

## Guest Editorial

# Special Issue on: Artificial Intelligence in Engineering Education – Part I

Guest Editors: ANDRÉS DÍAZ LANTADA<sup>1</sup> and JOSÉ LUIS MARTÍN NÚÑEZ<sup>2</sup>

<sup>1</sup> Escuela Técnica Superior de Ingenieros Industriales, Universidad Politécnica de Madrid, Spain. E-mail: andres.diaz@upm.es

<sup>2</sup> Instituto de Ciencias de la Educación, Universidad Politécnica de Madrid, Spain. E-mail: joseluis.martinn@upm.es

Artificial intelligence (AI) is radically transforming the way engineering systems are conceived, designed and managed, helping to maximize the chances of successfully achieving their goals. Engineering science, technology and research clearly benefit from AI and engineering educators should be able to make students aware of its potential, teach them the necessary fundamentals of this field of study and guide them through the application of these algorithms and technologies to the development of real engineering projects, as necessary aspects in modern engineering programs of study. However, the more relevant impact of artificial intelligence in engineering education goes beyond the application of a set of novel resources to solving specific engineering problems: In fact, the concept of “*artificial intelligence-aided engineering education*” refers to utilizing artificial intelligence techniques and resources for improving the teaching-learning process in higher education, especially in connection with scientific-technological studies.

In our study about artificial intelligence-aided engineering education (Martín Núñez & Díaz Lantada, Int. J. Eng. Educ. 2020) an implementation roadmap towards “*intelligent universities*” was discussed, involving the incorporation of AI for supporting educational practice, including curricular planning and course organization and assessment, for enhancing the results of teaching-learning experiences, for simplifying the bureaucratic burden and for helping educators and students optimize their efforts aimed at improving outcomes. Different trends and challenges were discussed then and pioneering educational activities involving AI or benefiting from it were analyzed.

More recently, the emergence of generative artificial intelligence has started to importantly affect the *status quo* of engineering practice and brings new possibilities and unknowns to engineering educational practice. In many ways these generative AI models facilitate the usability of AI and empower its widespread application, because the instructions are provided straightforwardly, in a highly user-friendly environment for beginners. Unexperienced users without almost any training in programming can reach very impressive results, regarding content creation, in just a few hours. Highly interesting impacts are already visible in the fields of engineering, design and art, and these advances are expected to radically affect the professional practice of engineers in the following years. This should be considered in actions aimed at the continuous reformulation of engineering education in a changing world.

Accordingly, to methodically study the possibilities, to maximize the expected benefits and to mitigate any possible drawbacks of AI in engineering education, the present IJEE special issue on Artificial Intelligence in Engineering Education was proposed following the advice of Chief Editor Ahmad Ibrahim.

The topic has generated remarkable interest from colleagues, and more than 30 papers have been received for evaluation since the launch of the call for papers. In consequence, the special issue will be published in two different parts, to give space to prolonged debates and discussions linked to this continuously evolving topic.

Part I of the Special Issue comprises a first selection of 10 papers and covers topics including: the incorporation of artificial intelligence to project-based learning experiences and capstone courses, the employment of AI to support the acquisition of programming skills and to improve laboratory experiences, the use of AI for facilitating the personalization of engineering education accounting for diversity and fostering equity, the study of biases and related ethical issues when employing AI in engineering education, and the assessment of students’ performance, learning process and acquisition of outcomes.

The Guest Editors are profoundly grateful to the authors for their outstanding involvement with this special issue and appreciate the advice and confidence of Chief Editor Ahmad Ibrahim. We truly hope that the result of this first part will be according to authors’ expectations and of interest for colleagues and readers of the International Journal of Engineering Education. We also hope that the published studies may support engineering educators towards incorporating artificial intelligence into engineering education in the most pedagogical and transformative way possible, ideally as a set of resources for underpinning equitable engineering education.

Andrés Díaz Lantada & José Luis Martín Núñez  
Madrid, October 2025