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Army Educational Outreach Program

Gains in the Education of Mathematics and Science (GEMS)



2017 Annual Program Evaluation Report

PART 1: Executive Summary

February 2018



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2 | Executive Summary

GEMS, administered by the National Science Teachers Association (NSTA) under the AEOP cooperative agreement, is a non-residential summer STEM enrichment program for elementary, middle, and high school students hosted at Army laboratories on site or in close coordination off site with the area Army laboratories. The overarching mission that drives the GEMS program is to interest youth in STEM through a hands-on Army laboratory experience that utilizes inquiry-based learning and Near-Peer mentoring. Although they operate under a shared mission, GEMS sites are free to include different topics in their curricula that highlight the mission of the laboratory and sites may set, in addition to the overall program goals, individual laboratory goals. Instead of prescribing a specific program-wide model and curriculum, individual sites are able to design curricula (using the hands-on, experiment-based model) and procedures that make sense considering the specialties of the facility and available resources. GEMS programs run from one to four weeks in length.

This report documents the evaluation of the FY17 GEMS 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 GEMS included questionnaires for students and mentors, 4 focus groups with students, 2 focus groups with mentors, and an annual program report compiled by NSTA.

2017 GEMS Fast Facts	
Description	GEMS is an AEOP STEM enrichment program hosted by U.S. Army research laboratories and engineering centers where local students are invited to participate in a one-week program led by Army scientists and engineers, resource teachers, and Near Peer Mentors.
Participant Population	5th through 12th Grade
No. of Applicants/Students	4,653
Number of Underserved applicants	819
No. of Registered Applicants	2,845
Number of Underserved Registered Participants	455
Placement Rate	61%
Number of Adults (Team Advisors and Volunteers – including S&Es, Near Peer Mentors, and Teachers)	510
Number of Army S&Es	281
Number of Army/DoD Research Laboratories	15

Total number of K–12 Teachers (including preservice and DoDEA)	62
Total number of K–12 Schools (Home, Private, Public, DoDEA)	924
Number of K–12 Schools — Title I	315
Number of Colleges/Universities	74
Number of DoDEA Students	34
Number of DoDEA Teachers	0
Number of DoDEA Schools	1
Number of Other Collaborating Organizations	3
Administrative Costs (includes salaries, fringe, indirect)	\$214,212
Participant Stipends	\$883,639
Other Operational Costs	\$33,425
Equipment and Supplies	\$175,128
Total Cost	\$1,306,404
Cost Per Student Participant – total cost/# of student participants	\$459

Summary of Findings

The 2017 evaluation of GEMS collected data about participants; participants' 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 the following table.

2017 GEMS Evaluation Findings	
Participant Profiles	
GEMS enrollment grew in 2017, and the program continued to serve students from populations historically underrepresented in STEM.	Enrollment in GEMS grew 15% from 2016 to 2017 (2,427 students in 2016; 2,845 students in 2017), exceeding the 2017 program goal of 2,550 participants. Nearly half of GEMS students (47%) were female in 2017 (46% in 2016), a population underrepresented in some STEM fields. GEMS continued to serve students from racial and ethnic groups historically underrepresented and underserved in STEM at rates similar to 2016. There was a slight increase in participation of Black or African American students in 2017 (26% compared to 23% in 2016); 7% of students identified themselves as Hispanic or Latino (compared to 8% in 2016).
	The proportion of students receiving free or reduced-price lunch, a commonly used indicator of low-income status, was similar in 2017 (12%) to 2016 (10%).

GEMS attracted more applicants in FY17 as compared to previous years.	GEMS sites continued to receive applications from more qualified students than they could serve. A total of 4,653 applications were submitted in 2016, exceeding the program goal of 4,600 applicants. This is an increase of 5% from 2016 when there were 4,414 applicants, an increase of 10% over 2015 when there were 4,161 applicants, and an increase of 28% over 2014 when 3,343 students submitted GEMS applications.
Actionable Program Evaluation	
GEMS marketed the program in a number of ways, however students continued to report learning about AEOP primarily through personal connections.	<p>NSTA and GEMS sites employed multiple strategies to disseminate information about the GEMS program, and implemented efforts to reach underserved and underrepresented populations such as incorporating stories and photos of GEMS participants from underserved and underrepresented backgrounds into marketing materials.</p> <p>Other than past participation in the program (37%), the most frequently reported sources of information about AEOP were personal connections, including friends (43%), family members (41%), past participants of the program (37%), and family members (34%).</p>
GEMS students were motivated to participate in the program primarily by learning opportunities, fun, the opportunity to gain laboratory experience, and career interests.	Students' most frequently cited motivators for participating in GEMS were the desire to learn something new or interesting (92%), an interest in STEM (90%), and the opportunity to learn in ways not possible in school (82%). Three-quarters of responding students (75%) indicated that having fun motivated them to participate in GEMS. The opportunity to use advanced laboratory technology (65%) and the desire to expand laboratory or research skills (64%) were also relatively frequently mentioned motivators. Over half of students also cited career interest and information as motivators, including figuring out education or career goals (57%) and exploring a unique work environment (54%) as motivators for GEMS participation.
GEMS students learned about STEM careers in general and, to a lesser extent, about DoD STEM careers, during their GEMS experiences.	<p>Nearly all students (97%) reported learning about at least one STEM job/career, and most (58%) reported learning about five or more. A smaller number (81%) reported learning about at least one DoD STEM job/career and 28% reported learning about 5 or more DoD STEM careers. These data are similar to student responses for 2015 and 2016.</p> <p>Students reported that the most impactful resource for learning about DoD STEM careers was simply participating in GEMS, with 72% of students reporting this as being somewhat or very much impactful. Over half of respondents (64%) indicated that their mentors were somewhat or very much impactful and 40% that invited speakers or career events were at least somewhat impactful in learning about DoD STEM careers. Over a third of students reported that they had not experienced other resources. Such as invited speakers or career events (38%), the AEOP website (40%), and the AEOP brochure (64%).</p> <p>80% of students indicated that they were more aware of Army or DoD STEM research and careers as a result of participating in GEMS, and 62% were more interested in pursuing a STEM career with the Army or DoD after participating.</p>
GEMS students engaged in a variety of STEM practices on a regular basis during their	A large majority of students (76% - 93%) reported engaging in most STEM practices at least once during GEMS. Three-quarters or more of students had engaged at least a few times during GEMS in practices such as using laboratory

<p>apprenticeships and reported significantly higher levels of engagement in these practices in GEMS as compared to their typical school experiences.</p>	<p>procedures and tools (88%), analyzing data or information and drawing conclusions (84%), and communicating with other students about STEM (78%).</p> <p>Students' engagement in STEM practices was significantly greater in GEMS than in their typical school experiences (large effect size, $d = 1.79$ standard deviations), suggesting that GEMS provides a unique experience with more intensive STEM engagement than students typically experience in school.</p>
<p>GEMS mentors used strategies associated with all areas of effective mentoring in their work with students.</p>	<p>A large majority of responding mentors (67% - 94%) reported using each strategy to help make the learning activities in GEMS relevant to students with the exception of selecting readings or activities that relate to students' backgrounds (48% used this strategy).</p> <p>Most mentors (52% - 98%) reported using all mentoring strategies to support the diverse needs of students as learners.</p> <p>Large majorities of mentors (83%-98%) reported using each strategy associated with supporting students' development of collaboration and interpersonal skills.</p> <p>A large majority of mentors (76% - 98%) reported using each strategy associated with supporting student engagement in authentic STEM activities with the exception of having students search for and review technical literature to support their work (35% used this strategy).</p> <p>Between 44% and 89% of mentors reported using each strategy associated with supporting students' STEM educational and career pathways. The wide variation in ages of GEMS students may account for the variable use of some of these mentoring strategies.</p>
<p>Students and mentors expressed high levels of satisfaction with their GEMS experience</p>	<p>Most students (56% - 91%) indicated that they were somewhat or very much satisfied with all program features. For example, 89% were at least somewhat satisfied with the variety of STEM topics available to them in GEMS, 91% with the teaching or mentoring during program activities, and 91% with the stipend.</p> <p>Students identified several benefits of GEMS, including the impact on their learning or knowledge in STEM students' learning or knowledge in STEM, the laboratory or hands-on experience students gained, and the opportunity to develop their 21st Century Skills (e.g., teamwork, communication, problem solving).</p> <p>Students' suggestions for program improvement included making the program longer and/or providing more time to complete projects, providing more options for program topics, and providing more hands-on activities.</p> <p>Large majorities of mentors (79% - 98%) were somewhat or very much satisfied with each feature of the program with the exception of communicating with the NSTA (44% had not experienced this). For example, 98% were at least somewhat satisfied with the location of GEMS activities and with communicating with GEMS organizers, and 91% with the support or mentorship they received during program activities.</p> <p>Mentors identified as particular strengths of GEMS the STEM learning GEMS students experience; the lab experiences and hands-on, real-world applications of knowledge GEMS offers; networking opportunities; speakers and field trips or lab tours; and the career information students receive.</p>

	Mentors' suggestions for program improvement included having more or more engaging speakers, improving curriculum to enhance activities or make it more age-appropriate, providing a larger space and/or more resources for program activities, incorporating more field trips and/or lab tours, and ensuring better technology access.
Outcomes Evaluation	
GEMS had positive impacts on students' STEM knowledge and skills.	<p>A majority of students (81% - 87%) reported learning in each area of STEM knowledge. For example, 87% learned "more than a little" or "learned a lot" about a STEM topic and 84% experienced similar levels of learning about how scientists and engineers work on real problems in STEM.</p> <p>GEMS impacted students' STEM competencies, including their science and engineering practices. For students in science-focused GEMS programs, the greatest gains were in communicating about experiments and explanations in different ways (68% learned more than a little or learned a lot) and supporting an explanation for an observation with data from experiments (67% learned more than a little or learned a lot). For students in engineering-focused GEMS programs, the greatest areas of learning (students reporting learning more than a little or learning a lot) were in carrying out procedures for an experiment (72%) and making a model of an object or system to show its parts and how they work (71%).</p>
GEMS had positive impacts on students' 21st Century Skills.	Nearly three-quarters or more of responding students (71% - 78%) reported that they learned more than a little or learned a lot in all areas of 21 st Century Skills including making changes when things do not go as planned (78%) and communicating effectively with others (77%).
GEMS had positive impacts on students' identities in STEM, and in their interest in engaging in STEM in the future.	<p>After participating in GEMS, most students (72% - 85%) agreed that GEMS had impacted their STEM identities, or feelings of confidence and self-efficacy in terms of STEM achievement. For example, 85% of students somewhat agreed or agreed that they felt like they had accomplished something in STEM and 76% that they were thinking creatively about a STEM project or activity.</p> <p>A majority of students (53% - 70%) indicated that they were more likely or much more likely to engage in most STEM activities, including participating in a STEM camp or club (70%) working on a STEM project or experiment in a university or professional setting (66%).</p> <p>Over three-quarters of students indicated that after participating in GEMS they were more interested in participating in STEM activities outside of school (82%) and that they were more interested in taking STEM classes in school (79%).</p> <p>A large majority of students (93%) were more confident in their STEM knowledge, skills, and abilities after participating in GEMS.</p>
Although GEMS students have limited awareness of other AEOP initiatives, students expressed interest in participating in AEOPs in the future and cited GEMS	<p>Most students reported that they were more aware of other AEOPs after participating in GEMS (74%) and were more interested in participating in other AEOPs (77%) as a result of participating.</p> <p>A large majority (88%) of students indicated being at least a little interested in participating in GEMS again and 75% indicated being at least somewhat interested in participating as GEMS NPMs in the future.</p>

<p>participation, their mentors, and invited speakers or career events as sources of AEOP information.</p>	<p>Many students (48% - 74%) had not heard of the other AEOPs, including JSS (48% had not heard of it), eCM (68% had not heard of it), and JSHS (72% had not heard of it). Most students who were familiar with the programs reported being at least a little interested in them, however, and relatively few indicated being “not at all” interested in future participation in any program. For example, only 9% of students were “not at all” interested in participating in JSS, 7% in eCM, and 5% in JSHS.</p>
	<p>Students indicated that participating in GEMS was most likely to impact their awareness of AEOPs “somewhat” or “very much” (86%). Their mentors (74%) and invited speakers or career events (44%) were other resources frequently cited as being at least somewhat impactful on their awareness of AEOPs.</p>
	<p>Mentors most frequently discussed GEMS (96%) and GEMS NPMs (80%) with students. More than half of mentors (52%) reported discussing AEOPs generally with students but without reference to any specific program. Relatively few mentors discussed other AEOPs specifically. For example, only 15% discussed JSHS, 15% discussed SEAP, and 7% discussed Unite with their students.</p>
	<p>Mentors most frequently rated participation on GEMS (93%) as at least somewhat useful for informing students about AEOPs. GEMS program administrators or site coordinators (88%) and invited speakers or career events (76%) were also at least somewhat useful. Over a third of mentors (35%) had not experienced the AEOP website, and 28% had not experienced the AEOP brochure.</p>
<p>GEMS students had positive opinions of DoD research and DoD researchers.</p>	<p>Large majorities of students (80% - 85%) agreed or strongly agreed with a series of positive statements about DoD researchers and research.</p>
	<p>A large majority of students (84%) reported that they have a greater appreciation of Army or DoD STEM research after participating in GEMS.</p>
<p>GEMS fostered students’ aspirations for education that would prepare them for STEM careers.</p>	<p>A large majority of students (95%) reported wanting to at least finish college (get a Bachelor’s degree), and over half (59%) indicated that they aspired to continue their education after college.</p>
	<p>Three-quarters of students (75%) were more interested in earning STEM degrees after participating in GEMS.</p>

Responsiveness to FY17 Evaluation Recommendations

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

FY16 Finding: GEMS served 2,427 students in FY16, a 6% increase over FY15. The continued upward trends in applications and enrollment provides some indication that the program attended to previous evaluator recommendations that existing sites expand their capacity to accommodate more students in order to meet existing needs and interest in communities that are already served by GEMS programs. The placement rate of 55% remained constant from FY15 to FY16 however; indicating significant continued unmet need in the program. Therefore, the FY14 and FY15 recommendation that more GEMS sites be

identified, recruited, and started in a variety of geographic locations to meet the needs and interest in more communities is repeated. Program administrators noted that there was no RFP for a new site in FY16, precluding an expansion in the number of sites, although the program did maintain the 11 sites that transitioned into the consortium in FY16. The next RFP to add a location is scheduled for FY17, and it is recommended that the program evaluate existing sites' ability to expand their capacity as well as consider adding new locations in the coming years. In order to expand the capacity of existing sites, the program should consider ways of increasing administrative support, teaching staff, physical infrastructure, and mentor participation to meet the needs and interest of potential GEMS participants.

GEMS FY17 Efforts and Outcomes: The capacity of existing sites was increased, most notably at the Engineer Research and Development Center (ERDC) and at Medical Research and Materiel Command (MRMC) Headquarters. These labs expanded participation under the FY17 RFP in Vicksburg, Mississippi, and Frederick, Maryland, respectively. ERDC added 40 students and MRMC was able to add 173 students.

A new location was also added – Armament Research, Development and Engineering Center (ARDEC) in Picatinny Arsenal, New Jersey. This site will provide room for an estimated 143 participants. The expansion to ARDEC provided 34 new Near-Peer Mentors (NPM) and Resource Teachers (RT) that did not participate last year. RT, NPM, and Scientist and Engineer (S&E) staff increased from 314 in FY16 to 510 in FY17. Administrative staff support expanded at 7 of 14 labs. Support remained constant at 4 of 14 and lowered at 2 of 14. Five of the 14 labs had new Local Program Coordinators (LPC.) Three of these five labs had LPCs who had never worked on a GEMS staff prior to FY17. Physical infrastructure expanded at 4 of 12 locations. Three of these 4 expansions were through satellite locations, Northwestern High School near Walter Reed Army Institute of Research (WRAIR); Academy of Innovation in Vicksburg, Mississippi; and Frederick Community College in Frederick, Maryland. In FY17, 281 scientists and engineers participated. This is an increase from FY16, where 215 participated.

FY16 Finding: There was little change in participation of groups underserved and underrepresented in STEM from FY14 to FY16. In FY15 and FY16 there was little evidence of targeted outreach to organizations that serve groups historically underserved and underrepresented in STEM. It is likely that in order to engage increasing numbers of students underserved and underrepresented in STEM, GEMS will need to expand targeted marketing while implementing more aggressive marketing and recruitment practices. The inclusion of organizations such as the Society for Women Engineers (SWE) and the Tiger Woods Foundation as strategic partners of the AEOP presents opportunities for marketing targeted toward these underserved and underrepresented groups. In addition, the more aggressive use of Facebook marketing implemented in FY16 should be continued, although program administrators should be mindful that only a very small percentage (3%) of students reported learning about AEOP via social media. Due to the perception of mentors that travel barriers preclude participation of some groups of students, the program and individual GEMS sites may wish to consider practical solutions to help more GEMS students travel to sites that are not close in proximity to their homes.

GEMS FY17 Efforts and Outcomes: Targeted local marketing was encouraged by the office of the Cooperative Agreement Manager (CAM) with its release of guidelines for LPC outreach in FY17. These

guidelines encouraged labs to target schools that had evidence of high percentages of members from communities that are historically underserved and underrepresented in STEM fields (U/U.) In accordance with these guidelines, the IPA cooperated with outreach partners, like DC STEM network and Prince Georges County Public Schools, to attend events in the Greater Washington, D.C. area (e.g., DC STEM network's 2017 STEM Fair). The IPA also provided Widmeyer Communications, AEOP's Marketing Partner, with stories and photos of those who participated in GEMS and came from U/U backgrounds. This was done during the program cycle and the effects will not be evident in FY17 program data, but the IPA believes providing examples of U/U inclusion will affect FY18 data.

FY16 Finding: Students continue to report that their primary source of information about GEMS was personal connections which emphasizes the quality of experience that students have in the program that motivates them to tell others about the program. However, this does exclude students who may not have connections to current or past participants. Given the large proportions of students who learned about GEMS through family, friends, and past participants of the program, the recommendation is repeated for FY16 to take measures to diversify the applicant and participant pool and to ensure that students without personal connections to sites have access to the GEMS program.

GEMS FY17 Efforts and Outcomes: There is evidence that some reduction of personally connected participants is taking place at the local level. One LPC reported that she no longer provided GEMS information through the staff newsletter that goes out to lab employees. One LPC reported that she delays putting out information to laboratory staff. Both reported that this has provided more opportunity for those that live and work outside of the laboratory's normal connections.

The IPA did not find these practices at all locations, as one local GEMS staff member reported making special accommodations on more than one occasion for those have personal connections to the lab. Interviews with LPCs during site visits revealed that it is often difficult for LPCs to turn away family of those that work in the lab due to social pressures and the need for continued support from peers and leaders inside the lab.

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

FY16 Finding: Since the program's ability to serve increasing numbers of students is limited by the number of mentors available, strategies to recruit additional RTs and NPMs and should be considered. Mentors noted in focus groups that they felt that additional support for mentors in terms of overhead funding, support for mentoring from superiors, and assistance in recruiting students for the program would be beneficial in retaining existing mentors and would increase the likelihood that Army S&Es would volunteer to act as GEMS mentors.

GEMS FY17 Efforts and Outcomes: RT and NPM application windows were opened earlier in FY17 with the hope that more NPM would apply prior to winter break. The feedback from LPC interviews suggested that the timeline was better, but that NPM and RT recruitment was more difficult this year than in previous years. A possible cause mentioned was a perception of increased scrutiny during Childcare National

Agency Checks and Inquiry (CNACI) and other lab-specific security requirements. One LPC felt like the process was a deterrent for those who wanted to participate. One LPC mentioned that potential NPMs were unable to come in for finger printing or unwilling to complete paper work.

Another LPC reported that pay was an issue. RT stipend amounts were less than local Summer School pay. This report was difficult to apply to other locations, as there seems to be inconsistency with how RTs are paid from site to site, despite an established Stipend Rate in the GEMS Stipend Policy. The inconsistencies were reported to the CAM office and a working plan was agreed upon to increase the resolution of data for stipend rates in FY18.

FY16 Finding: Since a majority of students identified their mentors as a key resource for information about AEOP opportunities, mentors should be provided with more comprehensive information about AEOP initiatives. Many mentors reported having no experience with AEOP resources. The program noted that in FY16 a presentation highlighting the AEOP portfolio was created for LPCs for use during staff orientation. Program administrators should take measures to ensure that this, and other AEOP resources, is utilized at sites during mentor orientation or informational sessions.

GEMS FY17 Efforts and Outcomes: No efforts directly mentioned regarding this finding in the FY17 GEMS APR.

FY16 Finding: Late stipend payments were a concern for NPMs. In order to retain highly skilled NPMs and recruit new NPMs, it is recommended that the program take measures to ensure that stipend payments are made on a regular, timely basis.

GEMS FY17 Efforts and Outcomes: Lead time for student stipends was lower this year than last. By the end of the first month, the median amount of business days between student roster submission and student check receipt was 7 business days. Data from last year's process was lower resolution, but the IPA estimates it was closer to 12 business days. There was an issue where reports between the IPA staff and GEMS LPC staff differ on what was sent and what was received. In the process, 93 student checks were lost. This was a risk with low probability of occurrence, but as an issue it had a large effect. The process of communicating the contents of shipments is currently in review, but will likely result in more specific data moving from the IPA to the LPC during shipments.

The IPA used more structured procedures for data entry to simplify the process of NPM and RT checks, and the results were better resolution on tracking individual staff checks. This better tracking helped the IPA determine whether checks were ahead or behind schedule. Initial feedback from LPCs led the IPA to believe that it made progress towards this recommendation. Data from evaluations and continued feedback from staff will determine if these changes led to an improved perception of timeliness. There were cases in FY17 of LPCs providing rosters to the IPA without the requested six-week notice, but most of these limited cases resulted in delays of less than two weeks. An example of the lack of a six-week

notice is one lab that began July 10: As of July 20th, the IPA staff had not received the roster to process GEMS staff checks.

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

FY16 Finding: Due to continued low rates of student awareness of AEOPs other than GEMS, the FY15 recommendation is repeated for the program to consider innovative ways to work with other AEOPs to create a more seamless continuum of programs. Since students reported that their mentors were key resources for learning about AEOPs, the program should ensure that AEOP informational materials, including the presentation created in FY16 highlighting the AEOP portfolio, reach mentors.

GEMS FY17 Efforts and Outcomes: Experiences during site visits showed that LPCs are making progress by integrating other AEOPs at the local level. During one site visit, SEAP students were completing training modules in the GEMS classroom. At the same location, a CQL student observed the GEMS students and helped answer some questions. One location continued to use a combination of the CQL and NPM programs to offer one or two college students a full-summer program. This location had two weeks of GEMS programs, so without the support of CQL, retaining NPMs through the summer would be more difficult.

The GEMS/CI IPA worked with the eCM IPA to investigate the possibility of allowing NPM to act as Team Advisors (TAs) for eCM. The main issue identified was an eCM regulation that prohibited TAs from being younger than age 21. This regulation would prohibit many NPM from participating in the programs. eCM was gathering stakeholder feedback to provide a solution or workaround. The GEMS/CI IPA continued to conduct site visits to meet with local educators and administrators promote and explain AEOP. The hope is for Local Education Authorities to see local research labs as a source for STEM education and AEOP programming.

FY16 Finding: The FY16 GEMS participation in the evaluation questionnaire is an area for concern. While the response rates for students were at an acceptable level, it was lower than in FY15. The ongoing low response rates for mentors raise questions about the representativeness of the results. Continued efforts should be undertaken to increase completion of the questionnaire, particularly for mentors. The program should emphasize the importance of evaluations with individual program sites and communicate expectations for evaluation activities. Because of issues with Internet access at GEMS sites, alternative means of questionnaire access for students should be considered. In addition, the evaluation instruments may need to be streamlined as perceived response burden could affect participation.

GEMS FY17 Efforts and Outcomes: Program time for student completion was provided in FY17. Purdue was also able to provide tablets that could gather data without a need for internet connectivity. One site reported a complete lack of internet connectivity for students and four sites reported intermittent or restricted internet connectivity. The IPA was encouraged by Purdue's willingness to provide solutions to

place-based issues and anticipates a better completion rate in FY17. The questionnaire completion rate in FY17 is unknown at end of program year. Purdue had not received 10 of 22 boxes of evaluation tablets from LPCs by their requested deadline. Purdue provided the IPA with a data brief on September 9, 2017, with about 25% of the student population reporting and 11% of the mentor population reporting.

One LPC identified an issue with tablets containing pictures of students at other locations. These photos could be considered personally identifiable information by some stakeholders. The issue was reported to Purdue and a method of wiping data from tablets was requested. Multiple LPCs reported the evaluation was too long for students and mentors. The CAM and LO planned to investigate solutions directly with Purdue.

Recommendations for FY18 Program Improvement/Growth

Evaluation findings indicate that FY17 was a very successful year for the GEMS program. Both applications to the program and participation increased for the year. Students consistently reported the impact of GEMS on their STEM knowledge, skills, interests, and future desires to participate in STEM. GEMS participants reported meaningful learning in regards to STEM careers and STEM careers within the DoD/Army specifically. In fact, 75% of participants were more interested in earning STEM degrees after participating in GEMS.

While the successes for GEMS detailed above are commendable, there are some areas that remain with potential for growth and/or improvement. The evaluation team therefore offers the following recommendations for FY18 and beyond.

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

As in FY16, GEMS student participants continued to report that their primary source of information about GEMS was personal connections which emphasizes the quality of experience that students have in the program that motivates them to tell others about the program. However, this does exclude students who may not have connections to current or past participants. Given the large proportions of students who learned about GEMS through family, friends, and past participants of the program, the recommendation is repeated for FY17 to take measures to diversify the applicant and participant pool and to ensure that students without personal connections to sites have access to the GEMS program.

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

In FY17, GEMS participants and mentors both echoed findings that have been prevalent across the AEOP portfolio. Only a very few number of participants and mentors are accessing and/or utilizing AEOP social media, including the website. In regards to GEMS, only 40% had accessed the AEOP website. It is important

for GEMS to play a role in working with the consortium overall to determine the strategy and plan for use of social media within and across the AEOPs.

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

A majority of student participants reported they had not learned about other AEOPs that would be next in their pipeline of opportunities, including JSS (48%), eCM (68%), and JSHS (72%). More than half of mentors reported only generally discussing AEOPs with participants. GEMS should invest additional effort in FY18 to provide sites with resources to use to introduce and teach participants about AEOPs in more than a one-time manner. A virtual alumni panel or using NPMs to teach GEMS participants would be good strategies to consider.