

Local DC nonprofit afterschool program adds diversity to engineering field

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Generating more than \$230 billion a year, the architecture, construction, and engineering industry combined represents the second-largest U.S. employer. Joined together, architecture, construction, and engineering— also recognized as the design-build industry— employ over seven million people, represent 10 percent of all businesses, and produce more than nine percent of the Gross National Product (GNP). The design-build industry is the most prominent aspect of American society. Yet, current statistics project the need for qualified, proficient professionals working in design-build will exceed the supply, with over one million job openings by 2012.

If the U.S. is to preserve its technological infrastructure, as well as its puissant position in the global marketplace, it requires a supply of well-educated, skillful, protean workers. Although there always has been constant fluctuation of student enrollment percentages in U.S. engineering programs, student enrollment has drastically plunged approximately within the past decade.



Travon Greene, an ACE DC mentee, at UMD's Summer Program

In 2004, the [National Science Board](#) noted in its publication, *Science and Engineering Indicators*, an overall shift away from engineering enrollments, presenting the question as to whether or not the supply of engineers will meet the demand. With only 18 percent of university degrees representing potential engineering professionals entering the workforce, it is safe to assume the design-build industry will face a crisis if young, educated professionals fail to join this workforce.

Advances in engineering have led to major transformations in everyday life. Over the past century, widespread electrification; convenient transportation; water purification mechanisms; communicative technologies, such as the Internet and cell- and/or videophones; and health and recreational technologies have facilitated human tasks or made human life more entertaining, nonetheless. The engineering world will only continue to evolve, becoming more technical and convoluted. Therefore, engineers of today not only must possess technical knowledge, but with the competitiveness that accompanies today's architecture, construction, and engineering marketplace, professionals joining the design-build industry must also possess first-rate skills in management, communication, and leadership.

Overall, having an engineering degree or license will not be the only requirement needed to cut it in the ever-evolving, competitive design-build marketplace. According to the [Brookings Institute](#), 50 percent of all buildings that will exist by 2030 have not yet been constructed, and the U.S. is projecting to build \$1.2 trillion worth of projects in the future. However, if there are only 18 percent of college-educated young professionals representing engineering degrees, how will the U.S. supply the product if it cannot meet its need for qualified, young, college-educated professionals?

Working almost two years in design-build, I have witnessed drastic changes within the architecture, construction, and engineering workforce. From my experience, the design-build industry mostly consists of middle-aged or near-retirement professionals— many who have exhausted innovative methods, keeping them atop of competitors. Yet, there is no time to twiddle thumbs in this industry, as clients constantly demand output and if a design-build agency is unable to meet client expectations, then its competitors have an advantage.

Surveying the land for potential design-builders

Witnessing this deficit of young, experienced, college-educated professionals in design-build, I was driven to conduct a survey. During this survey, I asked college-bound youths what images immediately come to mind when thinking of architecture, construction, or engineering. Most survey participants believed professionals in engineering perform astronomical work or are “computer geeks,” and architects were deemed as simply “artists who draw buildings”. When focusing specifically on construction, 20 out of 30 participants perceived this field as being for persons who had not pursued higher-level institutionalized education— these same participants also stereotyped construction professionals as being “lazy” with slovenly appearances. Hence, judging from these survey participants’ responses, many people’s perceptions of architects, construction professionals, and engineers have been widely formed due to external images presented from individuals not in design-build.

Since design-build has a muddled and obscured history when concerning its significance and function in society, inaccurate perceptions of architecture, construction, and engineering have been perpetuated throughout years of youth education cycles. According to professionals in design-build, this “poor” image can be attributed to five prime factors:

Burgeoning interests children develop are not fully nurtured, so as to foster eventual career paths.

Parents and school counselors have misconceived notions of what architecture, construction, and engineering entail.

Design-build is viewed as a profession filled with individuals lacking intelligence.

Engineering and construction are viewed as being too physically demanding, which is not appealing to white-collar careerists.

The design-build industry does not attract its needed share of women and minorities to fulfill expanding job slots.

It is essential to provide youths with positive images of the design-build industry. The need has never been more critical. During the last one hundred years, the technological revolution has improved the quality of human life, and engineers working behind the scenes have been hugely responsible. Yet today, youths and adults do not fully understand the engineer’s role in society.

With such obstacles impeding progress, what will become of the design-build future? How will the architecture, construction, and engineering industry recruit young, bright talent to fulfill the needs of the design-build world?

Dr. Charles Thornton, Chairman of the Thornton-Tomasetti Group and founder of the [ACE](#) (architectural, construction, and engineering) Mentor Program has been working earnestly to resolve the shortage of qualified, young, experienced professionals in design-build since the early 1990s. Through fulfilling its mission to “engage, excite, and enlighten” students from diverse backgrounds, ACE’s primary goal is to offset the growing trend in declining university enrollment in architecture, construction, and engineering disciplines.

Bridging the workforce development gap

ACE was founded in 1995 in New York with only one team of mentors and students. After years of research, and experimenting with varied mentoring program structures and ways to stimulate youths’ interest in design-build, ACE formed alliances with 17 firms, merging into three teams. Each of the three teams was arranged as typical design-build team models, enlisting roughly 90 students from local high schools to participate in its afterschool mentoring program.

By June 2003, the program of which Thornton and his associates were uncertain of its future success had expanded to 28 cities. The first affiliates were New York City, NY; Stamford, CT; and Newark, NJ. Currently, ACE is comprised of 67 affiliates, expanding programs to 80 cities in 36 states. Professionals from the three pillars of architecture, construction, and engineering provide practical knowledge, develop leadership and management skills, and foster healthy attitudes and support interests in future design-build careers to thousands of high school students. Since its inception, the ACE Mentor Program, now over a decade old, can be found in most major cities across the U.S.

“When ACE first started out, no one expected the program to take off as fast as it did,” said Trisha Grant, Executive Director of the [ACE Mentor Program of the Greater Washington Metropolitan Area](#), Inc. (ACE DC). “ACE is made up of dedicated professionals from all three areas: architecture, construction, and engineering— this is why the program has seen tremendous growth. ACE DC definitely has committed mentors that inspire our high school students...We [ACE DC] are so proud of our mentors and students; everyone truly works hard.”

The Greater Washington ACE Mentor Program, now in its tenth year, is an affiliate of the nationwide ACE Mentor Program. Much like its parent affiliate, ACE DC is an amalgamation of architects, construction professionals,

engineers, societies and organizations, and high schools and universities. Currently, ACE DC has teams in Washington, DC; Alexandria, VA; and Fairfax, Arlington, Montgomery, Prince George's, and Prince William counties. Through forming these teams, ACE DC presently serves approximately 268 students in Washington, DC, Maryland, and Virginia.

ACE DC recruits youths from grades 9-12 from both public and private schools, with special efforts made to reach minority and female youths. Working in the design-build industry for the past two years, I have noticed a marginal presence of minorities, especially women. As a woman working in design-build, I have even experienced discrimination from male co-workers.

When interviewing Grant, I asked how ACE DC helps to boost the number of minorities and women in design-build to promote diversity, thereby making those professionals considered "other" feel more accepted.

Well aware of the inequity between women and men employed in design-build, Grant says ACE DC has made tremendous efforts to ensure minority and female students are included in the future of architecture, construction, and engineering. This school year females make up 45 percent of student involvement for the hands-on, design-build team mentoring program. During the previous year, there were 45 girls and 100 boys in the program. Out of 145 students, 34 were black, 47 were white, 27 were Hispanic, and 20 were Asian.

Over the years, there have been huge disparities between percentages of women and men employed in design-build. According to a recent study conducted by the [National Research Council](#) titled, *Women Scientists and Engineers Employed in Industry: Why So Few?*, women comprise only 12.3 percent of the science industry workforce. In 1978, women made up nine percent of engineers in the U.S.. Now 22 years later, the ranks of women engineers have grown only by two percent.

Female youths only make up 30 percent of students enrolled in engineering programs in U.S. schools. This huge disproportion between women and men employed in design-build is attributed to hostile working environments. However, various networks, non-profit organizations, and other support systems have started recruiting women engineers to serve as mentors to female youths who have hopes of a career in design-build. ACE DC is definitely one of these organizations.

"ACE DC and all the other affiliates recognize diversity is very important in the architecture, construction, and engineering industry," said Grant. "ACE DC makes a strong effort to attract students of diverse backgrounds. We [ACE DC] have launched various initiatives to reach out to students from all backgrounds and communities."

Grant says this approach is synonymous to how mentors direct their team of students. ACE DC ensures no student is left behind, as every student's need is satisfied. During our interview, Grant even shared student testimonies, expressing how much their self-esteems have grown, since participating in the hands-on, design-build mentoring program. Grant declares many female students undergoing the ACE DC mentoring program display much character and strength; therefore, she has no doubt they will further succeed in their futures as design-build professionals.

ACE DC is taking great strides to increase the level of interest in youths who could potentially serve as assets to the design-build industry, lessening the shortage of young, qualified, well-educated and experienced professionals. Through providing opportunities to youths who would normally be omitted from a resourceful program, due to the neighborhood in which their high school is located, ACE DC has not only inspired a generation of youths to pursue careers in design-build, but also ACE DC has assisted in diversifying an industry that has been male- and white-dominated for too long.

"ACE DC has a diverse partnership. We have participating schools such as Chantilly Academy located in Chantilly, VA and then there is H.D. Woodson in Southeast, Washington, DC," said Grant. "ACE DC makes an effort to include every student from all school districts."

ACE DC has provided several scholarships to selected students desiring to attend college, in hopes of pursuing a career in design-build. To date, ACE DC has awarded \$272,000 in college scholarships to 84 high school graduates. Out of the 17 students who recently applied during the 2009-2010 school year, 12 students were granted \$4,000 scholarships for college. Many of ACE DC's graduates have been successful after undergoing the program, as many have attended prestigious schools, such as Dartmouth and Harvard.

I am extremely proud of the work ACE DC performs, as I witnessed a testimony from Travon Greene, a student of Crossland High School in Temple Hills, MD. Greene is one of few ACE DC students selected to attend the University Of Maryland School Of Architecture Young Scholars Summer Program this past summer. Greene's testimony resonated with me because I am an alumna of Crossland High School:

"The program really gave me strong insight into the architecture industry; and truly prepared me for my future. I enjoyed every aspect of it, and I've learned just how much of a productive student I could be. There was a lot of hard work, focus, and dedication needed to successfully complete the program. Extended hours of work, long nights with nothing but a ruler and pencil at my grasps, and complicated assignments came to me as a shock and wake-up call. However...through every obstacle comes success and this program taught me that. With this experience, I feel that I am now more than ready for college; and to begin my journey to become the next BILLION DOLLAR ARCHITECT!"

However, like other non-profit organizations, ACE DC is currently facing hardship, due to the current state of the economy. Unfortunately as a result, ACE DC has had to downsize, limiting the amount of scholarships awarded normally to students, as well as scaling down on some of its hands-on, design-build mentoring sessions. While student enrollment is steadily increasing for the hands-on mentoring programs, ACE DC is wrestling with its budget to support the capacity of an ever-increasing design-build program.

ACE DC has not only done tremendous things throughout various communities with its afterschool youth mentoring programs, but also in attempting to add more diversity to a field that has been plagued with inequity and therefore, employees of minority backgrounds who have been pigeonholed, including women. I can only hope ACE DC is able to endure the economic storm to continue developing our youths for a brighter future.

To learn more about ACE DC and how you can assist in its mission, please contact [Trisha Grant](#) for additional information.

For more info: If you would like to contact the DC Youth Issues Examiner, Aisha Ali, please [email](#) her.