
AC 2011-206: CAREER: INFLUENCE OF SOCIAL CAPITAL ON UNDER-REPRESENTED ENGINEERING STUDENTS' ACADEMIC AND CAREER DECISIONS

Julie Martin Trenor, Clemson University

Julie Martin Trenor, Ph.D. is an assistant professor of Engineering and Science Education with a joint appointment in the School of Materials Science and Engineering. Her research interests focus on social factors affecting the recruitment, retention, and career development of under-represented students in engineering. Dr. Trenor is a recent NSF CAREER award winner for her research entitled, "Influence of Social Capital on Under-Represented Engineering Students Academic and Career Decisions."

Influence of Social Capital on Under-Represented Engineering Students' Academic and Career Decisions

Motivation and Need

The United States faces an urgent need to increase the number and diversity of engineering students at the undergraduate level, and ultimately, in graduate studies and the workforce. Despite significant efforts over the last few decades to increase participation of under-represented groups in engineering, progress has been disturbingly slow. The time has come to re-conceptualize our theoretical approach to diversifying the field of engineering. This project significantly advances fundamental knowledge of social interactions that influence under-represented students' decisions to enter and persist in engineering.

Research and Education Goals

The specific goals of this NSF CAREER-funded project are to (1) build a conceptual model for understanding how engineering undergraduates develop, access and activate social capital in making academic and career decisions, (2) identify and characterize the potentially distinct mechanisms by which under-represented students utilize social ties that link them to resources related to engineering studies and (3) implement an education plan that provides research-to-practice training for university engineering outreach, recruitment, and retention practitioners using webinars and workshops as learning forums.

Theoretical Framework

The PI extends an established theoretical framework—social capital¹—to the field of engineering education. Social capital is defined in this work as “an additional pool of resources embedded in the social networks of individuals, which can help to achieve individual goals in conjunction with, or instead of, personal resources”². The PI's prior work (*self references to be added in final draft) suggests that students' decisions to select engineering as a college major and to persist in undergraduate engineering studies are influenced by social capital, and that women, under-represented minorities, and first generation college students—the focus of this CAREER research—may utilize different mechanisms for developing, accessing, and activating social capital. These data-driven studies strongly suggest that a well-developed conceptual model for describing how engineering students utilize social capital in making academic and career decisions shows promise as a new paradigm for diversifying the field. The PI is the first to apply the theoretical framework of social capital to explain engineering students' academic and career choices, building on its extensive literature by researchers in many other fields.

Research Methods

Data will be collected from a diverse sample of engineering undergraduates at seven public institutions, representing a variety of student body characteristics, Carnegie 2000 classifications, and locations. The PI has adapted quantitative techniques commonly used by social scientists²⁻⁵ for social network mapping and social capital measurement to the specific context of engineering

students' academic and career decisions. The adapted survey instrument is currently being administered to approximately 1,500 students. Group-level patterns in survey data will be identified using descriptive statistics and cluster analysis. Interviews with at least 75 participants will deepen understanding of how these patterns relate to individual experience and will form the basis for development of the conceptual model.

NSF Broader Impacts

This CAREER research has the potential to transform the way engineering education stakeholders undertake efforts to increase participation of under-represented students in engineering. The research advances fundamental knowledge related to diversifying the field of engineering by elucidating ways that social capital influences decisions of under-represented students in engineering, and perhaps contributes to their differential participation. The PI will integrate research and education through research-to-practice learning forums for engineering outreach, recruitment and retention practitioners at the seven participating institutions, thereby building capacity for research-based programming and practices for the thousands of females, under-represented minority, and first generation college students enrolled at those schools. As part of the education plan, the PI will deliver a series of conference workshops and nationally advertised webinars for personnel at institutions across the country. Webinars, hosted by the NSF-funded WEPAN Knowledge Center, will provide interactive, affordable, archive-able and synchronous training for participants in multiple geographic locations. Webinars will be archived on the Clemson webpage and project results will be catalogued and featured on the WEPAN Knowledge Center.

References

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3. Dika, S. L. (2003). The effects of self-processes and social capital on the educational outcomes of high school students, Educational Research and Evaluation (Vol. PhD, pp. 210). Available from <http://scholar.lib.vt.edu/theses/available/etd-05012003-162439/unrestricted/etd.pdf>.
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5. Van Der Gaag, M. P. J., & Snijders, T. A. B. (2005). The resource generator: social capital quantification with concrete items. *Social Networks*, 27(1), 1-29.