Guest Editorial

The third issue of Volume 19 of the World Transactions on Engineering and Technology Education published in 2021, is again marked by the situation we are in for the second year. The global pandemic has affected all aspects of our daily lives and has also been reflected in engineering and technology education.

The direct impact of the Covid 19 pandemic on educational methods and tools is addressed in the first two articles. In the first one, Paweł Mika, Łukasz Wesołowski and Sabina Kuc from Cracow University of Technology in Poland, based on many years of personal experience and the results of a survey study, outline the impact of the pandemic-induced changes on the effectiveness of student workshops and exhibitions. They analysed which solutions could be the best for these activities, and used in a post-pandemic reality. Tertia Jordaan, Marietjie Havenga and Byron Bunt from North-West University in Potchefstroom, South Africa report on mathematics students' on-line collaboration in game-based learning.

The content of other articles, to a greater or lesser extent, also touches on the consequences directly stemming from the pandemic, such as on-line delivery of education across different courses. Ratnadewi Ratnadewi, Ariesa Pandanwangi and Agus Prijono from Maranatha Christian University in Bandung, Indonesia, demonstrate how the pandemic forced the learning activities to be conducted on-line, including the Faculty of Engineering, which incorporates art into programming, thus leading to the students' fuller emotional and humanistic development.

Maria J. Żychowska from Cracow University of Technology in Poland presents a comparative analysis of the classroom-based and distance teaching of the subject Graphic Art Techniques. The direct face-to-face teaching model, developed over the years, which allows reviewing the applied standards and drawing conclusions while evaluating tasks, is challenged by the pandemic-caused on-line arrangement. This is particularly demanding in relation to same art topics that require *the master's hand* and direct contact during assessment.

Ewa Stachura from the same university, presents an on-line teaching module dedicated to architectural interventions in heritage sites located in various cultural environments, and demonstrates how architecture responds to environmental, social, political, economic and cultural factors that have profoundly influenced design and investment.

The article by colleagues, Puput W. Rusimamto, Munoto, Muchlas Samani, I G. Buditjahjanto, Ekohariadi, Luthfiyah Nurlaela and Mohammad Nuh from the State University of Surabaya in Indonesia deals with the possibility of using technological tools for the development of students' skills. Specifically, their study was aimed at developing a test instrument for the creative thinking skills assessment of electrical engineering students based on programmable logic controller (PLC) programming.

Luis M. Dos Santos from Woosung University in Daejeon, Republic of Korea, in view of the National STEM School Education Strategy 2016-2026, investigated Australian secondary school teachers' applications of, and experiences with, technology to teach STEM to students with little or no access to technology outside their classroom environment in regional Australia.

The final series of articles focuses on the application of innovative methods and techniques in the pedagogical process. Maurice Danaher, Anthony Rhodes and Ashley Ater Kranov from the Zayed University in Abu Dhabi, United Arab Emirates, present the use of asynchronous on-line discussion boards (AODB) to assess students' learning outcomes attainment.

Daniela Pusca and Derek O. Northwood from the University of Windsor in Canada, discuss how much change is needed to make remote teaching and learning more engaging and effective. It is the authors' opinion that both teaching and learning should be done creatively, regardless of the environment - face-to-face or remotely. In times of rapid technological changes, instructors and students should be able to use different tools associated with the learning management system (LMS) and course-related digital tools to achieve the desired student-centred results.

Katarína Smatanová, Miroslava Kamenská and Andrea Šeligová from Slovak University of Technology in Bratislava, Slovakia, in their research explore the consequences of implementing student architecture competitions as an assignment for the studio design work.

Magdalena Kozień-Woźniak deals with selected elements of synectics in architectural design. The author discusses the proposed use of synectics in architectural design education, and focusses on *the compressed conflict analogy of*

forms and *the forced fit of functions*, which serve as tools of architectural design education in the Faculty of Architecture at Cracow University of Technology in Poland.

Ľubica Vitková, Viktor Kasala, Olena Lemak and Oto Nováček present the applied methods of teaching studio work related to social inclusion issues on the city scale, carried out in the Faculty of Architecture and Design at Slovak University of Technology in Bratislava, Slovakia. Their article further focuses on teaching methods leading to the development of skills necessary to shape, guide and promote a sustainable environment with an emphasis on social diversity.

The final article from Ľubica Ilkovičová and Ján Ilkovič is a reflection on the trends and processes of Industry 4.0 in the education of typology and architecture of industrial buildings in the Faculty of Architecture and Design at Slovak University of Technology in Bratislava, Slovakia. The authors discuss the extent to which innovative systems of production, logistics and distribution should influence the methodology and content of education in the design of industrial buildings.

I am convinced that all the presented articles will contribute to the creative discussion and help in the further development of engineering education.

Pavel Gregor