

Guest Editorial: Engineering Education

THIS is a Special Issue of the SAIEE Africa Research Journal (ARJ), consisting of revised and extended articles that were originally presented at the 2020 IFEEES World Engineering Education Forum - Global Engineering Deans Conference (WEEF-GEDC), held virtually in November 2020. WEEF and GEDC are focused on bringing together the global community to build excellence in engineering education.

Out of the 42 peer-reviewed papers that were presented at the 2020 WEEF-GEDC conference, we identified 18 that presented significant and completed research on relevant topics. The authors of these papers were invited to rework and expand their papers, and submit them for consideration in this Special Issue. Of this, 8 submitted articles underwent a rigorous peer review process, in which each article was reviewed by three experts in engineering education, who gave substantive and constructive critical feedback. After revision, 6 articles were finally accepted for this Special Issue.

Engineering education encompasses concerns related to teaching and learning in the classroom as well as larger structural issues, such as industrial needs and challenges around diversity and retention. The articles in this Special Issue cover an eclectic range of topics touching upon several of these considerations.

In terms of teaching and learning in the classroom, Hattingh and Dison explore how assessment practices adopted in engineering courses influence students' learning approaches and behaviors. Their findings highlight the need for a more collaborative teaching and learning environment and reaffirm the importance of constructive alignment in the design of assessment practices.

Gwynne-Evans looks for evidence of student learning relating to ethics by analyzing student assignments. She notes that students need opportunities to develop their own sense of how their personal values align with the ethical choices made in engineering work. Hence, she argues for an expanded conceptualization of learning of ethics in engineering.

With the advent of Industry 4.0 and changes in teaching mode due to the ongoing Covid-19 pandemic, educators are heavily reliant on technology in communicating course material to students. Swartz' paper seeks to understand the ethical implications of using technology in teaching engineering.

Industry 4.0 has brought changes not only in the mode of teaching but also in the competencies that engineering graduates require to successfully contribute to the profession. Maisiri, van Dyk and Coetzee present the development and assessment of a competency assessment framework that can be used to measure the graduate skills needed for Industry 4.0.

Henry, Hall and Plummer investigate gender differences in enrollment and degree completion of chemical engineering students in Jamaica. They find that while female students have

a higher rate of degree completion, the percentage of female students entering the degree remains lower than their male counterparts and there still remains a lack of female role models.

As teaching and learning of engineering are continually evolving, it is important that faculty members also engage in ongoing capacity development. Kandakatla and Palla explore how a faculty development program designed along the lines of a community of practice model can lead to sustainable changes in instructional practices.

We hope that this Special Issue will form connections between engineering education researchers, engineering educators committed to implementing the best practices in their classrooms or virtually and engineers who are invested in the development of the future workforce.



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