



Helping or hurting? Can institutions help disadvantaged students in engineering without understanding socioeconomic status?

Dr. Valerie C. Lundy-Wagner, New York University

Dr. Lundy-Wagner's is an Assistant Professor in the Higher & Postsecondary Education Program at New York University. In general, her research focuses on how institutions of higher education can improve degree completion, with an emphasis on ethnicity/race, gender, and social class. Her recent work in focuses on socioeconomic status, academic advising, and student outcomes in engineering and other fields. She received her B.S. in Civil & Environmental Engineering at UCLA, master's in Education at Stanford, and Ph.D. from the University of Pennsylvania in Higher Education.

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Abstract

The utility of academic advising as a retention tool for socioeconomically disadvantaged engineering undergraduates remains unknown because of the scant research interrogating the meaning of such disadvantage. Drawing on in-depth interviews with 9 engineering academic advisers, this research uses Bourdieu's theory of stratification to explore how they understand socioeconomic status. The findings suggest that like the extant research, descriptions of socioeconomic status were diverse and at times conflicting. The discussion highlights the relevance of engineering academic adviser perspectives, and how to better align engineering student needs and institutional retention strategies that consider socioeconomic disadvantage. The paper closes with a call for more attention to demography beyond ethnicity/race and gender in engineering, acknowledging the complicated nature of socioeconomic status.

Introduction

Over the past fifty years, there has been increasing attention to pursuing social justice through engineering education¹. While much of that work has focused on increasing participation by women and ethnic/racial minorities², some scholars have begun to consider socioeconomic status and social class^{1,3,4}. Given the aggregate gains by women in engineering, and problems with racial categorization in an anti-affirmative action era¹, engineering education stakeholders interested in promoting equality have turned to social class as another way to reposition the diversity discussion. However, while engineering education scholars have undoubtedly begun to use measures of social class in their work^{1,3,4}, it remains unclear as to whether or not engineering schools understand the practical implications of having socioeconomically disadvantaged students in their retention strategies.

Purpose

To better understand how engineering schools make sense of socioeconomic status, a single institution study of academic advisers was conducted. The research question guiding this work was: How do academic advisers characterize socioeconomic status and the institutional support available to students from low-socioeconomic backgrounds? This qualitative research study was framed by Bourdieu's theory of social reproduction and the concept of cultural capital⁵, described below.

Theoretical Perspective

While various sociological theories inform student behavior in college, Bourdieu's theory of social reproduction and concept of cultural capital⁵ are especially relevant in this research given their attention to the relationship between individual agency and institutional structure. Although most

postsecondary stakeholders would admit that students enter college with varying levels of agency and support (i.e., social, financial, emotional, and familial), the extant research does not fully explain how academic advising acknowledges these differences or attempts to overcome the resulting disparities in outcomes. Cultural capital provides a “partial explanation for the less tangible or less immediately visible inequalities”^{6,7} that the extant research does not fully address.

In fact, Bourdieu’s notion of institutionalized cultural capital is predicated on a series of related concepts, including *habitus*. In his view, individuals possess cultural capital (i.e., knowledge, cultural awareness, credentials, preferences, skills, abilities, and mannerisms) that is typically acquired in the home through parents. Cultural capital is used as a type of social currency that can be exchanged for recognition and inclusion in particular social settings, or fields (e.g., schools). While cultural capital in one field is not necessarily useful in another, it does inform an individual’s *habitus*, or cumulative set of dispositions that govern interactions and preferences. Further, an individual’s *habitus*, which includes walking, talking, and gesticulating, for example, is then rewarded (or sanctioned) in schools.

Since cultural capital for college is acquired by students primarily from parents (and shapes *habitus*), the relative disadvantage in how students navigate college may be apparent for low-income and first generation students in particular, but is not precise. In general, these and other so-called disadvantaged students are considered less likely to have acquired the cultural capital necessary for successfully approaching and navigating college. However, there are many students who may have just one parent that attended college, or that attended an average public high school that may also have socioeconomic disadvantages. At issue is not who is most advantaged and most disadvantaged, but rather, how does socioeconomic disadvantage manifest among college-going students that are relatively privileged? Further, among undergraduates, engineering students are even more privileged¹.

One of the major limitations with the research on social class (and concomitantly socioeconomic disadvantage and cultural capital), is that while it is often quantitatively measured through an index, qualitatively it remains quite ambiguous. In addition, the qualitative research on social class in higher education is typically conducted without consideration for the academic field, despite the work indicating that the science, technology, engineering, and mathematics fields are unique. Unfortunately, the lack of understanding related to social class may be especially problematic in engineering, where the rhetoric around social class falls into two different schools of thought. On the one hand, some suggest that engineering is a field dominated by students with professional parents, and often where one parent has a STEM background. On the other hand, some suggest that engineering is a field where socioeconomically disadvantaged and specifically low-income students can pursue a stable and initially higher-than-average wage.

This tension in how engineering students can be characterized via social class and socioeconomic status may be especially problematic for retention efforts. In fact, the research on students considered socioeconomically disadvantaged suggests they have weaker academic profiles upon matriculation⁸ and lower academic expectations⁹, are less likely to be socially and academically engaged¹⁰, and are more likely to work¹¹, struggle with navigating college¹², and drop-out prior to graduation¹³. Besides the lack of information on students in the middle, quantitative research on class is limited fundamentally because it does not explain *how* students from various socioeconomic strata navigate colleges and universities. As a starting point, this paper presents a

qualitative study on engineering academic advisers and their perceptions of social class and socioeconomic disadvantage, through a lens of cultural capital⁵. By understanding how institutions identify students by socioeconomic status first, we can lay a foundation for explaining how these students navigate college, but also better designing and evaluating interventions.

Research Design

The research site is a small predominately White, private Carnegie Research University (high research activity), located in the eastern United States. Approximately 80% of all bachelor's degrees conferred by the school are in engineering or science. The school has a relatively diverse population in terms of ethnicity/race: Asian students represent 30% of all undergraduates in the school, White students 27%, Latina/o students 12% and Black students, 11%¹⁴. In addition, the school is socioeconomically diverse, with 44% of undergraduates receiving Pell grants in 2010¹⁴. Given the school's engineering-heavy curriculum, ethnic/racial demographics, and percentage of Pell grant recipients, this site was considered a setting where advisers were likely to observe a range of student socioeconomic backgrounds.

Participants

This study included nine staff academic advisers at the university. The participants comprised 50% of the non-faculty academic advisers at this institution, and represent academic degree program, academic support program, as well as academic affairs units. Based on the full-time undergraduate enrollment, the participants in this study advise approximately 16% of all students and approximately 50% of students in the state-funded income-based scholarship and retention programs¹⁴. Eight of the academic advisers were women, and three self-identified as White, the remainder were people of color. Table 1 includes a summary of participant demographic characteristics and departmental or program associations. Although there is considerable research on the benefits of faculty-student engagement, faculty advisers were excluded because their *primary* function does not incorporate retention, an issue focal in this research.

< INSERT TABLE 1 ABOUT HERE >

Methodology

Using public information from the school's website, I sent email requests for participation to all 18 staff academic advisers at Urban University. Individuals who responded affirmatively were re-contacted to schedule an interview. Individuals who did not respond to the initial email were contacted after at least two weeks had gone by via telephone. Eight advisers never responded to the initial email or telephone calls, and in only one case did an academic adviser decline participation. Nine staff academic advisers participated in this study; the overall response rate was 50%.

The data was collected through semi-structured face-to-face individual interviews; in all but one case the interviews were conducted on the Urban University campus and in the participant's office. Given that I had little prior exposure to the participants, these meetings lasted approximately 60-75 minutes and provided a time for the exchange of pleasantries, and then the formal in-depth, semi-structured interview. The interview protocol questions provided space for

contextualizing each advisers professional background and position (e.g., average time spent advising each week, placement within an academic unit or support program, and advising load), in addition to their perceptions of socioeconomic disadvantage. The interview protocol focused on participants' *perceptions of students' cultural capital and habitus* (e.g., attitudes toward academic advising, comfort level with faculty, level of academic preparedness, familiarity with educational systems, senses of entitlement, schedule flexibility, and challenges with integration).

Data Analysis & Validation

I transcribed the audio-taped interviews verbatim, using pseudonyms to protect participant and institution confidentiality. I analyzed the data in two stages, first coding the data focusing specifically on elements of Bourdieu's theory of stratification. For example, using the traditional definition of socioeconomic status (i.e., parent's education level, parent's occupation, and parent's income), I identified responses related to hours spent working for money, parent's income and education level, as well as their (in)ability to help students navigate financial tasks. Second, I coded the data by protocol question, during which I also allowed for alternative themes and subthemes to emerge¹⁵. This approach permitted me to focus on the primary research question, and accommodate other important contributions by participants about socioeconomic disadvantage and social class.

I employed a two-step validation technique typical in qualitative educational research to ensure that the data analysis was trustworthy: (a) peer debriefing and (b) assessing my own biases and value orientations. For the peer debriefing process, two graduate students reanalyzed significant portions of the data, one with a qualitative research background, and the other a higher education student affairs professional, both with academic advising backgrounds. These contributions were important as they helped minimize my bias, and ensure that the data findings and narrative were developed appropriately. To assess my own biases and values, I also wrote research memos and discussed the process with my peer debriefers.

Limitations

This study is limited in at least three ways. First, although half of the staff academic advisers participated, the study only includes responses from engineering academic advisers at one university. Second, the implementation of academic advising is quite diverse, even in engineering across schools, universities, and even departments. As such, the data presented should not necessarily be used to generalize beyond similar institutions. Finally, the focus of this work is engineering academic adviser's *perceptions* of social class and socioeconomic disadvantage.

Findings

Drawing on in-depth interviews with 9 (of 18) engineering academic advisers at one university in the eastern United States, the author identified two important findings. First, engineering advisers have a limited understanding of socioeconomic status and social class. For example, most advisers attributed socioeconomic disadvantage with financial need, neglecting to consider non-monetary components (i.e., having trouble engaging faculty or asking for help, not internalizing the relevance of support structures on-campus). In fact, as one adviser specifically noted: socioeconomically

disadvantaged “students tend just not to be as financially well off across the board.” In addition to financial well-being, advisers perceived other money-related issues that helped them determine who was disadvantaged and privileged. As one adviser noted, “students self-identify [socioeconomic status] when they talk about needing more money, having at least one job, and taking care of the family.” Whereas some advisers felt students divulged their low-socioeconomic background from their persistent interest in obtaining additional financial aid, others felt exposed to students’ financial shortfalls after they conceded that work was interfering with their courses.

In other cases, external money-related family issues highlighted how advisers deduced who was from a lower socioeconomic status background and who was not. One adviser even noted a few situations that contributed to financial stress: “My parents are going through a divorce and they’re debating who should pay for college, and right now no one is paying” or “I can’t fill out the FAFSA because my dad won’t sign it.” She also noted how despite the significant increase in the availability of loans¹⁶, for some students “there’s no cosigner. Or the cosigner’s credit’s not good enough. Or nobody wants to cosign.” Although the association between cost and socioeconomic disadvantage makes sense given the quantitative operationalization of socioeconomic status, given that nearly all college students work and/or receive financial aid^{8,11}, it may oversimplify the range of socioeconomic disadvantage present on-campus.

Second, most engineering advisers were hesitant to acknowledge perceived background differences among students, instead preferring to emphasize that most students were academically capable, and that their job was to divert references to personal, emotional, familial or financial issues to other offices. In fact, one adviser mentioned the Student Wellness Center, Tutoring Office, Financial Aid Office, and other on-campus resources where students should go for additional ‘help’ – but that her job was solely to manage course selection and to be ‘there for students’ to some unarticulated degree.

Thus among engineering advisers in this study, most were unable to characterize socioeconomic status in a complex, nuanced manner, even though they observed a diverse set of characteristics. As a result, despite research on the utility of academic advising as a retention tool in engineering¹⁷, its relevance for socioeconomically disadvantaged engineering students remains unknown because of institutional disregard for understanding or ignorance about how socioeconomic status or social class manifest.

Implications & Conclusions

This preliminary research shows that staff academic advisers have a valuable perspective on attrition among socioeconomically disadvantaged students that has largely been overlooked and understudied in engineering education^{18, 19, 20, 21}. In fact, the findings suggest that engineering advisers see students from a wide spectrum of socioeconomic status struggle in college, but in different ways.

For one, this research highlights the problem with comparisons of the extremes and concomitant the lack of attention to students in the middle²². While the typical narrative is of privileged students who need no help, and disadvantaged students who need lots of help are known, it is not clear how to deal with the majority of students who exhibit a more complex combination of social, emotional, financial, and other issues. Thus, more research from engineering adviser

perspectives could help scholars and practitioners in two ways. First, by better understanding who engineering undergraduates are by social class, and as a result helping scholars better understand the nuances associated with socioeconomic disadvantage to enhance/modify existing retention strategies.

While this study did not examine retention policies, it provides a starting point from which to examine the ‘classed’ nature of institutional structures and support systems. For example, one final question probed advisers about their perception of what more could be done to help socioeconomically disadvantaged students. That virtually all advisers noted that financial aid was the answer suggests a major disconnect in understanding the complexities of social class beyond money. Although the advisers recognized the importance of cultural capital and *habitus* (e.g., high school quality, parent involvement, and student ability/confidence to advocate for self) through various retention strategies, they continued to point to financial aid as the solution. This consistent proclivity for identifying economic capital as the only issue that institutions can help with suggests a disconnect in two places. First that there is research showing that financial aid alone does not significantly decrease socioeconomic disparities. And second, that retention strategies related to cultural capital and/or *habitus* may need to be re-evaluated. In fact, recent research by social psychologists²³ suggests that the independent paradigm promoted by most colleges may in fact perpetuate inequality for students that come from a more interdependent world view. Although that work has not explored the issue in an engineering context, conceptually it calls into question the cultural obstacles in colleges that contribute to social class achievement gaps. In sum, this preliminary work hearkens for more research on engineering academic advisers and the role they play (or think they play) in buttressing students cultural capital and *habitus*, as well as how students solicit help, take advantage of resources, and negotiate institutional bureaucracy or policies.

Over the past fifty years students have entered college with a variety of academic, demographic, psychological, emotional, and financial characteristics that institutions have tried to accommodate, often through advising^{24, 25, 26}. Despite that body of work, most of it does not consider the engineering education context. Further, when engineering educators have taken up this type of work, most of it has been quantitative with few qualitative contributions²⁷. This research builds off the extant work and complements other qualitative work on social class in engineering education²⁸. In sum, this study’s findings suggest that the lack of explicit attention to and understanding of socioeconomic status *may* translate into a disjointed and inefficient system that is ill-equipped for solving the very real class-based retention issues in engineering. Perhaps most poignant, this research demands: if engineering educators do not have a coherent understanding of socioeconomic disadvantage, then how do they expect academic advisers (or other personnel for that matter) to successfully contribute to decreasing gaps in persistence and attainment by socioeconomic status?

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