and Science (GEMS)** | 23 (50%) | 14 (30%) | 4 (9%) | 3 (7%) | 2 (4%) | 46 | **1.70** | 1.02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **GEMS Near Peers** | 26 (58%) | 13 (29%) | 2 (4%) | 1 (2%) | 3 (7%) | 45 | **1.68** | 1.16 |
| **UNITE** | 4 (9%) | 3 (7%) | 23 (50%) | 8 (17%) | 8 (17%) | 46 | **2.50** | 0.89 |
| **Science & Engineering Apprenticeship Program (SEAP)** | 25 (54%) | 16 (35%) | 2 (4%) | 1 (2%) | 2 (4%) | 46 | **1.48** | 0.98 |
| **Research & Engineering Apprenticeship Program (REAP)** | 17 (37%) | 15 (33%) | 6 (13%) | 5 (11%) | 3 (7%) | 46 | **1.86** | 1.06 |
| **High School Apprenticeship Program (HSAP)** | 24 (53%) | 18 (40%) | 1 (2%) | 0 (0%) | 2 (4%) | 45 | **1.33** | 0.91 |
| **College Qualified Leaders (CQL)** | 27 (60%) | 14 (31%) | 3 (7%) | 0 (0%) | 1 (2%) | 45 | **1.33** | 0.77 |
| **Undergraduate Research Apprenticeship Program (URAP)** | 27 (59%) | 16 (35%) | 2 (4%) | 0 (0%) | 1 (2%) | 46 | **1.26** | 0.73 |
| **Science Mathematics, and Research for Transformation (SMART) College Scholarship** | 22 (48%) | 18 (39%) | 3 (7%) | 1 (2%) | 2 (4%) | 46 | **1.46** | 0.93 |
| **National Defense Science & Engineering Graduate (NDSEG) Fellowship** | 27 (61%) | 14 (32%) | 1 (2%) | 0 (0%) | 2 (5%) | 44 | **1.41** | 1.00 |

**Note.** Response scale: **0** = "Never heard of it," **1** = "Never," **2** = "Once," **3**= "Twice," **4** = "Three or more times".

| **How SATISFIED were you with each of the following UNITE features?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **n** | **Avg.** | **SD** |
| **Application or registration process** | 25 (54%) | 0 (0%) | 2 (4%) | 5 (11%) | 14 (30%) | 46 | **3.57** | 0.68 |
| **Communications from Technology Student Association** | 22 (49%) | 1 (2%) | 1 (2%) | 2 (4%) | 19 (42%) | 45 | **3.70** | 0.76 |
| **Communications from [UNITE site]** | 2 (4%) | 0 (0%) | 1 (2%) | 9 (20%) | 34 (74%) | 46 | **3.75** | 0.49 |
| **Location(s) of program activities or event** | 1 (2%) | 0 (0%) | 1 (2%) | 7 (15%) | 38 (81%) | 47 | **3.80** | 0.45 |
| **Availability of programs in your area** | 10 (22%) | 0 (0%) | 4 (9%) | 10 (22%) | 22 (48%) | 46 | **3.50** | 0.70 |
| **Support for instruction or mentorship during program activities** | 5 (11%) | 0 (0%) | 2 (4%) | 8 (18%) | 30 (67%) | 45 | **3.70** | 0.56 |
| **Participation stipends (payment)** | 15 (33%) | 1 (2%) | 0 (0%) | 11 (24%) | 19 (41%) | 46 | **3.55** | 0.68 |
| **Online educational resources used or provided during program activities** | 15 (33%) | 3 (7%) | 5 (11%) | 8 (17%) | 15 (33%) | 46 | **3.13** | 1.02 |
| **Invited speakers or "career" events** | 9 (20%) | 0 (0%) | 1 (2%) | 5 (11%) | 31 (67%) | 46 | **3.81** | 0.46 |
| **Field trips or tours** | 12 (27%) | 1 (2%) | 2 (4%) | 5 (11%) | 25 (56%) | 45 | **3.64** | 0.74 |

**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. | % |
| Finding out about students' backgrounds and interests at the beginning of the program | 47 | 38 | 81% | 9 | 19% |
| Giving students real-life problems to investigate or solve | 47 | 45 | 96% | 2 | 4% |
| Asking students to relate outside events or activities to topics covered in the program | 47 | 45 | 96% | 2 | 4% |
| Selecting readings or activities that relate to students' backgrounds | 46 | 25 | 54% | 21 | 46% |
| Encouraging students to suggest new readings, activities, or projects | 47 | 32 | 68% | 15 | 32% |
| Making explicit provisions for students who wish to carry out independent studies | 46 | 20 | 43% | 26 | 57% |
| Helping students become aware of the roles STEM plays in their everyday lives | 47 | 43 | 91% | 4 | 9% |
| Helping students understand how STEM can help them improve their communities | 47 | 40 | 85% | 7 | 15% |
| Other, (specify): | 13 | 3 | 23% | 10 | 77% |

**Note.** Other = "understanding of teamwork and multi-cultural advantages", and "group presentations".

**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. | % |
| Finding out about students' learning styles at the beginning of the program | 47 | 31 | 66% | 16 | 34% |
| Interacting with all students in the same way regardless of their gender or race and ethnicity | 47 | 45 | 96% | 2 | 4% |
| Using gender neutral language | 45 | 36 | 80% | 9 | 20% |
| Using diverse teaching/mentoring activities to address a broad spectrum of students | 46 | 42 | 91% | 4 | 9% |
| Integrating ideas from the literature on pedagogical activities for women and underrepresented students | 46 | 23 | 50% | 23 | 50% |

| | | | | | |
|---|---|---|---|---|---|
| **Providing extra readings, activities, or other support for students who lack essential background knowledge or skills** | 46 | 23 | 50% | 23 | 50% |
| **Directing students to other individuals or programs if I can only provide limited support** | 46 | 34 | 74% | 12 | 26% |
| **Other, (specify):** | 11 | 4 | 36% | 7 | 64% |

**Note.** Other = "Brought a diverse instructional team with me so they would have peer mentors", "challenged them to define what the biggest problems are in the builds", and "cross cultural media".

**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 students tell others about their backgrounds and interests** | 47 | 36 | 77% | 11 | 23% |
| **Having students explain difficult ideas to others** | 47 | 40 | 85% | 7 | 15% |
| **Having students exchange ideas with others whose backgrounds or viewpoints are different from their own** | 46 | 41 | 89% | 5 | 11% |
| **Having students participate in giving and receiving feedback** | 46 | 41 | 89% | 5 | 11% |
| **Having students work on collaborative activities or projects as a member of a team** | 47 | 46 | 98% | 1 | 2% |
| **Having students listen to the ideas of others with an open mind** | 47 | 45 | 96% | 2 | 4% |
| **Having students pay attention to the feelings of all team members** | 45 | 38 | 84% | 7 | 16% |
| **Having students develop ways to resolve conflict and reach agreement among the team** | 45 | 39 | 87% | 6 | 13% |
| **Other, (specify):** | 11 | 4 | 36% | 7 | 64% |

**Note.** Other = "vary composition of teams", and "utilize open inquiry".

**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** | 44 | 31 | 70% | 13 | 30% |
| **Having students access and critically review technical texts or media to support their work** | 43 | 20 | 47% | 23 | 53% |

| | | | | | |
|---|---|---|---|---|---|
| **Demonstrating the use of laboratory or field techniques, procedures, and tools students are expected to use** | 45 | 36 | 80% | 9 | 20% |
| **Helping students practice STEM skills with supervision** | 44 | 37 | 84% | 7 | 16% |
| **Giving constructive feedback to improve students' STEM competencies** | 45 | 40 | 89% | 5 | 11% |
| **Allowing students to work independently as appropriate for their self-management abilities and STEM competencies** | 44 | 40 | 91% | 4 | 9% |
| **Encouraging students to seek support from other team members** | 45 | 43 | 96% | 2 | 4% |
| **Encouraging opportunities in which students could learn from others (team projects, team meetings, journal clubs)** | 45 | 41 | 91% | 4 | 9% |
| **Other, (specify):** | 9 | 3 | 33% | 6 | 67% |

**Note.** Other = "computational tools, but we didn't have time for 'hands on'".

**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 about students' educational and career interests** | 47 | 45 | 96% | 2 | 4% |
| **Recommending extracurricular programs that align with students' educational goals** | 47 | 39 | 83% | 8 | 17% |
| **Recommending Army Educational Outreach Programs that align with students' educational goals** | 46 | 25 | 54% | 21 | 46% |
| **Providing guidance about educational pathways that would prepare students for a STEM career** | 46 | 41 | 89% | 5 | 11% |
| **Sharing personal experiences, attitudes, and values pertaining to STEM** | 47 | 44 | 94% | 3 | 6% |
| **Discussing STEM career opportunities with the DoD or other government agencies** | 46 | 26 | 57% | 20 | 43% |
| **Discussing STEM career opportunities outside of the DoD or other government agencies (private industry, academia)** | 46 | 30 | 65% | 16 | 35% |
| **Discussing non-technical aspects of a STEM career (economic, political, ethical, and/or social issues)** | 45 | 32 | 71% | 13 | 29% |
| **Highlighting under-representation of women and racial and ethnic minority populations in STEM and/or their contributions in STEM** | 45 | 30 | 67% | 15 | 33% |
| **Recommending student and professional organizations in STEM** | 46 | 32 | 70% | 14 | 30% |
| **Helping students build effective STEM networks** | 46 | 24 | 52% | 22 | 48% |

| | | | | | |
|---|---|---|---|---|---|
| **Critically reviewing students' résumé, application, or interview preparations** | 45 | 15 | 33% | 30 | 67% |
| **Other, (specify):** | 9 | 2 | 22% | 7 | 78% |

**How USEFUL were each of the following in your efforts to expose student(s) to Army Educational Outreach Programs (AEOPs) during UNITE?**

| | 0 | 1 | 2 | 3 | 4 | n | Avg. | SD |
|---|---|---|---|---|---|---|---|---|
| **Technology Student Association website** | 28 (62%) | 1 (2%) | 1 (2%) | 5 (11%) | 10 (22%) | 45 | **3.41** | 0.87 |
| **Army Educational Outreach Program (AEOP) website** | 27 (60%) | 1 (2%) | 2 (4%) | 6 (13%) | 9 (20%) | 45 | **3.28** | 0.89 |
| **AEOP social media** | 27 (61%) | 1 (2%) | 6 (14%) | 4 (9%) | 6 (14%) | 44 | **2.88** | 0.99 |
| **AEOP brochure** | 23 (52%) | 1 (2%) | 4 (9%) | 8 (18%) | 8 (18%) | 44 | **3.10** | 0.89 |
| **Program manager or site coordinators** | 11 (24%) | 2 (4%) | 1 (2%) | 7 (16%) | 24 (53%) | 45 | **3.56** | 0.82 |
| **Invited speakers or "career" events** | 11 (26%) | 1 (2%) | 1 (2%) | 8 (19%) | 22 (51%) | 43 | **3.59** | 0.71 |
| **Participation in UNITE** | 7 (16%) | 2 (4%) | 0 (0%) | 7 (16%) | 29 (64%) | 45 | **3.66** | 0.75 |
| **AEOP instructional supplies (Rite in the Rain notebook, Lab coats, etc.)** | 20 (45%) | 2 (5%) | 1 (2%) | 7 (16%) | 14 (32%) | 44 | **3.38** | 0.92 |

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

**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. | % |
| **Camp Invention** | 44 | 3 | 7% | 41 | 93% |
| **eCYBERMISSION** | 42 | 2 | 5% | 40 | 95% |
| **Junior Solar Sprint (JSS)** | 44 | 0 | 0% | 44 | 100% |
| **West Point Bridge Design Contest (WPBDC)** | 43 | 3 | 7% | 40 | 93% |
| **Junior Science & Humanities Symposium (JSHS)** | 41 | 2 | 5% | 39 | 95% |
| **Gains in the Education of Mathematics and Science (GEMS)** | 44 | 11 | 25% | 33 | 75% |
| **GEMS Near Peers** | 43 | 1 | 2% | 42 | 98% |
| **UNITE** | 46 | 40 | 87% | 6 | 13% |
| **Science & Engineering Apprenticeship Program (SEAP)** | 45 | 13 | 29% | 32 | 71% |
| **Research & Engineering Apprenticeship Program (REAP)** | 45 | 22 | 49% | 23 | 51% |
| **High School Apprenticeship Program (HSAP)** | 44 | 11 | 25% | 33 | 75% |

| | | | | | |
|---|---|---|---|---|---|
| **College Qualified Leaders (CQL)** | 42 | 6 | 14% | 36 | 86% |
| **Undergraduate Research Apprenticeship Program (URAP)** | 44 | 9 | 20% | 35 | 80% |
| **Science Mathematics, and Research for Transformation (SMART) College Scholarship** | 43 | 12 | 28% | 31 | 72% |
| **National Defense Science & Engineering Graduate (NDSEG) Fellowship** | 43 | 5 | 12% | 38 | 88% |

**How USEFUL were each of the following in your efforts to expose your student(s) to Department of Defense (DoD) STEM careers during UNITE?**

| | 0 | 1 | 2 | 3 | 4 | n | Avg. | SD |
|---|---|---|---|---|---|---|---|---|
| **Technology Student Association website** | 27 (60%) | 2 (4%) | 2 (4%) | 6 (13%) | 8 (18%) | 45 | **3.11** | 1.02 |
| **Army Educational Outreach Program (AEOP) website** | 27 (59%) | 1 (2%) | 3 (7%) | 4 (9%) | 11 (24%) | 46 | **3.32** | 0.95 |
| **AEOP social media** | 27 (60%) | 5 (11%) | 0 (0%) | 8 (18%) | 5 (11%) | 45 | **2.72** | 1.18 |
| **AEOP brochure** | 24 (56%) | 2 (5%) | 2 (5%) | 6 (14%) | 9 (21%) | 43 | **3.16** | 1.01 |
| **Program manager or site coordinator** | 16 (36%) | 2 (4%) | 4 (9%) | 5 (11%) | 18 (40%) | 45 | **3.34** | 0.97 |
| **Invited speakers or "career" events** | 13 (30%) | 1 (2%) | 4 (9%) | 3 (7%) | 23 (52%) | 44 | **3.55** | 0.85 |
| **Participation in UNITE** | 6 (13%) | 0 (0%) | 5 (11%) | 4 (9%) | 31 (67%) | 46 | **3.65** | 0.70 |
| **AEOP instructional supplies (Rite in the Rain notebook, Lab coats, etc.)** | 26 (60%) | 1 (2%) | 4 (9%) | 3 (7%) | 9 (21%) | 43 | **3.18** | 1.01 |

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

**Rate how much you agree or disagree with each of the following statements about Department of Defense (DoD) researchers and research:**

| | 1 | 2 | 3 | 4 | 5 | n | Avg. | SD |
|---|---|---|---|---|---|---|---|---|
| **DoD researchers advance science and engineering fields** | 0 (0%) | 0 (0%) | 9 (20%) | 13 (28%) | 24 (52%) | 46 | **4.33** | 0.79 |
| **DoD researchers develop new, cutting edge technologies** | 0 (0%) | 0 (0%) | 10 (23%) | 13 (30%) | 21 (48%) | 44 | **4.25** | 0.81 |
| **DoD researchers support non-defense related advancements in science and technology** | 0 (0%) | 0 (0%) | 10 (22%) | 18 (39%) | 18 (39%) | 46 | **4.17** | 0.77 |
| **DoD researchers solve real-world problems** | 0 (0%) | 0 (0%) | 8 (17%) | 18 (39%) | 20 (43%) | 46 | **4.26** | 0.74 |
| **DoD research is valuable to society** | 0 (0%) | 0 (0%) | 7 (16%) | 17 (38%) | 21 (47%) | 45 | **4.31** | 0.73 |

**Note.** Response scale: **1** = "Strongly Disagree," **2** = "Disagree," **3** = "Neither Agree nor Disagree," **4** = "Agree," **5** = "Strongly Agree".

| 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% | 4% | 11% | 24% | 60% | 45 | **4.40** | 0.86 |
| **Apply STEM knowledge to real life situations** | 0% | 4% | 9% | 28% | 59% | 46 | **4.41** | 0.83 |
| **Learn about cutting-edge STEM research** | 2% | 18% | 18% | 32% | 30% | 44 | **3.68** | 1.16 |
| **Learn about different STEM careers** | 2% | 7% | 29% | 20% | 42% | 45 | **3.93** | 1.10 |
| **Interact with STEM professionals** | 7% | 11% | 17% | 20% | 46% | 46 | **3.87** | 1.29 |
| **Practice using laboratory or field techniques, procedures, and tools** | 9% | 0% | 14% | 43% | 34% | 44 | **3.93** | 1.15 |
| **Participate in hands-on STEM activities** | 0% | 5% | 5% | 40% | 51% | 43 | **4.37** | 0.79 |
| **Work as part of a team** | 0% | 0% | 7% | 17% | 76% | 46 | **4.70** | 0.59 |
| **Communicate with other students about STEM** | 4% | 2% | 11% | 16% | 67% | 45 | **4.38** | 1.07 |
| **Draw conclusions from an investigation** | 0% | 0% | 11% | 36% | 53% | 45 | **4.42** | 0.69 |
| **Build (or simulate) something** | 4% | 4% | 7% | 30% | 54% | 46 | **4.26** | 1.06 |
| **Pose questions or problems to investigate** | 0% | 4% | 18% | 27% | 51% | 45 | **4.24** | 0.91 |
| **Design an investigation** | 9% | 7% | 22% | 33% | 29% | 45 | **3.67** | 1.22 |
| **Carry out an investigation** | 7% | 7% | 18% | 38% | 31% | 45 | **3.80** | 1.16 |
| **Analyze and interpret data or information** | 5% | 0% | 14% | 41% | 41% | 44 | **4.14** | 0.98 |
| **Come up with creative explanations or solutions** | 0% | 4% | 11% | 36% | 49% | 45 | **4.29** | 0.84 |

**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** | 10 | 22% |
| **Technology** | 6 | 13% |
| **Engineering** | 24 | 52% |
| **Mathematics** | 6 | 13% |
| **Total** | **46** | **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** | 0 (0%) | 3 (7%) | 10 (22%) | 16 (36%) | 16 (36%) | 45 | **4.00** | 0.93 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Knowledge of research conducted in a STEM topic or field** | 1 (2%) | 6 (13%) | 12 (26%) | 12 (26%) | 15 (33%) | 46 | **3.74** | 1.12 |
| **Knowledge of research processes, ethics, and rules for conduct in STEM** | 3 (7%) | 7 (16%) | 10 (22%) | 11 (24%) | 14 (31%) | 45 | **3.58** | 1.27 |
| **Knowledge of how professionals work on real problems in STEM** | 0 (0%) | 3 (7%) | 11 (24%) | 14 (30%) | 18 (39%) | 46 | **4.02** | 0.95 |
| **Knowledge of what everyday research work is like in STEM** | 2 (4%) | 3 (7%) | 10 (22%) | 15 (33%) | 15 (33%) | 45 | **3.84** | 1.11 |

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

| **AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **n** | **Avg.** | **SD** |
| **Asking questions based on observations of real-world phenomena** | 0 (0%) | 0 (0%) | 3 (30%) | 4 (40%) | 3 (30%) | 10 | **4.00** | 0.82 |
| **Asking a question (about a phenomenon ) that can be answered with one or more investigations** | 0 (0%) | 0 (0%) | 3 (30%) | 5 (50%) | 2 (20%) | 10 | **3.90** | 0.74 |
| **Applying knowledge, logic, and creativity to propose explanations that can be tested with investigations** | 0 (0%) | 1 (10%) | 3 (30%) | 5 (50%) | 1 (10%) | 10 | **3.60** | 0.84 |
| **Making a model to represent the key features and functions of an observed phenomenon** | 0 (0%) | 1 (10%) | 3 (30%) | 4 (40%) | 2 (20%) | 10 | **3.70** | 0.95 |
| **Deciding what type of data to collect in order to answer a question** | 0 (0%) | 1 (10%) | 3 (30%) | 4 (40%) | 2 (20%) | 10 | **3.70** | 0.95 |
| **Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected** | 0 (0%) | 1 (10%) | 3 (30%) | 3 (30%) | 3 (30%) | 10 | **3.80** | 1.03 |
| **Carrying out procedures for an investigation and recording data accurately** | 0 (0%) | 0 (0%) | 3 (30%) | 5 (50%) | 2 (20%) | 10 | **3.90** | 0.74 |
| **Testing how changing one variable affects another variable** | 0 (0%) | 0 (0%) | 3 (30%) | 6 (60%) | 1 (10%) | 10 | **3.80** | 0.63 |
| **Considering different ways to analyze or interpret data when answering a question** | 0 (0%) | 0 (0%) | 4 (40%) | 5 (50%) | 1 (10%) | 10 | **3.70** | 0.67 |
| **Displaying numeric data from an investigation in charts or graphs to identify patterns and relationships** | 0 (0%) | 0 (0%) | 4 (44%) | 5 (56%) | 0 (0%) | 9 | **3.56** | 0.53 |
| **Using mathematics or computers to analyze numeric data** | 0 (0%) | 0 (0%) | 2 (20%) | 6 (60%) | 2 (20%) | 10 | **4.00** | 0.67 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Supporting a proposed explanation (for a phenomenon) with data from investigations** | 0 (0%) | 0 (0%) | 4 (40%) | 4 (40%) | 2 (20%) | 10 | **3.80** | 0.79 |
| **Supporting a proposed explanation with relevant scientific, mathematical, and/or engineering knowledge** | 0 (0%) | 2 (22%) | 3 (33%) | 3 (33%) | 1 (11%) | 9 | **3.33** | 1.00 |
| **Using data from investigations to defend an argument that conveys how an explanation describes an observed phenomenon** | 0 (0%) | 0 (0%) | 4 (44%) | 5 (56%) | 0 (0%) | 9 | **3.56** | 0.53 |
| **Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds** | 1 (10%) | 1 (10%) | 3 (30%) | 4 (40%) | 1 (10%) | 10 | **3.30** | 1.16 |
| **Communicating information about your investigations and explanations in different formats (orally, written, graphically, mathematically)** | 0 (0%) | 1 (10%) | 4 (40%) | 4 (40%) | 1 (10%) | 10 | **3.50** | 0.85 |

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

| **AS A RESULT OF YOUR UNITE EXPERIENCE, how much did you GAIN in the following areas?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **n** | **Avg.** | **SD** |
| **Identifying real-world problems based on social, technological, or environmental issues** | 0 (0%) | 2 (6%) | 9 (26%) | 10 (29%) | 14 (40%) | 35 | **4.03** | 0.95 |
| **Defining a problem that can be solved by developing a new or improved object, process, or system** | 0 (0%) | 1 (3%) | 8 (23%) | 13 (37%) | 13 (37%) | 35 | **4.09** | 0.85 |
| **Applying knowledge, logic, and creativity to propose solutions that can be tested with investigations** | 0 (0%) | 0 (0%) | 6 (18%) | 13 (38%) | 15 (44%) | 34 | **4.26** | 0.75 |
| **Making a model that represents the key features or functions of a solution to a problem** | 0 (0%) | 2 (6%) | 12 (33%) | 7 (19%) | 15 (42%) | 36 | **3.97** | 1.00 |
| **Deciding what type of data to collect in order to test if a solution functions as intended** | 1 (3%) | 6 (17%) | 10 (29%) | 11 (31%) | 7 (20%) | 35 | **3.49** | 1.09 |
| **Designing procedures for investigations, including selecting methods and tools that are appropriate for the data to be collected** | 2 (6%) | 4 (11%) | 10 (29%) | 8 (23%) | 11 (31%) | 35 | **3.63** | 1.21 |
| **Carrying out procedures for an investigation and recording data accurately** | 2 (6%) | 4 (11%) | 8 (23%) | 11 (31%) | 10 (29%) | 35 | **3.66** | 1.19 |
| **Testing how changing one variable affects another variable** | 1 (3%) | 5 (15%) | 9 (26%) | 7 (21%) | 12 (35%) | 34 | **3.71** | 1.19 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Considering different ways to analyze or interpret data** | 0 (0%) | 8 (23%) | 9 (26%) | 9 (26%) | 9 (26%) | 35 | **3.54** | 1.12 |
| **Displaying numeric data in charts or graphs to identify patterns and relationships** | 2 (6%) | 10 (29%) | 8 (23%) | 7 (20%) | 8 (23%) | 35 | **3.26** | 1.27 |
| **Using mathematics or computers to analyze numeric data** | 2 (6%) | 8 (23%) | 8 (23%) | 6 (17%) | 11 (31%) | 35 | **3.46** | 1.31 |
| **Supporting a proposed solution (for a problem) with data from investigations** | 1 (3%) | 6 (17%) | 9 (26%) | 9 (26%) | 10 (29%) | 35 | **3.60** | 1.17 |
| **Supporting a proposed solution with relevant scientific, mathematical, and/or engineering knowledge** | 0 (0%) | 4 (11%) | 12 (33%) | 7 (19%) | 13 (36%) | 36 | **3.81** | 1.06 |
| **Using data from investigations to defend an argument that conveys how a solution meets design criteria** | 1 (3%) | 7 (20%) | 6 (17%) | 12 (34%) | 9 (26%) | 35 | **3.60** | 1.17 |
| **Reading technical or scientific texts, or using other media, to learn about the natural or designed worlds** | 2 (6%) | 5 (14%) | 10 (29%) | 10 (29%) | 8 (23%) | 35 | **3.49** | 1.17 |
| **Communicating information about your design processes and/or solutions in different formats (orally, written, graphically, mathematically)** | 0 (0%) | 4 (11%) | 11 (31%) | 10 (28%) | 11 (31%) | 36 | **3.78** | 1.02 |

**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 complete** | 0 (0%) | 2 (4%) | 4 (9%) | 22 (48%) | 18 (39%) | 46 | **4.22** | 0.79 |
| **Making changes when things do not go as planned** | 0 (0%) | 2 (5%) | 4 (9%) | 19 (43%) | 19 (43%) | 44 | **4.25** | 0.81 |
| **Working collaboratively with a team** | 0 (0%) | 2 (4%) | 4 (9%) | 12 (26%) | 28 (61%) | 46 | **4.43** | 0.83 |
| **Communicating effectively with others** | 0 (0%) | 2 (5%) | 5 (12%) | 14 (33%) | 22 (51%) | 43 | **4.30** | 0.86 |
| **Including others' perspectives when making decisions** | 0 (0%) | 2 (5%) | 8 (19%) | 17 (40%) | 16 (37%) | 43 | **4.09** | 0.87 |
| **Sense of being part of a learning community** | 0 (0%) | 2 (4%) | 12 (26%) | 9 (20%) | 23 (50%) | 46 | **4.15** | 0.97 |
| **Building relationships with professionals in a field** | 1 (2%) | 3 (7%) | 6 (14%) | 14 (32%) | 20 (45%) | 44 | **4.11** | 1.04 |
| **Connecting a topic or field and their personal values** | 0 (0%) | 5 (11%) | 6 (13%) | 14 (31%) | 20 (44%) | 45 | **4.09** | 1.02 |

**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** | 0 (0%) | 0 (0%) | 30 (67%) | 15 (33%) | 45 | **3.33** | 0.48 |
| **More interested in participating in STEM activities outside of school requirements** | 1 (2%) | 1 (2%) | 34 (76%) | 9 (20%) | 45 | **3.13** | 0.55 |
| **More aware of other AEOPs** | 1 (2%) | 4 (9%) | 28 (62%) | 12 (27%) | 45 | **3.13** | 0.66 |
| **More interested in participating in other AEOPs** | 1 (2%) | 4 (9%) | 30 (68%) | 9 (20%) | 44 | **3.07** | 0.62 |
| **More interested in taking STEM classes in school** | 1 (2%) | 0 (0%) | 31 (72%) | 11 (26%) | 43 | **3.21** | 0.56 |
| **More interested in attending college** | 1 (2%) | 2 (4%) | 31 (67%) | 12 (26%) | 46 | **3.17** | 0.61 |
| **More interested in earning a STEM degree in college** | 0 (0%) | 1 (2%) | 29 (66%) | 14 (32%) | 44 | **3.30** | 0.51 |
| **More interested in pursuing a STEM career** | 1 (2%) | 1 (2%) | 30 (68%) | 12 (27%) | 44 | **3.20** | 0.59 |
| **More aware of Department of Defense (DoD) STEM research and careers** | 1 (2%) | 6 (13%) | 25 (56%) | 13 (29%) | 45 | **3.11** | 0.71 |
| **Greater appreciation of DoD STEM research and careers** | 3 (7%) | 2 (4%) | 25 (56%) | 15 (33%) | 45 | **3.16** | 0.80 |
| **More interested in pursuing a STEM career with the DoD** | 2 (5%) | 4 (9%) | 27 (61%) | 11 (25%) | 44 | **3.07** | 0.73 |

**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 Focus Group Protocol

**2014 Army Educational Outreach Program**

**Student Focus Group**

**Facilitator:** "Thank you for meeting with us today so that we can learn more about your experiences in [X] program. We'd like to suggest some basic ground rules to help the group's discussion proceed smoothly and respectfully for everyone:

- What is shared in the room stays in the room.
- Only one person speaks at a time.
- It is important for us to hear everyone's ideas and opinions. If you disagree, be respectful.
- It is important for us to hear all sides of an issue—both the positive and negative.
- Your participation is voluntary--you may choose not to answer any question, or stop participating at any time.
- We will be audio recording the session for notetaking purposes and will delete the email after the notes have been taken."

**Key Questions**

1. Why did you choose to participate in [X] this year?
    - How did you hear about [X]?

2. One AEOP objective is to increase your awareness of the AEOP's pipeline of STEM programs. Did you learn about other AEOPs in [X]?
    - Which ones did you learn about?
    - How did you learn about them?
    - Which AEOPs are you interested in pursuing?

3. One AEOP objective is to increase your awareness of STEM research and career opportunities within the Department of Defense. Did you learn about DoD STEM research and careers in [X]?
    - Which ones did you learn about?
    - How did you learn about them?
    - Which AEOPs are you interested in pursuing?

4. Overall, were you happy that you chose to participate in [X]?
    - How have you benefited from participating in [X]?

5. What would you suggest for improving [X] in the future?

**Ending questions:**

6. Have we missed anything? Tell us anything you want us to know that we didn't ask about.

# Appendix E

## FY14 UNITE Mentor Focus Group Protocol

**2014 Army Educational Outreach Program**
**Adult Focus Group**

**Facilitator:** "Thank you for meeting with us today so that we can learn more about your experiences in [X] program. We'd like to suggest some basic ground rules to help the group's discussion proceed smoothly and respectfully for everyone:

- What is shared in the room stays in the room.
- Only one person speaks at a time--we'll call on sites, if you have something to add or wish to build on another's idea, just type 'add' in the chat window and we'll come back to you.
- It is important for us to hear everyone's ideas and opinions. If you disagree, be respectful.
- It is important for us to hear all sides of an issue—both the positive and negative.
- Your participation is voluntary--you may choose not to answer any question, or stop participating at any time.
- We will be audio recording the session for notetaking purposes and will delete the email after the notes have been taken."

**Key Questions**

1. What do you perceive as the value of [X]?
    - How do you think students benefit from participating?
    - How have you benefited?

2. One AEOP objective is to increase participation of underserved and underrepresented populations in STEM. What strategies have you used this year to increase the diversity of participants in [X]?
    - What strategies seem to work the best?
    - What do you need in order to achieve greater success?

3. One AEOP objective is to increase participants' awareness of the AEOP's pipeline of STEM programs. What strategies have you used this year to educate participants about other AEOP initiatives?
    - What strategies seem to work the best?
    - What do you need in order to achieve greater success?

4. One AEOP objective is to increase participants' awareness of STEM research and career opportunities within the Department of Defense. What strategies have you used this year to expose participants to DoD STEM research and careers?
    - What strategies seem to work the best?
    - What do you need in order to achieve greater success?

5. What suggestions do you have for improving [X]?

**Ending questions:**

6. Have we missed anything? Tell us anything you want us to know that we didn't ask about.

# Appendix F

# APR Template

## Program Overview

Provide a one or two paragraph overview of your program.

## Accomplishments

**Provide the following for *each* program objective listed in the Proposed Work section of the FY14 Annual Program Plan.**

1. **What were the major activities conducted to accomplish the FY14 target for the objective. Report major activities undertaken by of the program adninistrator as well as a selection of 3-5 different site-level activities.**

2. **What were the results of those activities? Specifically, what progress was made toward achieving the FY14 target for the objective?**

3. **What is the proposed FY15 target for for the objective, considering the 5-year target?**

4. **What is planned to accomplish the FY15 target for the objective?**

The following structure can be used for each program objective (replicate as needed). Information in the top two rows ("Objective" and "FY14 Target") should be copied directly from the approved FY14APP.

| |
|---|
| **Objective:** [STATE OBJECTIVE] (**Supports AEOP Goal** [STATE GOAL #], **Objectives** [STATE OBJECTIVE LETTERS])<br>**Proposed Plan:**<br>[STATE PROPOSED PLAN] |
| **FY14 Target:**<br>[STATE TARGET] |
| **Major activities:**<br>[REPORT ACTIVITIES OF PROGRAM ADMISTRATOR]<br>[REPORT SELECTED SITE-LEVEL ACTIVITIES] |
| **Results:**<br>[REPORT RESULTS]<br>[REPORT PROGROSS TOWARD ACHEIVEING FY14 TARGET] |
| **FY15 Target:**<br>[STATE TARGET] |
| **FY15 Plan:**<br>[STATE PLAN TO ACCOMPLISH FY15 TARGET] |

## Changes / Challenges

1. **What changes (if any) were made to the plan for meeting FY14 targets for each objective? What were the reasons for the changes?**

2. **Do any of these changes have significant impact on budget/expenditures?**

3. **What challenges or delays (if any) prevented the program from meeting FY14 targets for each objective? What actions or plans were implemented to resolve those challenges or delays?**

4. **Do any of these challenges or delays require the assistance of the Army, the Consortium, or the Lead Organization to resolve? Please specify.**

## Products

1. **For all programs, list and briefly describe any products resulting from the administration of the program (program administrator or site coordinator) during FY14.**
   - **Websites and social media (provide website urls, social media handles, etc.)**
   - **Instructional materials and other educational aids or resources**
   - **Audio or video products**
   - **Guiding documents**
   - **Marketing or promotional materials**
   - **Presentations[34] (provide citations)**
   - **Publications[35] (provide citations)**
   - **Educational research or evaluation assessments**
   - **Other**

2. **In addition to the above, how many of each product resulted from the Army/AEOP-sponsored research conducted by students participating in apprenticeship programs?**
   - **Abstracts**
   - **Presentations**
   - **Publications**
   - **Patents**

[34] Presentations include things like conference contributions (oral or poster) or presentations to the public, news media, educational agencies, and other associations. Conference booths may also be reported.

[35] Publications include things like peer reviewed articles, technical papers and reports, books or book chapters, news media releases.

- **Other**

# Participants

## Recruitment and selection of participants

1. **Who is the audience(s) targeted by your program and how was the program was marketed to the audience(s)? Report major activities undertaken by of the program administrator as well as a selection of 3-5 different site-level activities toward marketing and recruitment.**

2. **What criteria were used to select participants for the program? Report any efforts of the program administrator (including guidance provided to sites) as well as a selection of 3-5 different site-level criteria.**

3. **AEOP Pipeline: Explain any efforts that were made to specifically recruit alumni of other AEOP initiatives into your program? Explain any efforts to specifically recruit alumni of your program into other AEOP initiatives?**

## Participant numbers and demographic characteristics

1. **How many of each participant group enrolled in the program? How many of each group applied and/or were selected/invited to participate? Report data using the following categories and enter "NA" where not applicable.**

| | Applied | Selected | Enrolled |
|---|---|---|---|
| **Participant Group** | **No.** | **No.** | **No.** |
| Elementary school students (grades K-5) | | | |
| Middle school students (grades 6-8) | | | |
| High school students (grades 9-12) | | | |
| Undergraduate students (including community college) | | | |
| Graduate students (including post-baccalaureates) | | | |
| In-service K-12 teachers | | | |
| Pre-service K-12 teachers | | | |
| College/university faculty or other personnel | | | |
| Army/DoD Scientists & Engineers | | | |
| Other volunteers (e.g., if a competition program) | | | |

2. **For the target audience(s) listed in the previous section (replicate the table as needed), how many were enrolled in the program per program site? How many of each group applied and/or were selected/invited to participate per program site?**

| [Identify Participant Group] | Applied | Selected | Enrolled |
|---|---|---|---|
| **Site** | **No.** | **No.** | **No.** |
| *(List each site by name)* | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

3. **For the target audience(s) listed in the previous section (replicate the table as needed), what are the demographic characteristics of the applicants and enrolled participants? Report data using the following categories:**

| Identify Participant Group] | Applied | | Enrolled | |
|---|---|---|---|---|
| **Demographic Category** | **No.** | % | **No.** | % |
| **Gender** | | | | |
| Male | | | | |
| Female | | | | |
| Choose not to report | | | | |
| **Race/ethnicity** | | | | |
| Native American or Alaskan Native | | | | |
| Asian | | | | |
| Black or African American | | | | |
| Hispanic or Latino | | | | |
| Native Hawaiian or Other Pacific Islander | | | | |
| White | | | | |
| Choose not to report | | | | |
| **School setting (students and teachers)** | | | | |
| Urban (city) | | | | |
| Suburban | | | | |
| Rural (country) | | | | |
| Frontier or tribal School | | | | |
| DoDDS/DoDEA School | | | | |
| Home school | | | | |
| Online school | | | | |
| Choose not to report | | | | |
| **Receives free or reduced lunch (students only)** | | | | |
| Yes | | | | |

| | | | | |
|---|---|---|---|---|
| No | | | | |
| Choose not to report | | | | |
| **English is a first language (students only)** | | | | |
| Yes | | | | |
| No | | | | |
| Choose not to report | | | | |
| **One parent/guardian graduated from college (students only)** | | | | |
| Yes | | | | |
| No | | | | |
| Choose not to report | | | | |
| **Documented disability (students only)** | | | | |
| Yes | | | | |
| No | | | | |
| Choose not to report | | | | |

**4. For the target audience(s) listed in the previous section (replicate the table as needed), what are the rates of past AEOP participation of the applicants and enrolled participants? Report data using the following categories:**

| [Identify Participant Group] | Applied | | Enrolled | |
|---|---|---|---|---|
| **AEOP element** | **No.** | % | **No.** | % |
| Camp Invention | | | | |
| Junior Solar Sprint | | | | |
| eCYBERMISSION | | | | |
| West Point Bridge Design Competition | | | | |
| Junior Science & Humanities Symposium | | | | |
| Gains in the Education of Mathematics and Science | | | | |
| UNITE | | | | |
| Science and Engineering Apprentice Program | | | | |
| Research and Engineering Apprenticeship Program | | | | |
| High School Apprenticeship Program | | | | |
| College Qualified Leaders | | | | |
| Undergraduate Research Apprenticeship Program | | | | |
| STEM Teachers Academy | | | | |
| SMART Scholarship | | | | |
| NDSEG Fellowship | | | | |

## Organizations participating or served

1. **How many of each organization are served by the program? Report data in the following categories:**

| Organizations | No. |
|---|---|
| K-12 schools | |
| Title 1 K-12 schools | |
| Colleges/universities (including community colleges) | |
| Army/DoD laboratories | |
| Other collaborating organizations (educational agencies, professional associations, external sponsors, etc.) | |

2. **Please list all colleges/universities served by the program.**

3. **Please list all Army/DoD laboratories served by the program.**

4. **Please list other collaborating organizations served by the program.**

# Other Impacts

**Have the FY14 program activities impacted human and/or infrastructure resources in any additional areas beyond the primary objectives of the program? If so, please describe any activities and results of those activities, especially pertaining to the following:**

- **Engagement opportunities for the public (beyond those persons typically considered program participants) to increase interest in STEM, perception of STEM's value to their lives, or their ability to participate in STEM**
- **Professional development for pre-service or in-service STEM teachers to improve their content knowledge and pedagogical skills**
- **Development and/or dissemination of instructional materials or educational resources**
- **Support for the development or advancement of STEM personnel (i.e., Army Scientists & Engineers, Army-sponsored university faculty and other personnel), programs, or other physical infrastructure**
- **Contributions having intellectual merit or broader impact to the field of informal science education and outreach**

If any of these activities are conducted through websites and/or social media, the summary of results should include the analysis of key website or social media analytics.

# Funding, Budget, and Expenditures

**1. Provide an overview of FY14 funding**

| FY14 Funding Overview | Amount |
|---|---|
| Carry-forward funding from FY13 | |
| New funding received in FY14 | |
| Total budget for FY14 (FY13 carry-over plus FY14 new funding) | |
| Total FY14 expenses (estimate for 30 Sept) | |
| Carry-forward funding from FY14 into FY15 (total FY14 budget minus estimate of total FY14 expenses) | |

**2. Funding to the cooperative agreement comes from a variety of sources (general purpose funds, laboratory specific stipend funds, and Navy and Air Force funds for JSHS, etc.). The type of funding is indicated on AEOP CA modifications. What type of funds supported your program in FY14 (include funding carried over from FY13 in your totals)?**

| FY14 AEOP CA Funding Type/Source | Amount |
|---|---|
| General purpose funds | |
| Laboratory specific stipend funds - [Indicate Laboratory and replicate row as needed so that each contributing laboratory is represented on a separate line] | |
| Total laboratory specific stipend funds | |
| Air Force/ Navy JSHS funds | |
| Total FY14 funding (add types of funding, should be equivalent to "Total budget for FY14" in table above) | |

**3. How do your actual FY14 expenditures (estimate for 30 Sept cut-off) compare with your approved FY14 budget? Report totals in the following categories:**

| | Approved FY14 Budget (includes FY13 carry-over and new FY14 funding) | Actual FY14 Expenditures (estimate through 30 Sept) | Carry-over from FY14 into FY15 |
|---|---|---|---|
| Marketing & Outreach (include additional funding received through special AEOP Cross-Marketing RFP process) | | | |
| National Event (where applicable) | | | |
| Scholarships/awards | | | |
| Stipends | | | |
| Other direct costs (including salary & fringe); Number of FTEs =[Indicate number of FTEs including PT wage workers] | | | |
| Overhead – Indirect Rate= [Indicate Indirect Rate and to which costs the indirect applies (i.e. labor, direct costs, etc.)] | | | |
| TOTALS (should match totals provided in tables above) | | | |

**4. Calculate average cost per student and explain how the calculation was made.**

# Fast Facts

**Complete the summary chart below. Report data using the following categories and enter "NA" where not applicable.**

| FY14 [Enter Program Name] | No. |
|---|---|
| **Applications & Participants** | |
| Student Applications | |
| Student Participants | |
| Student Participation Rate (no. participants/no. applications x 100) | % |
| Teacher Applications | |
| Teacher Participants | |
| Teacher Participation Rate | % |
| Near-Peer Mentor Applications | |
| Near-Peer Mentor Participants | |
| Near-Peer Mentor Participation Rate | % |
| **Partners** | |
| Participating Colleges/Universities (including community colleges) | |
| Participating Army/DoD Laboratories | |
| Science & Engineer Participants | |
| **Apprenticeships, Awards & Stipends** | |
| Apprenticeships Provided | |
| Scholarships/Awards Provided | |
| Expenses Toward Scholarships/Awards | $ |
| Expenses Toward Stipends | $ |
| **Budget & Expenses** | |
| FY14 Total Budget (including carry-over from FY13 and new FY14 funding) | $ |
| FY14 Total Expenses (estimate through 30 Sept) | $ |
| Carry-Over from FY14 to FY15 | $ |
| Average cost per student | $ |