Fostering an Asset Mindset to Broaden Participation through the Transformation of an Engineering Diversity Program

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Introduction

Engineers in the United States typically earn salaries that comfortably sustain families and lead to higher societal status and engagement. However, less than equitable participation by women and underrepresented racial/ethnic populations means lower earning potentials and views from the sidelines instead of contributing to efforts to solve the world’s great technical and societal challenges. The efforts to increase the diversity of engineers therefore must address the recruitment and retention in engineering of individuals from underserved and underrepresented communities, alongside creating more inclusive college climates that support diverse student success. Ultimately, the desired goal is to reach parity in representation with the communities from which engineering colleges draw students and to which they send engineers to support.

Past Models of Broadening Participation Programs

Traditionally, the mission to broaden engineering participation has been the domain of specialized college programs tasked with recruiting and retaining minority and women engineering students. The diversity programs housed within the engineering college at University of Colorado Boulder were among the first of their kind in the country (Landis, 1996). Created in the mode of traditional student support services, these programs often operate on small budgets that limit their reach and effectiveness, and their activities are constrained by existing campus structures and systems.

For instance, diversity programs must often utilize a centralized admissions or recruitment office, independent of the diversity mission of engineering colleges, whose primary intention is to follow standardized metrics to make admission decisions. Specific students who fail to meet strict admissions criteria, many from diverse backgrounds, unfortunately are eliminated from the potential pool of engineering students before diversity programs can advocate on their behalf. Consequently, the types and outcomes of recruitment activities conducted by diversity programs target those who do meet the standard criteria and pass through the baseline admissions gateway. These recruitment activities often contribute little to increase the bottom line of underrepresented student numbers within engineering student populations. A second such structure, scholarships for diverse students, often are scarcely awarded due to fund limitations and other constraints. Moreover, the scholarship system often is targeted towards standard notions of who deserves such awards. Awardees often represent majority populations and those who are from more privileged backgrounds who are less in need of financial support, yet they meet a predefined set of test scores and other strict criteria deemed “excellent” that do not match the backgrounds, experience and potential for success of diverse students.

The retention process for diverse students often starts within a long-standing, month-long or more summer bridge experience to boost the college readiness of attendees who choose to apply to such a program (Ackermann, 1991; Freeman & Persaud, 2005; Walpole et al., 2008). A
second retention factor again involves the awarding of scholarships. Previously, our model (and others) specifically awarded scholarships based on community engagement as measured by “membership” within the diversity program. Those who were active in student organizations but not scholarship awardees often expressed awkward sentiments that they belonged to “that” student society and not “this” diversity program. These differences in viewpoints about belongingness led student societies to further distance members from engagement with the college diversity programs. Lack of faculty members engaged in the diverse student communities or programs, through benign neglect or lack of impetus, caused or maintained an impersonal detachment in academic interactions. Faculty members stayed away from most undergraduate students, but notably those from different backgrounds. Faculty members’ unacknowledged implicit assumptions—e.g. faculty fears about competence, neediness, ability to communicate, and numerous other ill-defined “liabilities”—meant that diverse students were marginalized in the classroom and overlooked for potentially impactful interactions and experiences, both formal and informal.

Based on this traditional college model, diversity programs became accustomed to working within a confluence of limiting factors that they deemed out of their sphere of influence or control. The result continued to diminish personal contact with, and deficit mindsets about, the populations that they themselves intended to serve.

Need for Meaningfully Rethinking Diversity Program Structures

We realized that reaching parity representation for women and racial/ethnic minorities in engineering is attainable only if engineering educators, administrators, and participants began to fundamentally rethink and reconfigure our academic structures to recognize diversity as an asset rather than a liability. Instead, we learned from recent research revealing the insidious prevalence of binary classification systems which repeatedly categorize students as capable or incapable—sufficient or deficient—to begin or proceed onward in engineering undergraduate programs, with cascading consequences for students who find themselves in the latter grouping (Smit, 2012). We saw that often students found in need of “remedial” preparation are non-traditional, underrepresented students with preparation and backgrounds different from those in the mainstream, measured against and legitimized by standardized test scores and other quantitative variables. Yet these diverse students clearly bring unique and valuable strengths and experiences to engineering, fortes that many of the typical male, middle- and upper-class engineering students do not possess. Not surprisingly, these strengths—e.g. motivation, work ethic, leadership characteristics, community loyalty, strong ethnic cultural values, financial and family responsibility, among others— do not appear on an official transcript and are not captured by test scores (Seymour & Hewitt, 2000). In acknowledging these strengths as assets to all in the engineering student population, we must also consider these strengths in the admission and subsequent academic success evaluation process.

This paper discusses the ongoing work to transform our institution’s beliefs, as well as our academic and curricular structures, to be inclusive of diversity and consider a range of background experiences as assets rather than deficiencies. Examples of the structural, philosophical and measurable changes of our institution are discussed in the creation and
administration of a unified, more inclusive diversity program, called the Broadening Opportunity through Leadership and Diversity (BOLD) Center. An inclusive excellence mindset helped to instigate different actions in many previously unquestioned, long-standing systems and beliefs involved in our own work to make progress towards broadening participation in engineering. Focused on graduating—not simply supporting—increasing numbers of diverse engineers led the BOLD Center to identify structures and policies that could be optimized, eliminated or created that reinforced our unified intention to establish an academically successful system for underrepresented students (Louie, Parker, & Myers, 2015).

We also highlight the outcomes and lessons learned in creating and administering a novel access program, called the Engineering GoldShirt Program (GS), for next-tier students (T. Ennis et al., 2010). We acknowledge our initial and fallacious thinking that these students required additional “boosting” to be able to achieve success in their engineering education. This paper presents results from our research that raised awareness of the ways assuming GS students would need additional remedial coursework hindered their identity development as capable engineers. We also demonstrate how deficit ideologies and assumptions about the GS students received from the mainstream community instead reinforced their visible differences and outsider status, isolated from conventional curricular pathways. Changes to key aspects of the GS Program has led to more student success and growth in the program. These changes included providing more flexibility in course selection, peer mentoring and tutoring, a diverse set of internship and research opportunities, and employment in engineering departments in the College.

Background: Asset vs. Deficit Mindset

*Individual mindset development:* Yeager and Dweck (2012) studied the negative consequences from placing community college students in pre-college, or remedial, math classes. Up to two thirds of such students did not transfer to four-year colleges, a result of the complex system of thought and lack of academic progress established by the remediation process. The researchers found many of these students believed they did not have the ability to perform math tasks—a fixed mindset—and recommended that an intervention aimed at instilling a growth mindset was needed. These interventions focus heavily on the process and dedicated effort involved in learning new things. They note that such students have a high need for resilience as well. Duckworth and colleagues (2007) postulate that a non-cognitive factor called grit—exemplified by the perseverance and passion for long-term goals—will lead students to find success in the face of adversity.

In our work we promote both growing one’s intellect through hard work as well as instilling the determination that can motivate students to excel in challenging engineering coursework. Many students have already implemented the asset model in their high school education and personal lives using the power of working hard. Nevertheless, competing with individual beliefs are pre-existing structures and systems that perpetuate deficit beliefs about student abilities. For example, the common practice of having students take a math placement exam to determine their starting point in the math sequence can lead to detrimental interpretations of students being “behind” their peers or not belonging in an engineering degree program—all before official coursework even begins.
Remedial mindset in educational systems: It is easy to see that those in positions of power can undermine a student’s identity within a system with predisposed expectations about prior academic attainment. Students can be demoralized by a system that disregards their past accomplishments, cultural norms and strengths. Moreover, these new expectations ignore the belief system of individuals to use hard work in developing as college scholars and engineering students.

Phillips and Beddoes (2013) introduced the concept of deficit thinking to an engineering education audience in the context of engineering communication and the public image of engineering instead of applying it to examine our own diversity systems and educational programs. We find that turning a critical eye towards ourselves, acknowledging our deficit mindsets as administrators and faculty and examining how these limiting assumptions become embedded into our programs meant to support our diverse students, has revealed areas to target for change and improvement. The deficit mindsets of administrators and faculty are also passed along to many engineering students who then appropriate these assumptions and beliefs onto diverse students.

Educational researchers have examined the origins of deficit thinking in educational systems (Valencia, 1997), issued calls to action for teachers to challenge deficit-thinking models (Weiner, 2006) and specifically investigated the impact of deficit thinking in higher education (McKay & Devlin, 2016; Smit, 2012). In our own institution faculty, mentioning a student of color by name, have unwittingly associated students with deficit abilities based on outward appearances. We build on this prior research, using deficit thinking as a framework to explain the limitations of our prior diversity program model and consider how moving away from remedial assumptions towards asset and strength-based thinking has motivated the transformational changes made in our beliefs and actions to enable greater success in broadening participation outcomes.

Harper (2006; 2010) describes an anti-deficit approach to diversity and inclusion programming that provides a useful framework for our work. This framework developed from a significant study of successful black males in science, technology, engineering and math (STEM) collegiate fields. He proposes that sufficient research results have accumulated to document the differences in attainment between minority and majority students in graduation rates, grades, preparation levels, persistence in STEM degrees and continuation into graduate degree programs. Focusing on additional research in this vein does not add to the discourse that should focus on the attributes of creating student success. Instead, this work examines the factors that supported and promoted successful outcomes for Black males. The findings include greater understanding about, for example, the impact and type of family support, how students became more engaged in college activities and interested in leadership roles, and the types of faculty support and other college resources that successful students sought out and used. Perna and colleagues (2010) studied other underrepresented students in STEM with a similar, anti-deficit approach. Their study documents the benefits from, for instance, paid summer internships that help students to secure financial resources to pay for college, and at the same time, to overcome the marginalization that students can experience in their college settings as they integrate themselves into the STEM professional world. These types of positive, asset-building approaches used by
successful students are among those that the BOLD Center implements. Thus, the anti-deficit framework provides useful guidance as we steer students towards programming, resources and choices that will build their mindsets, abilities and skills for their engineering futures.

Building social capital to underpin success: Diversity programs have filled the vital social capital role of facilitating information transfer and resource availability for students. This role can be especially important for those who are first-generation, attended low-resourced high schools, or have diverse cultural backgrounds. Such “bridging” is a functionally specific component of social capital that links the knowledge on how to use a network or to access information that will provide opportunities to enhance one’s position within a system (Kim & Schneider, 2006). Parents of majority students often bridge their networks and knowledge for their children, especially if they themselves have attended college. However, using resources through programs that support diverse students is an asset-building action that can lead to educational attainment and opportunities developed from increased interpersonal relationships and broader social connections. Diversity programs also bridge social capital information related to the norms within a college setting that can build a sense of identity and belonging; understanding and using these norms are strong assets for students from non-majority cultures when undertaking an undergraduate degree in STEM disciplines (Bryan, Moore-Thomas, Day-Vines, & Holcomb-McCoy, 2011).

Methods and Research Questions

This study uses a mixed-methods procedure including both quantitative and qualitative assessment methods. Participants were students from the BOLD Center’s access initiatives and summer bridge programs. Survey assessments evaluated first-year identity measures of growth and importance. Qualitative assessments took the form of one-on-one interviews and focus groups composed of student participants; these interviews were coded qualitatively to develop themes related to asset vs. deficit mindsets and self-identity. Comparative and historical analyses of grade outcomes, enrollment and graduation rates, and demographics have also been conducted for the BOLD Center’s Engineering GoldShirt Program participants.

Of importance in this study is an understanding of the experiences of students. Therefore, the following research questions are addressed:

- In which areas in students’ academic and extracurricular lives do they experience asset or deficit treatments from the college systems and structures?
- How do the elements of the BOLD Center support or hinder student success?

Findings: New Inclusive Excellence Diversity Program – Formation and Transformational Actions

Data analysis of the historical recruitment and graduation rates at the University of Colorado Boulder led top college leadership to question the existing models of racial/ethnic and gender support programs, since many years of low or no growth existed for the numbers of diverse engineering students. Our institution had a separate program for women and minority students,
and both had been in place for over two to three decades. See Figure 1 for historical enrollment of first-year students by demographic.

![PERCENT WOMEN AND URM STUDENTS IN FIRST-YEAR ENGINEERING COHORT](image)

**Figure 1.** Undergraduate Female and URM students’ First-Year Enrollment by percentage.

Underrepresented minority student representation and total enrollment trends had been flat for numerous years. While moderate growth in women’s representation had been experienced, persistently low numbers undermined maintaining a growth trend. The first step to finding remedies to these unsatisfactory results was to raise the level of priority for diversity in the College through the appointment of a dedicated associate dean for inclusive excellence, one of the first among engineering colleges, whose mandate was to boost diverse student enrollment and graduation rates. The new associate dean recognized that the parallel but isolated efforts by both original diversity programs required more unified action. A focused and broadened recruitment effort meant working to increase both demographics simultaneously. Growth in enrollment numbers for first-year women and URM students became the first major goal. The unprecedented step was taken in 2008 to merge the two long-standing gender and racial/ethnic diversity programs to create the new Broadening Opportunity through Leadership and Diversity (BOLD) Center, supported by the leadership of the College and campus. Immediately, the staff numbers doubled, and the reorganization led to more defined responsibilities for the directors of the BOLD Center. It was instrumental in the work of the BOLD Center that the new associate dean advocated at the senior leadership level for increased resources and attention on the BOLD’s behalf. This was a large-scale demonstration of the asset mindset for the work of the new BOLD Center. See the new organizational configuration of the BOLD Center in Figure 2, which depicts the minority and women student threads that weaves through all programmatic efforts.
Responses to the new unified format varied across the spectrum. It is difficult to change programs that have existed in one format for so many years. Industry contacts applauded the new program, noting that they and their companies view diversity work through a unified lens. Immediately, they were interested to learn of our combined initiatives and to support them. Many faculty members also supported the changes, but a few expressed concerns echoed among a segment of the students. Many expressed doubts about providing a safe space for students. Women students had enjoyed a private environment amongst themselves that in its extreme meant isolation from nonusers of the space. Minority students were resentful of majority women and men studying in their former dedicated space. Through this transition period that lasted over two years, the BOLD Center staff remained positive and approachable for discussions. Asset-based transitions of this magnitude are controversial and painful but are necessary for growth. Upper-class students who were supported through these program hesitated to engage in the new model while incoming students experienced the BOLD Center during its infancy stage. The success of the BOLD Center during this stage is attributed to the BOLD Staff, key College leaders, BOLD student leaders and diverse student society student leaders who intentionally committed to working collaboratively through this transition. Now, all aspects of the program are working together.

**Expecting Excellence in Academic Outcomes**

Three pillars of excellence support the expanded diversity and inclusion work effort for the BOLD Center: access, retention and performance (Louie & Sullivan, 2010). Expecting and driving towards excellence establishes the belief and means to accomplish the new program’s goals. Along with seeking excellence, really understanding our data became, and still is, a
guiding principle for our work. We slowly came to realize our passivity in creating and maintaining systems rather than actively seeking real change. The gaps in graduation rates and performance (shown in Figure 3) demonstrated to the BOLD Center that instilling an excellence mindset in students, faculty and staff would be critical to realize any narrowing of these gaps. Seeking to praise achievement and the hard work it demanded started with intentional communications that students should expect to earn higher grades and work harder to achieve this goal (Yeager & Dweck, 2012). For instance, we frequently mentioned how companies seek engineering graduates with at least a B grades or greater, or a 3.0 grade point average (GPA). Students learn a variety of study and test-taking strategies to empower their efforts, many taught by BOLD staff. We have found that forming personal relationships that open up communication pathways about academic performance has led to better retention of students, especially those from underrepresented minority populations. As shown in Figure 3, early gains in performance are easily reversed, but in general, most graduation GPAs by demographic have increased to at least a 3.0 GPA since the instigation of the BOLD Center with long-term strategies to foster success.

![Figure 3. BS Degree Performance by demographic.](image)

Notably, the BOLD Center started the College’s first drop-in, peer tutoring program. Its usage has been advertised to all students in engineering, not just those from underrepresented groups, with the message that “‘A’ students get help from tutoring.” Students using the tutoring center were less likely to go on grade suspension, and their self-perception was that they earned about a letter grade greater than they would have without tutoring support (Louie, Knight, & Sullivan, 2011). Survey results had revealed that diverse students avoided tutoring due to feeling...
uncomfortable and hesitant to enter the space. Consequently, the BOLD Center took steps to make the tutoring space feel safer by training tutors in the art of friendliness, emphasizing the diversity and inclusion mission of the BOLD Center, and purposefully adding academically strong, underrepresented students as tutors and role models. The success of this approach led to faculty across the college sending students to work with our tutors after realizing the benefits from the more focused efforts spent on their subjects, further legitimizing the concept that tutoring in the BOLD Center is helpful and meant for everyone’s benefit. Now, usage of the program is at an all-time high. Tutor training has shifted to encompass more strength-based, or asset, thinking. An important concept tutors are encouraged to convey to struggling students is that “you don’t understand it yet.” By valuing the effort and time needed to understand more difficult concepts, the tutors laud students’ efforts to learn rather than sharing in their laments or self-limiting assumptions about their intellect.

The BOLD Center also promoted enrollment in math co-seminars, small, optional, collaborative pass-fail courses offered as a way to build calculus knowledge. For a time, the Program’s scholarship recipients were required to take these co-seminars. The historical grade analysis and prevailing sentiment was that higher calculus grades were earned for takers vs. non-takers. Moreover, when students with similar math entry metrics were compared, much more variable results were found, with many performing worse though enrolled in the co-seminar, though not found for all students. Additionally, a more detailed longitudinal analysis found that students who took the math co-seminar with Calculus 1 had lower engineering graduation rates than non-takers, but these results were mixed overall.

See Table 1 that presents these results for the set of math co-seminars courses (called “workgroups”). We dropped the requirement to enroll when survey and interview results revealed widespread resentment about our assumptions regarding their need for the additional course. After lifting the requirement, many students not enrolled in the co-seminars had average math course grades greater than for the co-seminar takers, but not consistently across all demographics or all levels of math.

The previous requirement was implemented to help BOLD Center students earn higher grades, but many students viewed this intention negatively and remedial rather than simply helpful. Students interpreted the additional required course as forcing them to address their externally perceived deficits in prior knowledge or skills. In reality, many had already taken calculus or pre-calculus in high school and felt confident about their abilities. Removing the co-seminar requirement meant that the BOLD Center supported students’ self-beliefs and chosen actions about their math abilities. In contrast, the tutoring program’s similar messages were better received because it became a student’s choice whether or not to use tutoring. This strategy empowered students to take more control over their own learning, supporting development of a hard work mindset as an asset instead of requiring additional remedial courses to address perceived deficits.
Table 1. Math course average grades by demographic for students who enrolled in co-seminars (called “workgroups”) after dropping the requirement for Program scholarship holders.

<table>
<thead>
<tr>
<th>Course</th>
<th>Workgroup Takers</th>
<th>Workgroup Non-Takers</th>
<th>Significant Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Course Grade Avg</td>
<td>% D/F/W</td>
<td>Course Grade Avg</td>
</tr>
<tr>
<td>APPM 1235 - Precalc for Eng</td>
<td>2.63</td>
<td>9%</td>
<td>2.13</td>
</tr>
<tr>
<td>Female</td>
<td>2.75</td>
<td>2.10</td>
<td>2.15</td>
</tr>
<tr>
<td>Male</td>
<td>2.54</td>
<td>1.69</td>
<td>2.23</td>
</tr>
<tr>
<td>URM</td>
<td>2.45</td>
<td>3.06</td>
<td>2.30</td>
</tr>
<tr>
<td>Majority</td>
<td>3.06</td>
<td>2.23</td>
<td>0.0674</td>
</tr>
<tr>
<td>APPM 1350 - Calculus 1</td>
<td>2.60</td>
<td>18%</td>
<td>2.49</td>
</tr>
<tr>
<td>Female</td>
<td>2.86</td>
<td>2.66</td>
<td>0.2104</td>
</tr>
<tr>
<td>Male</td>
<td>2.38</td>
<td>2.56</td>
<td>0.1527</td>
</tr>
<tr>
<td>URM</td>
<td>1.93</td>
<td>2.33</td>
<td>0.1823</td>
</tr>
<tr>
<td>Majority</td>
<td>2.70</td>
<td>2.59</td>
<td>0.2648</td>
</tr>
<tr>
<td>APPM 1360 - Calculus 2</td>
<td>2.22</td>
<td>27%</td>
<td>1.94</td>
</tr>
<tr>
<td>Female</td>
<td>2.73</td>
<td>1.80</td>
<td>0.0042</td>
</tr>
<tr>
<td>Male</td>
<td>2.07</td>
<td>2.22</td>
<td>0.4640</td>
</tr>
<tr>
<td>URM</td>
<td>1.78</td>
<td>1.51</td>
<td>0.6135</td>
</tr>
<tr>
<td>Majority</td>
<td>2.38</td>
<td>2.21</td>
<td>0.3432</td>
</tr>
<tr>
<td>APPM 2350 - Calculus 3</td>
<td>2.15</td>
<td>32%</td>
<td>2.11</td>
</tr>
<tr>
<td>Female</td>
<td>2.74</td>
<td>2.18</td>
<td>0.0322</td>
</tr>
<tr>
<td>Male</td>
<td>1.98</td>
<td>2.20</td>
<td>0.2772</td>
</tr>
<tr>
<td>URM</td>
<td>1.71</td>
<td>1.84</td>
<td>0.7768</td>
</tr>
<tr>
<td>Majority</td>
<td>2.31</td>
<td>2.23</td>
<td>0.6642</td>
</tr>
</tbody>
</table>

Another asset-building initiative was the encouragement to undertake an undergraduate research experience. Presented as a good way to get that elusive experience that employers seek, many students viewed the typical 10+ hours per week work effort as too demanding a load on top of their numerous courses and did not pursue undergraduate research experiences. In response to this perception, the BOLD Center developed two introductory research pathways to help break down the access barriers (Louie, Ennis, & Dunn, 2016). First, a semester-long program, completed on a work schedule of three to five hours per week, established graduate student mentors paired with undergraduates who accomplish a small research project designed and guided by the graduate student. Second, a one-week program over spring break also paired graduate mentors with undergraduates with the goal of learning research skills and undertaking tasks to build knowledge in the graduate’s research area. Both programs provided significant training for graduate students in coaching and mentoring (2012; 2013). Feedback from both programs reveal the asset-building aspects of all participants, graduate and undergraduate students, as they work with each other to accomplish a technical goal.
Access Issues Lead to a New Program for Next Tier Students

In the *access* arena, much like many institutions around the country, the centralized process produced a yearly batch of admitted students that the individual colleges would take on during fall enrollment. It became clear that the centralized system limited the ability by the College and the BOLD Center to keep track of admitted student numbers, much less to affect the consideration process that could lead to finding additional excellent, diverse students in high schools. Discussions by the associate dean with the Admissions office led to gaining real-time access to the Admissions database and updated information regarding enrollment numbers. Moreover, the published standardized test scores became a range rather than a single average across the entire cohort, a key factor in attracting more applications.

*Increasing women’s enrollment:* The access work then involved multiple ways of contacting students to alert them to opportunities in engineering (Parker et al, 2014). Awareness of scholarship support—fueled by phone calls and postcard writing by BOLD students with this information—attracted more applications, particularly from women. As shown in Figure 1, women’s first year enrollment has increased by 60% in first-year class representation (from 20% in 2008 to 32% in 2016) and by an amazing 116% increase in the number of women in the first-year class (from 154 in 2008 to 332 in 2016, accompanied by overall college growth). Figure 1 also marks the changeover to the BOLD Center in 2008, demonstrating the marked increase in growth numbers. The BOLD Center continues to work on increasing the numbers of applicants, which directly increases the numbers of women who enroll.

*Increasing Enrollment of Racial/Ethnic Diverse Students:* The BOLD Center’s work to understand the profile of high school graduates led to increased contact with a different set of schools from which such students graduated. Yet, when the graduation numbers were tallied and sorted by admissibility, the BOLD Center realized their goals to reach parity for URM students could not be realized for many years. As illustrated in Figure 4, we evaluated the admission “funnel” looking at how many applications, admittances, and confirmations would be necessary to matriculate the number and percent of women and minority students in our 3-year and 10-year goals, based on a fixed enrollment class size of 725. We found that there were fewer underrepresented minority students graduating in our state, with test scores deemed in the range necessary for admission, than we would need to apply to our single school to meet our 10-year goal.
Figure 4. The admission “funnel” that showed the large number of women and underrepresented minority students that needed to apply to our college to achieve the desired enrollment goals.

Through numerous brainstorming sessions with a variety of college stakeholders invested in building a more diverse student population, a novel approach led to creation of an alternative access pathway to and through our engineering college. While the numbers of directly admissible diverse students were limited, including the “next tier” of high school graduates for engineering admissions consideration was worth pursuing; a go-ahead was obtained from the leadership ranks to form the new Engineering GoldShirt (GS) Program (T. Ennis et al., 2010). Figure 5 shows a 30% increase from 2009 to 2010 for the number of underrepresented students who enrolled in the College, directly attributable to the implementation and growth in the GS Program. In fact, GS Program first-year enrollment in 2016 is nearly equivalent to the total underrepresented first-year enrollment average in the several years prior to its start. This catalytic effect on enrollment by the GS Program encourages the BOLD Center to continue to grow this program and find other access approaches that can attract more underrepresented students including the community college pathway.
Candidate Identification: The identified student candidates for the Engineering GoldShirt Program had applied to one of the majors in our College of Engineering and Applied Science, but they were not directly admissible by traditional criteria; in the past, they had been given admission to an alternative college option, our College of Arts & Sciences. In contrast, we set out to create an inclusive program housed in the engineering college, and several desirable candidate attributes surfaced: personal interaction and support, demonstration of leadership and/or academic accomplishment, and positive contributions to current and future communities. An interview process was set up to seek this more holistic evidence from candidates that is missing from the standard admissions information. Selection criteria, participation requirements, future course options and schedules, and housing arrangements were determined and reviewed on a real-time basis. Each year details and requirements were changed, many because of their restrictive nature, and some because they were superfluous. Some changes occurred to address the tones of “remedial” and “deficit mindset” that we ourselves had inadvertently implemented, thinking that our actions were “good for the students.”

Interview Process: An interview script and rubrics were developed to determine how candidates approached challenges, including academic help-seeking attitudes and behaviors. Questions around organizational habits were included. Of key importance was to learn about their past team and leadership experiences. From these areas desirable candidate characteristics included
engineering interest, personal responsibility, self-initiative, determination, compassion, and importance of community. We enlisted a broad group of faculty and staff from the College to interview candidates. Many gave individual feedback about the “outstanding” candidates they had the opportunity to meet during their one-on-one interviews. In this way, the GS Program over time helped to shift the mindset of other faculty and staff in the College from possible deficit thinking to asset thinking, expanding their involvement in the future with diverse students from the BOLD Center, as they learned about the pathways students had chosen to undertake to attain a future in engineering. This shift towards an asset mentality contributed to the overall diversifying efforts for the College. The transformational process starts with small steps.

Summer Bridge: One of the premises about a summer transition experience for first-year students, commonly called “Summer Bridge,” was its efficacy in promoting persistence and better performance in engineering. However, an examination of the long-term results reflected the poor subsequent academic results for many years of previous Summer Bridge attendees of which 33% earned probationary or suspension status. These results could not justify the high cost of the five- to six-week program. Consequently, BOLD and GS Program leadership reduced the length of time and revised the content of the two summer experiences they offered. Previously, students participated in short versions of their future fall courses, regardless of past academic record. Now, both Summer Bridge offerings focus on the development of strong engineering identity, through interactions with faculty and student mentors. As role models, they convey their excitement for engineering and strategies for academic success.

The GS Program Summer Bridge components include courses such as spatial visualization and engineering design to build background skills for engineering. Of importance are intentional activities to support building one’s community in the cohort and increase familiarity with the campus, and seminars that increase students’ ability to navigate the higher education landscape. Students live and learn together in a residence hall as near peer mentors serve as residence advisors and teaching assistants during the two-week program. The program ends with an engineering design expo and a closing community building activity. These activities celebrate the beginning of the engineering pathway for GS Program students to convey their developing personal assets and positive mindsets for accomplishing their goals.

On-campus housing: GS Program students had taken spaces offered by another engineering academic program keen to diversify their residential make-up. This program encouraged their participants to reside in the hall all the way through the senior year, creating a unified community. Early in the existence of the GS Program, we realized the academic and community benefits of students residing on campus for more than one year, so a requirement for two years was implemented, a decision that positively affected their performance.

We believed that GS Program students would identify with those from the other engineering academic program, and all students would gain from learning about other’s experiences in living with those of different backgrounds. The community was filled with students committed to engineering who enjoyed many extracurricular activities together. The high achievement of students from both programs would provide a common backdrop.
However, student interviews and conversations revealed evidence of demeaning behavior by some of the other engineering academic program students who joked or claimed assumptions about the deficits of the GS Program students. Comments included calling the GS students the “GoldS!#@ students,” a particularly hurtful permutation of the program’s name. One GS Program student describes the scenario:

“I know a lot of the other cohorts of the GoldShirt Program told us that people call us ‘GoldS!#@’ (derogatory term). Because we technically didn't get into the College of Engineering and we live with the people who are the smartest in engineering. They don't really like that mix. I know a lot of people at the engineering program don't like that mix either. They call us GoldS!#@.”

~ Interview with Amanda, GS Cohort 5

The disrespect expressed towards GS Program participants was mitigated somewhat when the residence hall director emailed all residents to warn against “referring to them [GS students] like that,” but without faculty intervention the tendencies of the students to use such language is telling of the relative perceptions of the GS students from those in the other academic program.

The students from the other program came from high-achievement, often privileged, backgrounds, and they were directly admissible. On the other hand, GS students, though also often demonstrating stellar achievements through their high school years, entered through an alternative process pathway. A good portion—though not all—were underrepresented and/or from lower privileged circumstances. GoldShirt students often started in lower level math courses, and they frequently sought the help of their hall neighbors who seemed glad to offer it. Those in the other program called out these and other differences, making many question their identification with a nd belongingness in engineering and, in some instances, contributing to decisions to leave the College.

On the faculty side during this same period, additional damaging biases were revealed when instructors would mention in passing that they had a certain number of GS students enrolled in their courses. When questioned further, these instructors would explain that they assumed students of certain ethnicities were part of the GS program, simply based on their physical appearance instead of any actual knowledge of their affiliation with the program.

The Dean of the College, in his strategic plan, said he intended to grow the program in an effort to increase the representation of diverse students. When an effort to gain more beds in the shared residence hall failed, the program leadership decided to move the program to a different residence hall. The decision to move the GS Program to another dedicated residence hall changed the attitudes for many in positive ways; dedicated social programming helped students to celebrate and share with each other without judgment. A branch of the BOLD Center’s tutoring program operated nightly within that residence hall, so GS and other engineering friends worked together with the trained and paid tutors. Community building and social events were planned and students actively participated (e.g. attending theatre and concert events and celebrating social and holiday activities together). The GS leadership learned that the concept of safe spaces, where students can be themselves, is key in the experiences of college students. A
A safe residential hall can lift the burden of others’ expectations—because a higher proportion of students are more alike—while establishing ways to acknowledge the many assets of underrepresented students.

Course Choices: One-on-one interviews revealed that GS students were sensitive to the perceptions that they were in a remedial program, as no other engineering students were enrolled in many of their courses. Their first-year courses were prescribed for them, leaving them little choice in course selection. They viewed their special program as “the fifth year of high school” rather than their first in college. They demanded to be treated “like every other engineering student” (O’Connor et al., 2015). An improved enrollment advising process, which looked deeper into each student’s academic readiness, empowered the students to choose optional courses, sections of required courses, and the math and science courses that matched their preparation level. In addition, the students also enrolled in a humanities course with other engineering students, led by a professor widely recognized for outstanding teaching. This course provided a venue for discussions and activities fostered by reading classical books with surprisingly modern connotations. These arguably small decisions when summed together build the concept of one’s own engineering identity for the GS students.

Readiness for Calculus 1 is expected for incoming engineering students, but nationwide colleges, including ours, are finding that many students earn poor grades in their first college-level calculus course. Standardized test scores, placement and prior calculus or pre-calculus experience all demonstrate varying degrees of correlation to college calculus success (Edge & Friedberg, 1984). Like others, our College decided to implement a course placement process to ensure that students are “qualified” to enroll (“Calculus Readiness Requirement - Cockrell School of Engineering,” 2017). When many GS students placed into the pre-calculus level, such a course existed only in the Math department housed in another college. GoldShirt students were enrolled into small sections of the Math-based Algebra or Trigonometry courses as well as a Calculus co-seminar course to bridge their knowledge to Calculus, but in their next math class, Engineering-based Calculus 1, they struggled. Students had deemed their course prior to taking Calculus 1 as “easy”—most earning high grades without much effort. Consequently, GS leadership worked to establish a pre-calculus course for our College that better prepared student for the pace and intellectual level of Calculus 1. The course, “Pre-Calculus for Engineers,” was established to support readiness for calculus and showed initial success. In the first semesters of its offering the GS Program paid particular attention to student performance and actively worked with instructors to meet student needs. (Ennis et al., 2013). Grade improvements started to take place in Calculus 1. Additional data analysis showed that 12%-17% of all first-year engineering students earned math placement scores that demonstrated poor proficiency in pre-calculus topics, revealing a need for more sections of the new Pre-Calculus course. Figure 6 shows the distribution of math placement scores for students enrolled in Calculus 1.
Despite offering more sections of Pre-Calculus and working to better place students according to placement scores, the math story is still being written. The rapid expansion of the Pre-Calculus course without adequate engagement of all instructors seemed to have a marked negative impact on student performance. The leadership of both the BOLD Center and the College had agreed with the philosophy that a math placement exam would lead to better grades earned by all engineering students, but that result did not manifest (Louie & Myers, 2015). Currently, the dropout rates from the course and college itself for engineering students who take Pre-Calculus is high. Feedback from GS students who struggle with Pre-Calculus reveals demoralized attitudes; their concerns revolve around being further behind if their Pre-Calculus grades are so poor as to require them to repeat the course. Many direct-admit engineering and pre-engineering students required to enroll in Pre-Calculus already have taken a calculus course in high school. They wonder why their readiness for Calculus 1 boiled down to a single test taken in mid-summer without any preparation. The variation of high school calculus instruction makes it difficult to find factors to address the inconsistency of student backgrounds and preparation. Finally, course credit for taking Pre-Calculus does not count towards the requirements in the engineering majors. We recognize this scenario as an example of the remedial mentality that inhibits the important perception that students are making real progress toward their degree (Klingbeil & Bourne, 2015). In recognition of these factors, BOLD and GS leaders are encouraging students as much as possible to move to Calculus 1, utilizing external support through tutoring and study groups to succeed in the course. They are encouraging and empowering students to demonstrate self-motivation and use group study to support their learning. At the same time, our leadership continues the conversation that performance in Pre-Calculus, Calculus 1 and beyond should not be the defining gateway into an engineering career, a serious idea behind which the entire college community is starting to rally.
Physics Experience: Many high school students have not taken a true physics course in high school, especially those who enrolled in a biology sequence that is acceptable for the science requirement required for admission into many colleges. Some GS students fall into this category, and their confidence in and knowledge of physics is low. A confounding factor, as stated above, is that most GS students placed into pre-calculus, preventing their enrollment in the Physics co-requisite of Calculus. GoldShirt leadership took this as an opportunity to use the content from an existing introductory physics course (Physics1000) being taken by the students to create a unique, interactive and hands-on course called Engineering Explorations through Physics (GEEN1010), with the intent to link engineering concepts with their underlying physics principles. Thought-provoking engineering-style experiments, substantial homework and frequent quizzes provide plenty of challenge and a glimpse of future engineering ideas. The pre- and post- Force-Motion Concept Evaluation (FMCE) results demonstrate significant learning gains, greater than the gains seen for the bulk population of Physics 1 students. Figure 7 shows these impressive knowledge gains. Table 2 shows the pre- and post-course knowledge levels by GS students for Physics1000 and following the changeover to GEEN1010.

Figure 7. FMCE percent gains over time, from PHYS1000 to GEEN1010.
Table 2. FMCE Pre- and Post- Test scores for 2009-2012 offerings of Physics1000 and 2013-2015 for GEEN1010.

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent Gain</th>
<th>Average Pretest Score</th>
<th>Average Post Score (max =47)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>28%</td>
<td>8.2</td>
<td>20.0</td>
</tr>
<tr>
<td>2010</td>
<td>15%</td>
<td>10.2</td>
<td>14.6</td>
</tr>
<tr>
<td>2011</td>
<td>12%</td>
<td>9.6</td>
<td>15.3</td>
</tr>
<tr>
<td>2012</td>
<td>33%</td>
<td>12.2</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Course Changes

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent Gain</th>
<th>Average Pretest Score</th>
<th>Average Post Score (max =47)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>58%</td>
<td>10.2</td>
<td>31.4</td>
</tr>
<tr>
<td>2014</td>
<td>55%</td>
<td>10.2</td>
<td>30.5</td>
</tr>
<tr>
<td>2015</td>
<td>52%</td>
<td>10.0</td>
<td>29.1</td>
</tr>
</tbody>
</table>

\[\text{% gain} = \frac{(\text{post \%} - \text{pre\%})}{(1-\text{pre\%})}\]

This approach to preparation for the physics sequence is in a similar vein to the idea of needing preparation for the engineering math sequence. However, GS students note that other students with similar high school science backgrounds are able to choose to enroll in Physics 1, without the requirement of taking an introduction to physics course. This discrepancy in treatment could be another example of using deficit thinking to guide the treatment and expectations of a subset of diverse students. One option that can help diffuse the negative connotations of taking this valuable course is our College’s consideration of expanding the number of sections to other students in engineering who need preparation for Physics 1. We continue to monitor student perceptions to taking GEEN1010: Engineering Explorations in Physics to help us frame the idea of preparation as an asset to use to one’s advantage versus deficit/remedial thinking.

**Self-Management and Leadership Course:** One of the longest standing courses hosted by the BOLD Center is a foundation course for GS students. Originally offered as a stand-alone course in the fall term, the addition of a required spring course in sequence makes it yearlong and a useful vehicle for convening the students. The course content of the fall semester primarily focuses on instilling personal responsibility concepts, including time and stress management, goal setting, study strategies, hearing from student panels on ideas for success, and using office hours and grade tracking. These topics enable the new college students to establish themselves as responsible engineering students.

The second semester topics enable a focus on demonstrating how leadership and professionalism play roles in developing engineering careers and benefitting society, especially through a team project to improve a community issue. Professional skills development include preparing résumés and cover letters, developing effective communication skills, undertaking leadership training, hearing from panels of professional engineers and faculty, and other activities to reinforce students’ engagement with and identity in engineering. These changes recognize the desire and capacity of GS students to gain a deeper understanding of how engineers contribute.
their skills to solving the world’s problems. At the same time, these students build their social capital for becoming a practicing engineer.

**Creating Engagement and Community Supports Diverse Students**

Underpinning these programmatic efforts are the BOLD Center’s commitment to creating an inclusive and engaged community, with an awareness for social justice topics. First, we established a regular meeting hour for developing community among students. At the start, the schedule of meeting topics focused primarily on academic excellence. Meetings were designed around the importance of grades, using study strategies topics and hosting math professors who talked about the same things. Attendance dwindled since students already “knew” these things. We realized that an engaged community of support must think more broadly. The set of topics has since grown in response to students’ positive feedback about such things as getting industry networking experience, preparing to attend career fairs, and hearing from industry professionals themselves (Louie, Palmer, & Dunn, 2016). We grew more accustomed to hosting meetings to talk about local and national social issues. In response to the killings of Trayvon Martin and Michael Brown, two African American males in Florida and Missouri, respectively, and others around the country, as well as other local issues, students wanted to engage in a larger dialogue within the safe environment of our space. These types of professional topics combined with real-world discussions that affect them directly help prepare our students in positive ways that build on their assets. We will continue to recognize them as young adults capable of high accomplishments.

The number of diverse societies have grown over time, due in large part to the BOLD Center requiring its scholarship recipients to join one of these societies each year, amply boosting membership levels and broadening student participation in professional development communities. Student societies have received additional resources and support over the years, and the BOLD Center provides a joint office space for the student society leaders. More financial support came from our recommendations to industry to support those societies that had not received much of that largesse, enabling many to attend their regional and national conferences. A student leadership council was established to promote inter-society activities and help identify areas of concern and possible solutions. Many students have taken on leadership roles within these groups at the local, regional and national levels. Through them, we have been able to help foster professional development and interactions with industry professionals while building meaningful communities for student engagement.

**Discussion: Asset vs. Deficit Experiences of Students**

- Research Question #1: In which areas in students’ academic and extracurricular lives do they experience asset or deficit treatments from the college systems and structures?

A variety of partnerships and relationships among the college faculty, undergraduate and graduate tutors and mentors, GS and BOLD leaders, industry professionals and the many students participating in our programs demonstrate the power of asset thinking to benefit the student experience. The changes that led from a deficit mentality to the power of asset thinking defines our strong investment that we all have in all our students’ burgeoning successes.
**Academic:** Through the in-house drop-in tutoring program, peer tutors can provide positive reinforcement to BOLD and GS students to support their learning process. Furthermore, opening the tutoring opportunities to all students in the College sends the broad message that everyone—not only diverse students—can gain academic benefits from working with knowledgeable tutors. Also, the addition of diverse students to the tutoring ranks sends a broad message that these students are also experts. Tutors convey delight that many students gain that “aha” moment during their work sessions, which they celebrate with spontaneous high-fives. This often implicit, inclusive, message demonstrates the power of asset thinking.

A related experience for many GS students is finding the needed preparatory coursework in math and science palatable through shared, communal efforts and recognition. It is heartening to see students celebrate their high test scores—rewarded with a gift card to a coffee shop centrally located within the engineering college, enabling subtle yet meaningful recognition of these students’ successes while reinforcing their membership in the engineering community. In addition, scholarship “monetary bumps” awarded to students who earn a semester GPA of $\geq 3.3$ are layered on top of their existing scholarships in the subsequent semester. GoldShirt students also embraced being “regular” engineering students after a revision of their restrictive curricular requirements led to choices that mainstreamed them with other engineering students within the first semester, removing obviously deficit ideology from the start of their engineering education. Moreover, their professors in Pre-Calculus and Engineering Explorations through Physics acknowledge the hard work and subsequent knowledge gains that these students demonstrate in their courses.

GoldShirt students have meaningful discussions and work related to building their professional skills and learning engineering college norms in their Self-Management and Leadership course. While most students will push back against the idea that their time-management or study skills could improve, having a cohort of classmates with whom to discuss these important personal skills conveys that others are working to improve themselves as well. When these students prepare their final research reports on leaders of color in engineering, they highlight the same struggles and learned personal management skills that they themselves are accomplishing. These personal attributes carry over to their engineering courses, too, as they navigate multiple time constraints and responsibilities on a daily basis.

**Extracurricular:** Students also are empowered by the skills and knowledge gained by their participation in one of the BOLD-sponsored research programs. Their side-by-side efforts alongside supportive graduate student mentors convey powerful messages about attaining greater personal and professional levels than they had previously envisioned. BOLD students also benefit from the strategic partnerships the BOLD Center has with the College community and local engineering industry. BOLD students land specific research positions or internships—designated for student participants in BOLD Center programs. They also hold highly valued, part-time jobs around the College for the same reason. Student leaders from our affiliated diverse student societies gain leadership training and skills that empower them in their academic project teams and beyond.
BOLD and GS students gain unique opportunities to network with industry professionals who express the desire to meet them. In the last year, students networked with BOLD industry advisory board members as they dialogued about case studies that highlighted work issues they may confront in their internships or professional positions. Several students presented personal stories to the advisory board members to explain their challenges and accomplishments.

The diverse student societies hosted in the BOLD Center enable many students to engage with other students and professionals from industry based on various identities with which they have an affinity. Since they are required for those awarded BOLD scholarships, these societies have grown in size over the years. They are also very active: some hold weekly outings or meetings, all invite industry speakers to engage, and many attend regional or national society meetings. The BOLD leadership encourages students to take on society leadership roles, in which industry representatives express interest. Many students receive multiple job offers based on the breadth of experience and relationships formed due to these leadership positions.

Safe Spaces: The BOLD leadership learned to honor the need for safe spaces for our underrepresented students in the College. Our qualitative research results documented instances where GS students had negative interactions, particularly within the shared residence hall environment, that made them question their belonging in engineering. Even within the BOLD Center space, unmonitored interactions can leave students vulnerable to comments that demonstrate bias and discrimination. After moving, GS students subsequently reported enjoying the safe housing environment that a space dedicated to only residents of their program allowed. In addition, the BOLD Center recently reserved usage of its community space during the evening hours for only verified members of the affiliated diverse student societies. A paid student assistant monitors the space to minimize extraneous visitors or activities. Student society leaders have been proactive in scheduling meetings and study nights for their members in the space now dedicated for their use. Recognition of the challenges faced by underrepresented students—ones which majority students rarely experience—made BOLD leaders more attuned to the many goals of our diversity mission.

- Research Question #2: How do the elements of the BOLD Program support or hinder student success?

The BOLD Center navigates the area between mandating requirements and offering choices through its participation guidelines. Participation or engagement with the BOLD community supports student success by creating an atmosphere filled with opportunities for personal and professional growth. The tutoring program is an example of offering a choice to use its services. Within the tutoring spaces, tutors work collaboratively with students on understanding conceptual reasoning and problem solving skills. The tutors encourage these same students to provide guidance to others seeking help for the same problems and concepts, further solidifying newly developed knowledge through verbal communication. These ad hoc study groups support student success without calling overt attention to the process.

However, a calculus co-seminar requirement seemed to carry the perception that it hindered or did not contribute to student success in calculus, perhaps by intimating the blanket perception of
BOLD students needing remedial help. Student self-perceptions about their own abilities can undermine the message of the helpfulness of a structure such as the calculus co-seminar. Now, for example, GS Program courses with potentially remedial connotations center around the idea of preparation for the next level of courses through authentic immersion in engineering practices. Students value the idea of preparing for success. The *Engineering Explorations through Physics* course is effective in promoting successful student outcomes by exposing students to engineering topics to come later in the engineering curriculum.

The BOLD Center had been passive participants to the academic process that categorized students by test score, courses taken, and other measures that can promote or hinder student progress. By analyzing historical data, the BOLD Center found that many students struggled to navigate the curriculum effectively due to these seemingly arbitrary measures of success. Now, BOLD engages in the discussions around these academic structures, and they provide results from the literature and student performance analyses that suggest alternatives to better support student success. These once, non-negotiable academic structures are undergoing changes to address traditional hallmarks of student success such as grades. For instance, recent work has revealed that high school performance is a better predictor of engineering college performance than standardized test scores (Myers, 2016). Systematic changes are also being encouraged to promote a more inclusive classroom environment that supports diverse students.

Increasingly active participation by graduates and undergraduates in the BOLD research programs have led to more overall interest in research activities and the vibrant, community-sharing celebrations at the end of the research programs. Graduate students gain successful experiences as mentors and in managing a set of research ideas that are suitable for students new to research. The BOLD leadership has found that graduate students should undergo a deep training session prior to undertaking an undergraduate mentee. Also, sharing problems and experiences with other graduate mentors through lunch-and-learn sessions empowers them to see new approaches that can be applicable to their own research relationships and direction. Undergraduates benefit from gaining knowledge about the great variety of research settings and topics. A successful outcome found through survey results is the inspiration and support that undergraduates experience in research-based relationship with their graduate student mentors.

**Conclusions**

The BOLD Center uses many approaches to build up the social capital and engineering identity in students. BOLD leaders work with students to develop their professional and leadership skills that they can then use in a variety of settings. Such knowledge is foreign to most new engineering students, and for students underrepresented in engineering, these skills can be intimidating to embrace. For instance, BOLD students become role models for younger students by participating as tour leaders and panelists during recruitment events, giving participants an opportunity to express to others what engineering means to them. They gain professional knowledge through their industry interactions facilitated through BOLD activities. These low-stakes experiences—such as networking around being engineers and the new interpersonal skills they get to try on first, along with their technical training—will serve them well as they transition
to the workplace. The BOLD Center works hard to ensure that students are exposed to a variety of such empowering experiences.

BOLD has also worked to build academic resources for students. Survey results confirm that retention initiatives such as student tutoring and research opportunities support academic success and persistence in engineering. BOLD leadership found that encouragement through positive messaging to seek out resources such as tutoring, rather than a system of requirements, shifts the decision-making to students. Self-awareness of one’s academic needs, if any, builds one’s growth mindset in recognizing the positive results from the efforts of the learning process. For some students participating in research also builds their social awareness of this professional environment. The BOLD Center hosts entry-level research experiences aimed for underrepresented students that remove the intimidation factor by keeping these experiences short and focusing on the collaborative relationship between a graduate mentor and the undergraduate mentee. This professional type of experience enhances the engineering identities for all participants. Undergraduates learn what it means to conduct research, while graduate students use their existing knowledge developed from working with their faculty mentors and grow their own set of skills. The College faculty and administration also understands that the BOLD Center values their research focus. Thus, on multiple levels the BOLD Center’s research programs builds the social standing of its participants and for the goals of the work in which BOLD itself is involved.

Moreover, establishing a new access initiatives such as revised admissions practices and the Engineering GoldShirt Program added real transformational results: far greater numbers of women and underrepresented minority students enrolled in the College. The GS Program cut across numerous boundaries, serving to enlighten college and campus leadership by creating alternatives to the traditional admissions process, and incorporating more holistic measures of a candidate’s qualifications for admission into engineering. Now, the entire College has set the expectation to achieve parity representation in these numbers. The GS Program also highlighted the hidden biases our own Program staff owned that led to implementing requirements and initiatives that layered deficit thinking onto the experiences of the students we served. Analyzing our accumulated data, along with gaining honest answers to questions about the reasons behind heretofore “standard” ways of doing business, led the BOLD and GoldShirt Programs to grow their own asset-based thinking. These changes are helping lead the way to important transformations in the academic structures and systems that empower student success.

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