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CONCEIVE DESIGN IMPLEMENT OPERATE

THE 20TH INTERNATIONAL CDIO CONFERENCE, TUNISIA

Proceeding - Full Papers

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Mark Nivan Singh, Reidar Lyng, Nicoleta Maynard, Johan Malmqvist, Fredrik Byström (eds.)

Cover Design: Communication Department ESPRIT
Cover Photo: Communication Department ESPRIT
Proceedings of the 20th International CDIO Conference, Tunis, Tunisia, 10–13 June 2024
Published by Chalmers University of Technology

ISBN (e-book): ISBN 978-91-88041-55-5
Distribution: www.cdio.org
CDIO Initiative
Proceedings of the International CDIO Conference ISSN 2002-1593

Editorial

The CDIO Initiative is an approach to designing innovative educational frameworks, aiming for educations that support students in developing the necessary professional skills required of a practicing engineer while simultaneously acquiring strong technical fundamentals This is done by providing students with dual-impact learning experiences that are based upon the lifecycle of an engineering project, the Conceiving-Designing-Implementing-Operating (CDIO) of real-world products, processes, and systems. Throughout the world, over 200 institutions have adopted CDIO as the framework for curriculum development.

CDIO collaborators recognize that engineering education is acquired through programs of varying lengths and stages in a variety of institutions and that educators in all parts of this spectrum can learn from practice elsewhere. Several times each year, CDIO collaborating institutions, engineering educators and researchers gather to exchange ideas and experiences, review developments, assess and further refine the CDIO approach.

The Annual International Conference is the key event for the CDIO community where CDIO practitioners from all over the world come together, share knowledge and promote the advancement of the practice of the CDIO Initiative for producing the next generation of engineers. It includes presentations of papers as well as specialized seminars, workshops, roundtables, events, and activities.

The 20th CDIO International Conference took place in Tunis, Tunisia, June 10-13, 2024, hosted by Ecole Supérieure Privée d'Ingénierie et de Technologies (ESPRIT).

The main theme of the conference was **"Engineering education in the era of AI".** The theme is present in the keynote presentations, paper presentations, roundtables, workshops working group sessions, and the panel debate on the final day of the conference. The program covered many aspects of engineering education, such as AI driven learning approaches, sustainability, active and adaptive learning, lifelong learning and change leadership. Specific topics covered include curriculum agility, emotion and reason in engineering education, digital transformations and of course reports on implementation of the CDIO Standards and the CDIO Syllabus.

The conference featured three types of contributions: Full Papers, Project in Progress contributions, and Extended Abstracts for Activities. All contributions have undergone a full single-blind peer-review process to meet high scholarly standards. The Full Papers are papers assessed to be of archival quality and thus published in these proceedings. They fall into three tracks: Advances in CDIO, CDIO Implementation, and Engineering Education Research. The Projects in Progress contributions describe current activities and initial developments that have not yet reached completion at the time of writing. The Extended Abstracts summarize the Roundtable Discussions, Workshops and Working groups held at the event.

Initially, 206 abstracts were submitted to the conference. The authors of the accepted Full Paper and Projects in Progress abstracts submitted 161 manuscripts to the peer review process. During the review, 313 review reports were filed by 98 members of the 2024 International Program Committee. Acceptance decisions were made based on these reviews. The reviewers' constructive remarks served as valuable support to the authors of the accepted full papers when they prepared the final versions of their contributions. We want to address our warmest thanks to those who participated in the rigorous review process.

A total of 61 educational institutions from 30 countries, representing 6 continents, were present during the conference. The total number of registered participants at the conference was 194.

This publication, which is available as an electronic publication only, contains the 62 accepted Full Papers that were presented at the conference, of which 1 is in the Track Advances in CDIO; 51 are in CDIO Implementation; and 10 are in Engineering Education Research. These papers have been written by 297 different authors with submitting authors from 24 different countries. Additionally, 36 CDIO Project in Progress contributions were presented at the conference but are not included in this publication. Also, a total of 26 collaborative contributions for activities in 11 Workshops, 11 Roundtable Discussions and 4 Working Groups took place, as well as a range of social events.

Note that the Proceedings of the International CDIO Conference Proceedings is SCOPUS Indexed.

We hope that you find these contributions valuable in developing your own research, curriculum development, and teaching practice, ultimately furthering the engineering profession. We also hope that you benefit through the truly unique community of practice that exists within the CDIO Initiative.

The CDIO 2024 Program Committee wishes all of you a wonderful CDIO experience!

Tunis, June 10, 2024.

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