

Editorial

Welcome to Volume 11, Issue 5 & 6 of the Journal of STEM Education: Innovations and Research! The Journal is now in its tenth year of publication, and we would like to thank all of our authors, reviewers, and readers for making these past ten years possible. We could not have done it without your high-quality research, your detailed reviewing, and your frequent interest in our journal.

This decade has brought many innovations in STEM research, and as the year begins to draw to a close, it is an excellent time to reflect on the past and look to the future. Our first article, authored by myself and my editorial assistant, Ashley Clayson, does just that. "The Future of STEM Education: An Analysis of Two National Reports" examines two reports recently released that call for changes in national approaches to STEM education. In the article, we assess the value and practicality of the reports' recommendations, and make our own recommendations for and predictions of STEM education's future.

Our first peer-reviewed article, "Impact of Peer Mentoring on Freshman Engineering Students," written by Dan Budny, Cheryl A. Paul, and Beth Bateman Newborg, presents a unique approach to first-year engineering instruction. The curriculum of the Introduction to Engineering course at the University of Pittsburgh was redesigned to combine large class instruction in general engineering topics with small peer mentor groups that discuss the first-year experience in engineering. The curriculum is described, as is the selection of peer mentors, and an assessment of the program is provided.

Next, Matthew Franchetti, Tina Ravn, and Vicki Kuntz discuss five techniques used by The University of Toledo to recruit and retain female students in engineering. "Retention and Recruitment Programs for Female Undergraduate Students in Engineering at the University of Toledo, Ohio, USA" also recommends several mentoring techniques, including peer mentorship, faculty mentorship, mentorship in co-op programs, and mentorship through the Society of Women Engineers. The paper also presents a female undergraduate student's perception of the programs.

"Simulation-Visualization and Self-Assessment Modules' Capabilities in Structural Analysis Course" by Subhash Kadium, Ahmed Ali Mohammad, and Duc T. Nguyen introduces an online module for analyzing structures. Students use the Stiffness Matrix Model (SMM) Module to create and analyze truss, frame, and beam structures. They can use the module's self-assessment tools to check their comprehension. Self-assessments are graded by computer and sent to both the student and instructor automatically via email. This allows the student extra practice without extra grading for the instructor.

In "A Pre-Engineering Program Using Robots to Attract Underrepresented High School and Community College Students," Pauline Mosley, Yun Liu, S. Keith Hargrove, and Jayfus T. Doswell discuss using robots to recruit underrepresented students to STEM fields. The program described is offered at Baltimore City Community College in conjunction with Pace University and Morgan State University. It uses a problem-based learning approach and robotics instruction to make learning about engineering interesting and fun. The paper discusses implementation and assessment of the program, and presents it as a model that other colleges and universities can use to increase recruitment of underrepresented students.

Mary A. Rose, Jason W. Ribblett and Heather Hershberger, in "Employing the Experimental Method to Inform Solar Cell Design," also discuss problem-based learning. They describe using the experimental method to inform solar cell testing in high school laboratory classes. Using the example of solar cells, the authors describe how to use this technique to lead students through scientific inquiry instead of simply lecturing about scientific principles.

Finally, Kumar Yelamarthi and P. Ruby Mawasha, in "A Scholarship Model for Recruitment and Retention in STEM Disciplines," discuss a scholarship program at Write State University. The paper describes the program's techniques for success and evaluates its effectiveness through GPA, major distribution, and retention rates.

I hope that these articles inspire you to continue researching these highly relevant issues. In the end, our students' education is ultimately in our hands. Happy reading and have a good rest of the semester.

P.K. Raju
Editor-in-Chief