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Grigoris Antoniou
University of Huddersfield, UK

Vadim Ermolayev
Ukrainian Catholic University, Ukraine

Vitaliy Kobets
Kherson State University, Ukraine

Vira Liubchenko
Odesa Polytechnic National University, Ukraine, Hamburg University of Applied Sciences, Germany

Heinrich C. Mayr
Universität Klagenfurt, Austria

Aleksandr Spivakovsky
Kherson State University, Ukraine

Vitaliy Yakovyna
Lviv Polytechnic National University, Ukraine, University of Warmia and Mazury in Olsztyn, Poland

Grygoriy Zholtkevych
V.N. Karazin Kharkiv National University, Ukraine


This edited collection represents the proceedings volume of ICTERI 2023: the 18th International Conference on ICT in Education, Research, and Industrial Applications, held in Ivano-Frankivs’k, Ukraine, in September 2023. It comprises 26 papers that were carefully peer-reviewed and selected from 90 submissions. The volume is organized in three parts. Part I presents the Proceedings of the Main Conference. Part II contains the papers of the PhD Symposium. Part III collects the papers presenting the contributions for the Poster Session.
Preface

This volume contains the contributions to ICTERI 2023, the 18th International Conference on Information and Communication Technologies (ICT) in Education, Research, and Industrial Applications. The conference was held in Ivano-Frankivs’k, Ukraine, during September 18–22, 2023, with a focus on research advances in ICT, business or academic applications of ICT, and design and deployment of ICT infrastructures. To our regret, current security situation in Ukraine did not allow us to organize the conference as a face-to-face gathering. Therefore, the conference proceeded in a hybrid mode.

Topically, the Main Conference of ICTERI 2023 collected the contributions to: (i) ICT research advances, (ii) information systems technologies and applications, (iii) academic and industry cooperation in ICT, and (iv) ICT in Education. As a complement to the Main Conference tracks, ICTERI 2023 continued the tradition of hosting co-located events this year by offering the PhD Symposium and two workshops: the 6th International Workshop on Methods, Resources and Technologies for Open Learning and Research (MRQL 2023) and 2nd Workshop on Digital Transformation of Education (DigiTransfEd 2023). The PhD Symposium provided the opportunity for PhD candidates to present, listen to, and discuss the research on the topics relevant to the scope of the ICTERI conference series. The workshops addressed the following:

- MRQL 2023. This workshop focused on new and emerging technologies application in the open systems of higher education. It explored the use of open education and research tools, resources, and methods for forming a creative and ICT competent person in the view of European Research Area development.
- DigiTransfEd 2023. This workshop focused on the theory and practice of Digital Transformation of Education. Digital transformation of educational process of all levels, branches, and directions of training

Overall, ICTERI 2023 attracted 90 paper submissions authored by colleagues from eleven different countries. These submissions included: 53 – for the Main Conference; 26 – for the PhD Symposium; and 11 – poster papers. Out of these submissions, we accepted: 13 papers for the Main Conference; 8 papers for the PhD Symposium; and 5 poster papers. The acceptance rate across all the tracks was 28.9 percent. The workshops were run as autonomous co-located events and published their proceedings separately.

The structure of this proceedings volume reflected the conference program. It contained three parts: (i) Main Conference papers; (ii) PhD Symposium papers; and (ii) Poster papers.

The Main Conference was, traditionally, the backbone track of ICTERI 2023. The aim of the track was to offer a forum for presenting and discussing quality contributions focused on research, design, development, deployment, and usage of advanced information systems and ICT infrastructures in industry and education. When forming the program, particular attention was paid to make sure that the presented ideas and solutions can be or have already been put into practice. This could have been demonstrated by a proof-of-concept implementation, a comprehensive prototype, a comprehensive
case study, or the analysis of real use cases. Reports on academic-industrial partnerships for ICT innovation and knowledge transfer were as welcome as technological and methodological contributions. The rationale behind holding our PhD Symposium under the umbrella of ICTERI 2023 was to offer an expert environment for the presentation of the tractable ideas and early results of PhD projects or other research aiming at receiving a PhD. The poster part of the proceedings is composed of the best selected papers describing poster presentations given at the conference.

This volume would not have been possible without the support of many people. First, we are very grateful to all the authors for their commitment and intensive work. Second, we would like to thank the members of our Program Committee and additional reviewers for providing timely and thorough assessments. Furthermore, we would like to thank all the people who contributed to the organization of ICTERI 2023. Without their efforts, there would have been no substance for this volume.

September 2023

Grigoris Antoniou
Vadim Ermolayev
Vitaliy Kobets
Vira Liubchenko
Heinrich C. Mayr
Aleksander Spivakovsky
Vitaliy Yakovyna
Grygoriy Zholtkevych
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Oleksandr Spivakovsky’s Educational Foundation (OSEF, http://spivakovsky.fund/) aims to support gifted young people, outstanding educators, and those who wish to start up their own business. OSEF activity is focused on the support and further development of educational, scientific, cultural, social, and intellectual spheres in the Kherson Region of Ukraine.

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