

Stimulation of Scientific Interest and Higher Confidence through the Engineering Ambassador Programs Experience

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Abstract

The primary goal of the Engineering Ambassador Program (EAP) at the inception was to engage undergraduate engineering students in K-12 outreach activities for promoting careers in engineering. The ambassadors run hands-on earthquake and coastal engineering challenges at large-scale public outreach events and schools throughout the Washington DC area. This paper, however, focuses on the stimulation of both scientific and engineering interests as an attribute by which the ambassadors themselves significantly benefit from. As the ambassadors

2016 ASEE Mid-Atlantic Section Conference

structure and later testing it in the flume. Similarly, the shake table challenge is an interactive activity informing youth participants and families about earthquakes, their impact on structures, and the role of earthquake engineers. This activity utilizes a small scale earthquake simulator for demonstration and a handheld shake table for testing. Fig.1 presents some pictures of the ambassador running the two outreach challenges.

Demonstration/Introduction, Building/Construction, Testing
Fig.1 Ambassador running the two outreach challenges.

A faculty mentor from the Department of Civil and Environmental Engineering administers the EAP at Howard University. The faculty mentor provides general guidance, communicates with the NSF, manages resources, defines general objectives, and serves as a Technical Advisor. NSF (D) (e) (4) (p) 0.1

Training is an essential component of the EAP. The training focuses on the preparation to run the two challenges and getting prepared for training sessions with volunteers (non-students). The ambassadors attend several training sessions where they work on specifics about the activities and their roles as ambassadors. Fig. 2. Shows ambassadors during training sessions. Prior to training sessions, the ambassadors must read specific background materials about tsunamis, earthquakes, and structural engineering. They also practice the introductory talk and how to answer potential questions. The ambassadors do “run-throughs” of the activity so they can anticipate issues they might encounter on the actual day of the activity. The more experienced ambassadors take leadership roles in the training sessions.

Fig. 2 Ambassadors during training sessions

Skills and attitudes changed on ambassadors

Data collected on surveys developed by T. Anagnos, et al² identified the positive impact of Engineering Ambassadorship on students. The data showed that 100% of the ambassadors reported that they had learned a great deal about the activity and their roles as ambassadors. The data also showed that 100% of the ambassadors reported that they had developed leadership skills and that they had become more confident in their ability to lead. The data also showed that 100% of the ambassadors reported that they had become more comfortable with public speaking and that they had become more comfortable with working in a team. The data also showed that 100% of the ambassadors reported that they had become more comfortable with working in a team and that they had become more comfortable with working in a team.

On the impact of EAP on stimulation of engineering interest and confidence

The participation on the EAP can bring challenges to ambassadors during the training of volunteers, when running activities and when they are answering different questions of the participants of the activities. During these interactions, the ambassadors not only need to recall their background knowledge but also to talk with authority about new subjects "tsunami earthquakes, and structural engineering". The faculty advisor perceives the ambassadors' enthusiasm to get prepared to properly handle the different interactions and to be perceived as good role models to different audiences. Further, the ambassadors perceive themselves understanding that new subjects matter better than their peers that are not part of EAP.

EAP provides exposure to the ambassadors to engineering challenges that show the real-world relevance of science and engineering; consequently, their involvement in EAP

activities on higher graduation rates in STEM disciplines[4]. It is noteworthy that the positive effects of such activities have been reported to be strongest among minorities such as African American students [5, 6]. Also, the results presented in this paper point to the fact that participants during the EAP activities in 2011 and 2012 have all successfully completed their bachelor's degree at Howard University. As such, the graduation rate of the participants in the EAP was 100%. Since the data on the number of years before graduation was not gathered, this graduation rate could not be compared with the typical 6 year or less data which is available for the College of Engineering and Architecture (CEA) and that of the Howard University. Also, the fact that the EAP participants were top academic performers might explain the 100% graduation rate. Nevertheless, the perfect graduation rate can be an indicator of the significant positive impact that the EAP participation plays on the academic success of the undergraduate students in engineering.

Acknowledgement

The authors acknowledge the support provided by the National Science Foundation through the awards CMMI-1150462 and CMMI-0927178 to support EAP. The continuous support of Dr. Joy Pauschke, NSF program manager, is gratefully acknowledged. The authors acknowledge the support of the dedicated undergraduate students -Kara Barrett and Nestor Carter

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2016 ASEE Mid-Atlantic Section Conference