Division-1 / Proposal Number-1102

Student

Title of Proposal

A "World Café" on the Nuanced Experiences of Women Across STEM: Theoretical and Methodological Considerations of Disciplinary Differences and Intersectionality in Computer Science and Engineering

Abstract

This interactive symposium and has three primary aims: (1) To raise awareness of the importance of considering disciplinary differences in research on gender and STEM; (2) to share strategies for acknowledging intersectionality in such research; and (3) to foster an ASHE scholarly community around gender in computer science and engineering.

Format

First Choice: F03- Interactive Symposia
Second Choice: F00-
Third Choice: F00-

Content

OBJECTIVES OF THE SESSION

In recent decades, and especially in recent years, significant attention has been paid to the "gender gap in STEM." National data on major selection and degree attainment demonstrates that women represent approximately 35 percent of students enrolled in STEM fields, despite representing 57 percent of all college students. Efforts to understand the gender gap in STEM extend back over four decades, revealing a vast but evolving literature on the roots of such underrepresentation (Kanny, Sax, & Riggers-Piehl, 2014; Hill, Corbett, & Rose, 2010; NAS, 2007). In fact, research has stressed the importance of diverse classroom and work environments in enhancing STEM education and cultivating innovative ideas (Blickenstaff, 2005; Lewis, Harris, & Cox, 2000). However, there are two key shortcomings with scholarship on the gender gap in STEM. One is that it too often aggregates all STEM fields together. As noted by Kanny et al., this prevents an understanding of how women’s representation varies across different STEM subfields (from a low of 17% in engineering to a high of 58% in the biological sciences (National Center for Education Statistics, 2011)) and, perhaps more importantly, why it varies across the STEM subfields. A second limitation of existing literature is that women are often examined as a monolithic group, without specific attention to how women’s experiences in STEM may be further shaped by their racial/ethnic, class or other identities. The importance of considering women’s intersecting identities in STEM has been noted by Grossman and Porche (2013), Johnson (2012), and Nix, Perez-Felkner and Thomas (2015), among others. It is increasingly clear that any understanding of women’s experiences in STEM must attend to the many dimensions of women’s lived experiences.

This symposium will engage in dialogue about the importance of considering both disciplinary differences as well as intersectionality when conducting research on women in STEM. For the purpose of this session, we will focus primarily on computer science and engineering, since these fields report the largest and most persistent underrepresentation of women in all the STEM fields (National Science Board, 2014; Organisation for Economic Co-operation and Development, 2012). Further, engineering and computer science have begun to receive special attention in both policy and scholarly communities due to a shortage of trained workers in these fields.

In addition, the interactive nature of this symposium is designed to jumpstart the formation of a scholarly community within ASHE that is focused specifically on issues of gender, intersectionality, and disciplinarity within STEM. The symposium will focus especially on the theoretical and methodological approaches that are best-suited for examining these issues. Though all panelists conduct research on women’s experiences in computer science and/or engineering, their work...
represents a wide range of methodological approaches.

IMPORTANCE OF THE THEME TO ASHE MEMBERS

While disciplinary associations in engineering and computer science often have special interest groups that focus on women’s representation, a social scientific perspective is often lacking from such conversations. It is important for the ASHE community to take the scholarly lead in this area. ASHE scholars have increasingly focused on these issues in recent years, however, as of yet, there is not a well-developed scholarly community at ASHE around the issues of gender and STEM. As such, this symposium will not only educate participants on the key issues of disciplinarity and intersectionality related to women in STEM, but will help to fill a void by bringing together interested scholars in a purposeful discussion of what our larger aims might be beyond the symposium session. Further, if the symposium is accepted, we will reach out to our ASHE colleagues and other networks to encourage their participation in this session.

BACKGROUNDs ON THE PRESENTERS AS RELATED TO THE RESEARCH PROBLEM

Linda J. Sax (moderator) is Professor of Higher Education in the Graduate School of Education & Information Studies at UCLA. For over 25 years, Dr. Sax’s research has focused on gender differences in college student development, specifically how institutional characteristics, peer and faculty environments, and forms of student involvement may differentially affect male and female college students. A major focus of her research is on how these issues play out in the context of STEM. Current grants from the National Science Foundation and the Anita Borg Institute for Women and Technology provide her with the opportunity to study women’s experiences in computer science from a macro-level through the nationwide Freshman Survey, but also from a micro-level through a mixed methods study of individual computer science departments aiming to diversify their student bodies.

Lara Perez-Felkner is an Assistant Professor of Higher Education and Sociology in the Department of Educational Leadership and Policy Studies at Florida State University. Her research uses developmental and sociological perspectives to examine how young women and men’s social contexts influence their college and career outcomes. She focuses on the mechanisms that shape entry into and persistence in fields in which they have traditionally been underrepresented. In particular, she investigates racial-ethnic, gender, and socioeconomic disparities in entry to scientific career fields. She is currently examining how institutional and regional contexts influence the gender gap in engineering and computer science fields, using US and Cambodian national data. Future projects with FSU colleagues will look further at race/ethnicity intersections as well as the community college context. In addition, her current NSF grant has provided her as well as original data collected from students in gateway engineering and computer science courses at two U.S. universities.

Lois Calian Trautvetter is Associate Professor and Director of the Higher Education Administration and Policy program in the School of Education and Social Policy at Northwestern University. Her research on gender includes faculty and professional development issues such as productivity, enhancing research and teaching, motivation, faculty-student interaction, and new and junior faculty socialization, as well as holistic college student development. As a former chemist/chemical engineer, her most recent research involves engineering education through a National Science Foundation-sponsored grant titled "Prototyping the Engineer for 2020" and a NSF-funded NRT-DESE grant titled: “Training in Data Driven Discovery – From the Earth and the Universe to the Successful Careers of the Future.” Both NSF grants involve studying and supporting recruitment and retention of women and historically underrepresented minority students for undergraduates and graduate students, respectively.

Xueli Wang is an assistant professor in the Department of Educational Leadership and Policy Analysis at the University of Wisconsin-Madison. Dr. Wang’s research centers on students’ choice of STEM majors and community college students’ transfer access to, and success within, four-year STEM programs of study. She is directing two large-scale research grants from the National Science Foundation focusing on student experiences in STEM courses and programs in a community college context, and how these experiences are linked to success at both two-year and four-year levels. This work allows her to look closely at women’s experiences across STEM disciplinary contexts, as well as institutional contexts.

STRUCTURE AND FORMAT OF THE SESSION

The symposium will be structured using a highly interactive format as described below:
such as gender stereotypes, as well as lack of information and support (Rose & Hill, 2013).

Community colleges meet unexpected roadblocks to their pursuit of a four-year STEM degree, and many baccalaureate-aspiring women starting at community colleges are more likely to be first-generation and racial/ethnic minority students compared to their counterparts starting at four-year institutions. Women beginning at community colleges are more likely than men to have attended a community college (Tsapagos, 2004). In addition, women students and faculty who make recruiting subsequent women easier. However, these types of responsibilities for recruitment, outreach, and advising tend to fall on the backs of only a few faculty members, especially women and minority faculty. Furthermore, there is the perception that such efforts are not given strong consideration in determining promotion and tenure or merit salary decisions.

Lois Trautvetter will discuss what she has learned about institutional cultures, practices, and policies that play a role in recruiting and supporting female and underrepresented undergraduates in engineering. During the last four years, she has used concurrent mixed methods to investigate these issues using qualitative data from 468 faculty, student, and administrator interviews from six case study engineering institutions, and quantitative data from nationally representative surveys of faculty and administrators from 31 engineering institutions. Some of the solutions include strategic admissions policies and concrete strategies and practices for recruitment including self awareness and “high-touch” efforts. In addition, success begets further success, as in a “critical mass” of women students and faculty who make recruiting subsequent women easier. However, these types of responsibilities for recruitment, outreach, and advising tend to fall on the backs of only a few faculty members, especially women and minority faculty. Furthermore, there is the perception that such efforts are not given strong consideration in determining promotion and tenure or merit salary decisions.

Xueli Wang will share her latest mixed methods research focusing on factors shaping the intent to transfer into a four-year STEM major among women who begin their postsecondary education at a community college. Among bachelor’s or master’s degree recipients in STEM fields of study, women are more likely than men to have attended a community college (Tsapagos, 2004). In addition, compared to their counterparts starting at four-year institutions, women beginning at community colleges are more likely to be first-generation and racial/ethnic minority students (Cohen, Brawer, & Kisker, 2014). Therefore, community colleges are uniquely positioned to expand both the number and diversity of women holding a STEM baccalaureate through the upward transfer function. Despite this potential, many baccalaureate-aspiring women starting at community colleges meet unexpected roadblocks to their pursuit of a four-year STEM degree, such as gender stereotypes, as well as lack of information and support (Rose & Hill, 2013).
Drawing upon her state-wide longitudinal study following students beginning in STEM programs and classes at Wisconsin’s two-year colleges, Wang will discuss how community college women’s transfer intent is shaped by motivational, learning, and contextual factors across different STEM disciplines. In addition, focusing on computer and engineering programs and classes, Wang highlights how community college women’s other identities and backgrounds, such as race/ethnicity, age, and parental status, moderate the relation between their learning experiences and motivational beliefs around future transfer to a four-year institution.

3. World Café (40 minutes). Following discussions by the panelists, we will engage session participants in a highly interactive fashion through the World Café method. This conversation facilitation tool is best suited for cultivating deep, rich conversations around issues that genuinely matter to a community of scholars sharing similar interest and passion. Specifically, we will form groups of four or five session participants and set up progressive rounds of conversations of 10 minutes each. Each panelist will serve as a designated table host. Both table hosts and members share and take note of key ideas focusing on the following questions:

• Building upon the panel discussion, what are the major takeaways regarding disciplinary differences in the research on women in STEM? What are methodological implications of accounting for disciplinarity (and interdisciplinarity?)

• What are the methodological and theoretical considerations inherent in studying intersectionality for women in STEM, particularly in engineering and computer science?

• How do we cultivate and sustain an ASHE community of scholars around these issues?

Upon completing the initial round, we will ask one person to remain at the table as the host while others serve as “ambassadors of meaning” who carry major themes and questions into their new conversations. The table host briefly shares the main ideas and themes of the initial conversation and encourages guests to connect ideas from their previous conversation. Through three progressive rounds of such conversations around the central questions, the session participants as a whole will further and deepen our collective understanding of the topic and generate some strategies for building a community of scholars who can work in a concerted manner to advance research in innovative, robust, and nuanced ways. To bring the discussions full circle, toward the end of the session, we will spend 10 minutes sharing discoveries and insights in a whole group conversation and will summarize participants’ goals and ideas for forming an ASHE community of scholars around gender and STEM. (If this proposal is accepted, we will work with the ASHE office to see if the room can be arranged into roundtables; if not, we will ask participants to form small-group circles for this purpose.)

Attached File

Reference(s)


of Technology, Melbourne, Australia.


