

Industry Integrated Engineering and Computing Education

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Editors

Industry Integrated Engineering and Computing Education

Advances, Cases, Frameworks, and Toolkits
for Implementation

 Springer

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Foreword

Academia: Dr. Hassan Al-Derham, President of Qatar University, Doha, Qatar

Qatar has set a futuristic vision to transform into innovation- and knowledge-based economy by 2030. The Qatar National Vision 2030 presents a model that articulates the focus on building human capacity with a national mandate to support and strengthen science, technology, engineering, and mathematics (STEM) disciplines. Qatar University has set an ambitious transformation strategy to configure itself as effective contributor to the national vision of Qatar. At the core of the university transformation comes educational model and delivery transformation; engineering and computing education is a core component in this process. One of the major pathways in implementing educational and curricular transformation is organically constructing the needed competencies of industry in engineering and computing education. This book is a scholarly contribution to raise awareness and to initiate further dialogue on the importance of engineering and computing education alignment with industry needs. The book stands as one of the few available recent compilations of advances and studies on the topic, and Qatar University is proud of this seeding contribution. I would like to thank the authors and editors for their contributions and efforts. I am also grateful to the Qatar National Research Funds (QNRF) for funding the project under which this work has been achieved.

Industry: Dr. Mohammed Yousef Al-Mulla, Managing Director and CEO, Qatar Petrochemical Company (QAPCO) Q.P.J.S.C.

It is my pleasure to introduce this new scholarly book on “Engineering and Computing Industry Integrated Education,” a much-needed topic to address nowadays. I am personally excited to write this foreword as the book is addressing a global challenge of aligning the educational curricula with national needs, which are faced almost in every country. This is highly important within the current dynamic transformation of the industry, the so-called Industry 4.0. The educational institutions should examine new and relevant education and training opportunities, exposing them to a necessary adaptation to such new era. A continuous dialogue with the industry will be the key to address industry-specific talent challenges and to anticipate and prepare the future skills. The combination of the editors’ and authors expertise in both technical and pedagogical fields across different contexts

and countries has been ideal to undertake this work. The book has provided a number of international case studies as well as local case studies. Furthermore, the book provided strategic translational perspectives from pedagogy and organizational development for the execution of further socioeconomic impact on engineering schools and curricula. I hope, with this contribution to the general body of research and knowledge advancement, a holistic discourse is initiated, enhancing further developments and implementations of industry needs in engineering and computing education.

Acknowledgments

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Editors Biographies



Mahmoud Abdulwahed holds BSc, MSc, and PhD in Electrical, Control, and Systems Engineering; he completed his graduate studies in Germany, Sweden, and the UK. His professional and scholarly expertise is in innovation and strategic development, mainly in the higher education industry. His expertise in exploiting systems control and process engineering methods into strategic development and education systems and processes design (e.g., engineering the education or education engineering) is relatively unique, and he is among few globally experts in this area. These translational methods enable effective, accelerated, goal-oriented, and systematic outputs. In scholarship, he has ranked among top 50 scholars globally in the field of engineering education research (EER) in terms of indexed publications number in Scopus (2012–2017 periods). He published 2 books, 1 book chapter, and 60+ peer-reviewed conference and journal articles and developed 40+ institutional reports/frameworks or strategies; his multidisciplinary publications span over the areas of innovation, digital transformation, entrepreneurship, leadership, pedagogy, education design, organizational development, and applied systems theory. He attained several industry funds, academic recognitions/awards, and best papers distinctions from various universities and organizations, as well as fellowships from the University of Technology Sydney, University Science Malaysia, and US Department of State (Ministry of Foreign Affairs). Mahmoud joined Qatar University in Fall 2011 as joint faculty member between College of Engineering and College of

Education and progressed in innovation advisory and strategic development assignments with Engineering Dean's office, the Vice President and Chief Academic Officer Office, and the President Office, where he is currently director of Strategic Initiatives Office and Associate Professor of Engineering.



Abdelaziz Bouras is professor in the Computer Science and Engineering Department of the College of Engineering at Qatar University where he is chairing the Industrial and External Relations Committee. He is also managing the Pre-Award Department at the Office of Research Support at Qatar University. With his team of senior specialists, he manages several initiatives and high-impact collaboration programs, at both international and industrial sides, and contributes to an ambitious governance program for Qatar University, within its Strategy 2030. He also held the *ict*Qatar (ICT Ministry) chair position until September 2016, where he worked on bridging the gap between policy-makers and R&D institutions in Qatar. He led several initiatives on cooperative education and capacity building within the European Commission Erasmus-Mundus program and currently leads the Qatar Foundation Pro-Skima project “PROfessional education development and SKills Management – Ontology-Enhanced Workplace Learning” (NPRP7-1883-5-289), in collaboration with the European universities and Qatari stakeholders. He guided around 30 PhD students in ICT and information systems fields. Some of them were co-supervised with the international institutions under joint agreements (from EU, Africa, and Asia). He published more than 150 research papers in referred journals and international conferences and edited several books and two international journals (IJPD, IJPLM). He is also chairing the IFIP International Federation of Information Processing WG5.1, which is holding a yearly international conference on specific enterprise information systems (PLM), and coediting a yearly Springer book. Prof. Bouras is currently member of several committees in Qatar, such as the Ministry of Transport and Communications “Digital Incubation Center” judging board or the Challenge22 projects’ reviewing board. He is regularly invited to be part of awards and dissertation juries in several countries.



Laurent Veillard is associate professor at Lumière University Lyon 2, France. After a master's degree in Industrial Chemistry obtained in 1993, he completed a PhD in Education about students' workplace learning in the context of a work-based engineer training course in 2000. He reached the position of associate professor at Lumière University Lyon 2 (France) in 2001 and became a member of the ICAR laboratory, which is characterized by some multidisciplinary research activities on the multimodality of the use of language in some various interactional contexts (workplace, family, educational contexts, etc.). He obtained the "Habilitation à Diriger des Recherches" (HDR) in 2015. His own researches are about the initial vocational education and learning both at secondary and tertiary levels, especially in technical fields like production management, data processing, cars maintenance, etc. He is more precisely interested in the specificities of teaching and learning according to different social contexts (classroom, workshops in school, workplace, etc.), students' transitions between these contexts, and problems of connectivity and integration of different knowledge and learning experiences. He uses some ethnographic approaches combining various types of data: interviews, observations, video recordings, and analyses of written documents. He is co-manager of the ViSA national project which aims at developing and sharing some methodological and technical tools for educational studies using video recordings. He teaches in a technical institute, which is specialized in work-integrated training programs for training middle-level managers in different technical fields. He gives also some teaching courses in different master's programs in the field of vocational and professional education.