Volume 17, Number 4, 2019



World Transactions

on

Engineering and Technology Education

Editor-in-Chief Zenon J. Pudlowski World Institute for Engineering and Technology Education (WIETE) Melbourne, Australia

Melbourne 2019

World Transactions on Engineering and Technology Education



Commonwealth Science and Technology Academy for Research (C-STAR) Chennai, India



Faculty of Architecture

Cracow University of Technology

Kraków, Poland



Faculty of Architecture Gdańsk University of Technology Gdańsk, Poland



Faculty of Architecture Slovak University of Technology in Bratislava Bratislava, Slovakia

Published by:

World Institute for Engineering and Technology Education (WIETE) 141 The Boulevard, Ivanhoe East, Melbourne, VIC 3079, Australia

E-mail: info@wiete.com.au Internet: http://www.wiete.com.au

© 2019 WIETE

ISSN 1446-2257

Articles published in the World Transactions on Engineering and Technology Education (WTE&TE) have undergone a formal and rigorous process of peer review by international referees.

This Journal is copyright. Apart from any fair dealing for the purpose of private study, research, criticism or review as permitted under the Copyright Act, no part of this Journal may be reproduced by any process without the written permission of the publisher.

Responsibility for the contents of these articles rests upon the authors and not the publisher. Data presented and conclusions developed by the authors are for information only and are not intended for use without independent substantiating investigations on the part of the potential user.

World Transactions on Engineering and Technology Education

| EDITOR-IN-CHIEF | |
|---|---|
| Prof. Zenon J. Pudlowski | World Institute for Engineering and Technology Education (WIETE) 141 The Boulevard, Ivanhoe East, Melbourne, VIC 3079, Australia Tel/Fax: +61 3 94994339, E-mail: zenon.pudlowski@wiete.com.au Internet: http://www.wiete.com.au |
| MANAGER & ASSOCIATE EDITOR | |
| Dr Dianne Q. Nguyen | World Institute for Engineering and Technology Education (WIETE), Melbourne, Australia |
| ASSOCIATE EDITORS | |
| Dr Ian R. Dobson Mrs Dorota I. Pudlowski | Monash University, Melbourne, Australia World Institute for Engineering and Technology Education (WIETE), Melbourne, Australia |
| Prof. Robert Špaček Ms Krystyna Wareing Mr Nial Wareing | Slovak University of Technology in Bratislava, Bratislava, Slovakia Independent Communications Consultant, Tetbury, Gloucestershire, England, UK University Lecturer (Ret.), Tetbury, Gloucestershire, England, UK |
| ADVISORY BOARD MEMBERS | |
| A/Prof. Stanislav Avsec A/Prof. Kristijan Breznik | University of Ljubljana, Ljubljana, Slovenia International School for Social and Business Studies; College of Industrial Engineering, Celje, Slovenia |
| Prof. Colin U. Chisholm Prof. Ahmad Ibrahim A/Prof. Ľubica Ilkovičová Prof. Sabina Kuc | Glasgow Caledonian University, Glasgow, Scotland, UK Yorkville University, Toronto, Ontario, Canada Slovak University of Technology in Bratislava, Bratislava, Slovakia Cracow University of Technology, Kraków, Poland |
| Prof. Viljan Mahnič Prof. George Metaxas Prof. Andrew Nafalski | University of Ljubljana, Ljubljana, Slovenia University of West Attica, Piraeus-Athens, Greece University of South Australia, Mawson Lakes, Adelaide, Australia |
| Prof. Lucyna Nyka Prof. Derek O. Northwood A/Prof. Arthur J. Swart Prof. Steven Thatcher | Gdańsk University of Technology, Gdańsk, Poland University of Windsor, Windsor, Canada Central University of Technology, Bloemfontein, Free State, South Africa Central Queensland University, Cairns, Australia |
| Prof. Jacek Uziak Prof. Algirdas V. Valiulis Dr Aji P. Wibawa | University of Botswana, Gaborone, Botswana Vilnius <i>Gediminas</i> Technical University, Vilnius, Lithuania State University of Malang, Malang, Indonesia |

World Transactions on Engineering and Technology Education

Contents

| Z.J. Pudlowski | Editorial | 419 |
|---|--|-----|
| N. Sokół & J. Martyniuk-Pęczek | Lighting education for architects, the barriers and challenges: a survey of architecture students | 420 |
| T. Gaczoł & M. Celadyn | Basic drawings as primary material for teaching natural balanced ventilation systems | 425 |
| L.M. Dos Santos | Evaluation checklist for English language teaching and learning for health science professionals | 431 |
| A. Rek-Lipczyńska & I. Kozłowska | Assumptions of interdisciplinarity in educating interior designers | 437 |
| G. Rembarz & J. Martyniuk-Pęczek | Teaching infrastructure urbanism to aid participatory planning | 442 |
| K. Radziszewski & J. Cudzik | Parametric design in architectural education | 448 |
| P. Haupt | Architectural education for primary school students mentored by university students | 454 |
| K. Radziszewski & J. Cudzik | Robotics in architectural education | 459 |
| I. Burda & M. Dymnicka | Student competitions as a socio-spatial tool for planning urban structures | 465 |
| K. Zielonko-Jung | Aerodynamics in the education of prospective architects | 471 |
| Ł. Wesołowski | Virtual reality and BIM as a potential tool for architectural engineers' education | 477 |
| S. Filipowski, M. Nessel & K. Romaniak | Improving student competence through workshops | 483 |
| A. Golędzinowska & M. Kostrzewska | Co-operation with local stakeholders: a crucial element of urban design | 490 |
| M. Rembeza & D. Kamrowska-Załuska | The <i>resilient city</i> in architectural engineering education: a joint design studio between Gdańsk and Chalmers universities of technology | 495 |
| I. Burda & M. Dymnicka | The principles of arturbain.fr for teaching sustainable urban design | 500 |
| Index of Authors | | 506 |