

Board 380: Self-storytelling Interventions to Promote Engineering Student Success

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Dr. Krishna Pakala is an Associate Professor in the Department of Mechanical and Biomedical Engineering at Boise State University (Boise, Idaho). He was the Director for the Industrial Assessment Center at Boise State University. He served as the Faculty in Residence for the Engineering and Innovation Living Learning Community (2014 - 2021). He was the inaugural Faculty Associate for Mobile Learning and the Faculty Associate for Accessibility and Universal Design for Learning. He was the recipient of the Foundation Excellence Award, David S. Taylor Service to Students Award and Golden Apple Award from Boise State University. He was also the recipient of 2023 National Outstanding Teacher Award, ASEE PNW Outstanding Teaching Award, ASEE Mechanical Engineering division's Outstanding New Educator Award and several course design awards. He serves as the campus representative and was the past-Chair for the ASEE PNW Section. His academic research interests include innovative teaching and learning strategies, use of emerging technologies, and mobile teaching and learning strategies.

Eric Jankowski, Boise State University

Dr Jankowski's interest in efficiency underpins his research in thermodynamic self-assembly for materials and his research into how to best empower students as effective engineers. He is an assistant professor in Boise State University's Micron School of

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Dr. Anne Hamby, Boise State University

Anne Hamby is an Associate Professor of Marketing. Her research focus is in the area of consumer psychology. Specifically, she studies how emotional and structural aspects of stories engage their audiences, and how engagement in stories influence beliefs and behavior in a marketing context. She is also interested in issues related to consumer well-being and examines the psychological, social, and cultural factors that influence risky consumption practices and prosocial behavior.

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Self-storytelling Interventions to Promote Engineering Student Success

The field of engineering is often at the forefront of progress and innovation, playing a role in the advancement and design of new technologies, programming, urban planning, healthcare systems, clean energies, and beyond. It is as important as ever to strive for diversity in the voices and experiences of engineers facilitating more equitable solutions to the problems we face as a diversely growing population. For decades researchers and engineers have made the call for increasing diversity, yet attrition for students belonging to historically excluded groups continues to pose a threat in the field. This IUSE project focuses on the development, implementation, and evaluation of the impact of a unique storytelling intervention to enhance the self-view of undergraduate engineering students. It explores how telling personal narratives about oneself affects students' engineering professional identity, sense of belonging, and persistence in the major. Collaborating with the non-profit organization The Story Collider and funded by an NSF grant (award #2142137), the research uses a design-based mixed-methods approach to investigate the impact of storytelling on undergraduate engineering students. Incorporated into engineering courses, this intervention targets students during their sophomore year with the goal to develop and refine open-source curricular materials focused on teaching storytelling skills to engineering students. Each iteration of the intervention spans a semester, and involves personal narrative development supported by producers from The Story Collider. Our research is guided by the following three research questions:(1) What are the thematic and structural characteristics of personal narratives written by students about their experiences in engineering education?; (2) How does students' development and performance of a personal narrative about their experiences in engineering education relate to their professional engineering identity, sense of belonging in the major, and downstream persistence?; (3) How do the thematic and structural characteristics of personal narratives written by students about their experiences in engineering education relate to their professional engineering identity, sense of belonging in the major, and downstream persistence?

Major Project Goals

The goal of this project is to develop, implement, and examine the mechanisms and effects of a novel, theoretically-informed storytelling intervention designed to help shape and reinforce engineering students' self-view. Specifically, we will examine the effects of the intervention on students' engineering professional identity, sense of belonging in the major, and persistence (i.e., student success).

Research Instruments

In order to answer the research questions, quantitative data will be collected via both pre and post semester surveys utilizing validated Likert scales to measure the constructs. These surveys inquire about student identification with the major, their sense of belonging, and their persistence intentions. Furthermore, students will be asked to voluntarily participate in post semester semi-structured interviews in which they are asked about their experiences in the storytelling workshop and performance and how it influenced their sense of belonging and identification with the major. Finally, students will submit their written stories, which will be coded for major themes. These themes will be transformed into quantitative data which will be used as

predictors of changes in identification, sense of belonging, and persistence intentions (to address RQ3)

Significant Results

Quantitative Results: Preliminary findings based on quantitative measures of student identity, sense of belonging, and persistence intentions (collected before and after the storytelling intervention; N = 104) indicate significant positive shifts in engineering professional identity in terms of engineering competence ($F(1,87) = 6.16, p < .05$) perceived recognition by others ($F(1,87) = 2.98, p < .10$), considering oneself to be an engineer ($F(1,87) = 3.14, p < .10$) and sense of belonging ($F(1,87) = 5.09, p < .50$).

Qualitative Results: Out of the 104 students that completed the surveys, 19 participated in post intervention interviews with the research team. In these interviews students expressed enjoyment in participating in the workshop and highlighted the increased sense of community they felt with their peers. Interviews highlighted how students reconsidered their professional identity within the major when they spoke about their feelings relating to imposter syndrome and hailed this as a unique opportunity in their engineering education to reflect on their engineering identity and purpose in the field. Students indicated it influenced their sense of belonging as they talked about how participation in this workshop and story performance challenged stereotypes and broadened their perspective of what it means to be an engineer and which types of people get to become engineers. Students experienced a boost in confidence in both their writing and public speaking abilities and a result of sharing their personal stories. The importance of communication emerged as a crucial skill, with participants recognizing its value in both personal and professional settings.

Impact

The findings of this research have the potential to support the use of storytelling and performance as a method to facilitate improvements in undergraduate engineering student sense of belonging and professional identity. Additionally, the open source curriculum material will provide a guide for instructors to implement this workshop, independent of our research team, in their own courses.