
AC 2012-4060: IDENTIFICATION WITH ACADEMICS AND MULTIPLE IDENTITIES: COMBINING THEORETICAL FRAMEWORKS TO BETTER UNDERSTAND THE EXPERIENCES OF MINORITY ENGINEERING STUDENTS

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Identification with Academics and Multiple Identities: Combining Theoretical Frameworks to Better Understand the Experiences of Minority Engineering Students

Abstract

Despite many years of focus, diversity remains a challenge across engineering disciplines, particularly with respect to minority students, and these students continue to lack support in many academic settings. Educators have proposed a variety of theories and approaches to address this challenge. One particularly promising explanation for lower rates of retention and academic performance of minority students is lack of identification with academics. Identification is a motivational construct associated with the degree to which individuals value and perceive themselves part of a given domain—in this case, academics, and more specifically, engineering. Identification has been shown to correlate with academic success, and also to vary by racial category. However, we argue here identification may not be sufficient because it does not typically take into consideration the intersection of multiple identities that students bring with them. Multiple identities theory provides a way to examine how individuals' demographic, cultural, social, and personal identities (e.g. race, class, gender, ethnicity, age) intersect; this approach emphasizes that experience is not simply an additive sum of individual identities. In this paper, we highlight key research studies in both domains and argue for bringing the two frameworks together.

Introduction

Despite years of effort and considerable research focusing on attracting and retaining a diverse pool of engineering students,¹ diversity is still limited throughout engineering. Data from the 2000 census reported by the National Academy of Engineering, for example, reports that while African-Americans made up 12.1% of the U.S. population, they made up only 2.5% of the U.S. engineering workforce.² Moreover, retention rates for African-American students are lowest (42.1%), and retention rates for Native Americans (52.9%) and Hispanics (62.5%) still remain below those of non-Hispanic whites (73.7%).² Minority doctorate numbers and minority faculty numbers also remain low, especially in the leading research institutions. Data on science, engineering, and health (SEH) doctorate recipients show that Blacks, Hispanics, and American Indians/Alaska Natives, as a group, earned less than 10% of SEH doctorates from U.S. universities in 2008.³

Underrepresented students often face challenges to academic success that stem from a perceived lack of belonging, and as a result, support programs often focus on providing students with both mentor and peer groups that help create a strong sense of belonging. Such approaches make sense given current research on belonging, and more specifically on “identification with academics”⁴ as it relates to student success. Identification with academics here refers to an individual's sense of the value of a given domain (in this case, academics) coupled with a feeling of belongingness in that domain. A number of research studies link stronger identification with academics to positive outcomes such as retention and higher achievement.^{4,5} Conversely, disidentification with academics and stereotype threat have been linked to negative academic outcomes including poor academic performance.^{6,7} Identification with academics may be particularly salient for minority students because several studies highlight the ways in which

identification shows statistically significant differences across racial groups.⁸ Thus increasing the degree to which minority students identify with academics should play a significant role in increasing these students' academic success.

At the same time, however, researchers in race and gender theory have consistently raised concerns about isolating individual dimensions of identity as explanatory factors and instead focused on the ways multiple identities intersect differently in different contexts (see Jones, 2000 for a useful starting point⁹). That is, being a black woman in engineering is not simply the sum of being black in engineering plus being a woman in engineering; instead, different dimensions of identity may be salient in different contexts, and the ways those dimensions intersect are not always the same. Studies that examine the multiple dimensions of student identity, then, may offer critical insights into the ways in which race, class, gender, sexual orientation, and a host of other factors may intersect to influence the degree to which individual students experience phenomena such as identification with academics.

To the authors' knowledge, however, no studies have bridged these two theoretical frameworks; studies that employ multiple identity theory do not typically account for the kinds of motivation factors that identification with academics provides, whereas studies of identification typically do not explore the complex intersections among identity dimensions. More importantly, very few studies in either domain look specifically at the experiences of engineering students. This paper begins to address that gap by bringing these two frameworks together to propose a new approach to understanding the diverse experiences of minority engineering students. We provide a review of key studies in both areas, then identify themes in both that have implications for diversity in engineering. By providing a preliminary review of existing literature and locating possible intersections between these theories, the paper identifies themes for practical applications of this synthesis that can lead to the enhancement of academic outcomes and point toward future research. The analysis provides a starting reference point for faculty and staff who are interested in increasing the degree to which minority engineering students identify with engineering as a mechanism to improve performance and retention.

Identification with Academics

Building on work in the area of self-esteem research, and extending a theory of disidentification proposed by Steele, Osborne defines identification with academics as "the extent to which academic outcomes affect self-esteem."^{10, p. 731} More broadly, it reflects individuals' sense of belongingness in a domain and the degree to which they value success in that domain as a measure of self.

The primary research methodology associated with identification with academics is quantitative survey data using validated instruments to measure identification as construct, followed by correlational data analysis between the construct and varying measures of academic success. Studies have examined both secondary and college students in a range of institutional settings, though in general the studies focus on identification with academics broadly and do not address identification with specific domains (e.g. engineering, math, history).

Results from studies of identification consistently show statistically significant positive correlations between level of academic identification and desired academic outcomes such as

strong self-efficacy,¹¹ higher overall GPA,¹² lower absenteeism,⁶ and decreased cheating.¹³ However, Osborne also found that the correlation between academic identification and achievement scores varies among different racial/ethnic groups, and also varies by gender within groups.⁸ In all cases, though, decreases in identification were linked to decreases in academic performance.⁸ Later work by Osborne also related low levels of identification with academics to the underachievement in minorities that lead to disidentification or withdrawal from the school.¹⁴

The relationship between race and disidentification, however, is not yet fully understood. Steele correlated disidentification and withdrawal from the academic environment by stigmatized African-American and women students with sensitivity to negative stereotype threats;¹⁵ that is, students who were keenly aware of negative stereotypes about their demographic (i.e. race or gender) were more likely to perform poorly and show increasing disidentification with school. In these cases, reducing the stereotype threat mitigates the disidentification. Several other studies have also linked stereotype threat to disidentification with academics and showed that it negatively impacts student learning.^{7, 16, 17} However, while stereotype threat is one possible powerful factor influencing identification, factors such as socio-economic class, culture, family, and related factors may also play a role.

Despite the general consensus of the definition of identification with academics, the variables and unit of analysis varies significantly in different studies. As noted above, identification with academics is defined as the internal feeling of belongingness in the school environment and the external value of academic success.^{12, 18, 19} Researchers have used a variety of instruments to measure identification. Validated scales include those developed by Voelkl,¹⁹ Osborne,²⁰ Schmaeder et al.,²¹ and Lesko and Corpus.²² Several studies have also used self-esteem as a partial proxy for identification e.g.,^{8, 10, 20}. Harrison et al. assessed identification with academics in terms of the degree to which students experienced stereotype threat¹⁶ and Fletcher used participation in school activities to measure the degree to which students identified with school.²³ Variation also occurs in the output variables, including GPA (actual and self-reported), SAT scores, GRE scores, and even tendency to cheat.

The variability in measurement approaches presents a challenge when comparing studies, and to some extent the resulting lack of convergent validity prohibits the development of a predictive model to anticipate changes in students' identification with academics. However, Walker, Greene & Mansell developed a best fit model that demonstrated that meaningful cognitive engagement was positively predicted by identification with academics; their model also integrated identification with intrinsic motivation, extrinsic motivation, and self-efficacy.¹¹

More importantly, as noted earlier, racial group differences exist in the level of identification and the impact identification with academics has on achievement, and those differences also vary by gender.^{8, 24} Such correlations are particularly difficult to do because of the numbers involved in determining statistically significant results for minority populations, particularly at predominantly white institutions; the number of participants that fit into any complex category (lesbian black girls, upper class black boys, etc.) grows smaller with each increase in complexity. Moreover, few if any studies look specifically at students' experiences within engineering, suggesting that more work remains to be done in understanding the complexities of students' social identities as they intersect with their experiences in engineering as a specific academic domain.

Multiple Identities

As noted above, variations by gender indicate that the relationship between race and academic identification is confounded by other dimensions of students' identities. Gender is certainly one component, and the most common one measured, but work in the area of multiple identities and intersectionality suggests that other components such as sexual orientation²⁵ or socio-economic class may also be significant. These studies also suggest that the intersections may not simply be additive, and they may not be the same for every minority group, as evident by the differing trends for women in various racial groups in Osborne's studies.⁸ These complexities suggest a role for multiple identities frameworks to enhance our understanding of how academic identification occurs and how it affects students' experiences. As noted earlier, multiple identities frameworks take into account the different dimensions of social identity each of us experiences, including not only the common demographic variables of race, class, and gender, but also sexual orientation, family role, religion, national or regional culture, and other factors.⁹ ²⁵ As Abes and Jones explain, "the model of multiple dimensions of identity describes the dynamic construction of identity and the influence of changing contexts on the relative salience of multiple identity dimensions, such as race, sexual orientation, culture, and social class"^{26, p. 3} That is, not every identity is always equally salient, and the intersections among identity dimensions varies with context.

In contrast to work on academic identification, studies that reflect a multiple identities framework typically employ qualitative methods including phenomenology, interviews, and ethnography. For example, Jones used the three interview sequence to develop a conceptual model of multiple identities based on the feminist theory notion that identity is defined by both internal and external factors, which have cognitive consequences.⁹ Abes & Jones also used the three interview sequence to investigate the complexity associated with negotiating sometimes conflicting identity dimensions, focusing particularly on lesbian college students.²⁶ The authors considered not only the interaction of sexual orientation with other dimensions of identity, but also its interaction with epistemological development. Other researchers have utilized in-depth interviews to explore multiple identities within various groups including first generation students,²⁷ women of color in engineering,²⁸ and Black college students.²⁹ Importantly, these studies all adopt a situative perspective, which specifies knowledge as an attribute of a group that carry out cooperative activities and the engagement of an individual who participates within a community.³⁰

The results of these studies demonstrate the complexity of individual dimensions of identity as they affect students' experiences in school. Jones, for example, studied the relationship between intersecting identities and self authorship as defined by Baxter Magolda.^{31, 32} Her work highlights the tensions individuals experience among multiple identities, particularly between visible identities such as race or gender and invisible ones such as class or sexual orientation.³² Her findings showed complex relationships among different dimensions of participants' identities that influenced epistemological development. Participants experienced tensions between privileged and oppressed dimensions of their own identities (e.g. being of a high socio-economic class but a racial minority), as well as the power of class as an "invisible" dimension of identity that still exerts a strong internal force.³² Work by Stewart further complicates our understanding of identity by addressing issues of spirituality in the lives of Black students.²⁹ Participants in her study recognized multiple dimensions of their identity, but also experienced a sense of coherence

that, she argues, may be the result of their use of spirituality as a primary lens. As she notes, students in her study “perceived the relationships among their identity facets to be interconnected and synergistic, so that the whole of their identity became greater than the sum of their identity facets”²⁹, p. 265. As she notes, her work has significant implications for those concerned with student development, suggesting not only that we consider programs for more targeted groups (e.g. Black women students or Black LGBT students rather than Black students) but also that we consider components such as spirituality that are not often recognized within academic frameworks.

Importantly, multiple identity research is not confined to minority students. For example, Orbe found that for first-generation college (FGC) students’, the salience of that dimension of their identity varied considerably based on situational context (hometown vs. school) and campus type (selective, PWI, public, or community college).²⁷ Moreover, unlike other identity groups that may experience a sense of social connection based on identity, many FGC students lacked a sense of community associated with this dimension of their identity.²⁷

Less work has been done on multiple identities within engineering specifically, but recent work by Tate & Linn found that women of color in engineering distinguished between their social and academic peer groups which required students to function within multiple communities and to behave and engage differently in different contexts.³³ Their study examined the intersection of social, academic, and intellectual identities. Participants clearly articulated the role of identity as context dependent, and while they felt fully engaged in their engineering program, they also expressed feelings of difference and not belonging.³³

Together, these and related studies indicate the ways in which identity is complicated by a range of social and personal factors, and thus identification with academics, particularly in terms of its development over time and its affect on student outcomes, merits more qualitative research to provide a fuller understanding of the underlying issues.

Although the multiple identities framework conceptual model demonstrates the intersecting relationship between various dimensions of identity, there are limitations of the studies included in this review. One limitation is that the studies focused on specific groups but did not establish commonalities across the groups. Because most of the work in multiple identities is qualitative, it employs small numbers of participants to develop rich understandings of participants experiences and identify themes. However, such studies typically do not intersect with constructs such as identification that are measured quantitatively in large-scale surveys; more often, researchers pair them with similar qualitative frameworks such as Baxter-Magolda’s construction of epistemological development. Yet the power of constructs such as identification with academics suggests the value of mixed methods approaches that join the rich description provided by qualitative studies of multiple identities with the correlations available in quantitative survey results.

Synthesizing Frameworks: Conclusions and Next Steps

As the discussion above suggests, combining the two frameworks in a mixed methods approach could compensate for the limitations observed in existing studies and, more importantly, lead to better understanding of strategies faculty and administrators need to help overcome the barriers

for academic success of underrepresented minorities. Both theories assert that socially constructed identities impact students' experiences in school, their success, and their persistence. The individual theories each tell partial stories about the mechanism of how minority students' participation in multiple communities enhances or limits their identification with academics and other desired academic outcomes. In both cases, however, the stories may be incomplete. In future studies, the authors propose to measure identification with engineering using previously validated instruments, coupled with in-depth interviews of selected participants to describe how their level of identification has developed within the context of multiple dimensions of their identity. The results could provide faculty and administrators with effective approaches to individualizing the kinds of scaffolding and programs needed to support a wide range of minority students, each of whom brings a complex set of social identities to their study of engineering.

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