

# **Educating Engineers for the post-COVID 21st Century**

Paul G. Leahy<sup>1</sup>, Dylan Furszyfer<sup>2,3</sup>, Benjamin Sovacool<sup>3</sup>, Aoife M. Foley<sup>2</sup>

1. School of Engineering, University College Cork, Republic of Ireland
2. School of Mechanical and Aerospace Engineering, Queens University Belfast, Northern Ireland
3. Science Policy Research Unit (SPRU), University of Sussex Business School, University of Sussex, United Kingdom

Over a decade ago, two of the authors of this submission presented a paper entitled “Educating Engineers for the 21st Century” at the International Symposium for Engineering Education, held at this venue. We made some predictions of the demands that would be placed on engineering graduates in the following years and how the academy could best educate Engineers for a world characterised by rapid change, increased specialisation and economic uncertainty.

In this contribution, we reflect on the changes experienced in Engineering education in the past decade, and focus particularly on the unpredicted and rapid changes that have occurred due to the COVID-19 pandemic. Some trends in Engineering education that emerged in the past decade, such as the replacement physical labs with computer simulations, have accelerated as a result of the restrictions imposed in response to the pandemic. Other effects include increased individualisation of student effort and a shift away from group work. The previous trend we noted towards increased specialisation in Engineering education may have reversed, with a greater focus on more general degree programmes. Despite the rapid pace of technological and social change of the past decade, and the once-in-a-generation disruption of the pandemic, many of the concerns of ten years ago are still to the forefront for graduates entering the workforce today, for example, economic uncertainty, climate change and a requirement for career flexibility.

We draw upon the results of a survey of the career concerns of students in several institutions, to discuss the implications of the past decade’s developments for professional practice of the current generation of graduate Engineers, and propose educational approaches which will give society the engineers required to deal with today’s major societal challenges.