



World Transactions
on
Engineering and Technology
Education

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

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



Faculty of Engineering
State University of Malang
Malang, Indonesia



UNIVERSITY OF BOTSWANA
University of Botswana
Gaborone, Botswana



University of West Attica
Piraeus-Athens, Greece

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
Prof. Robert Špaček
Ms Krystyna Wareing
Mr Nial Wareing
Monash University, Melbourne, Australia
World Institute for Engineering and Technology Education (WIETE),
Melbourne, Australia
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

Prof. Hosni I. Abu-Mulaweh
A/Prof. Stanislav Avsec
A/Prof. Kristijan Breznik
Prof. Colin U. Chisholm
A/Prof. Chih-Hsien Huang
Prof. Ahmad Ibrahim
A/Prof. Lubica Ilkovičová
Prof. Sabina Kuc
Prof. Viljan Mahnič
Prof. George Metaxas
Prof. Andrew Nafalski
Dr Zorica Nedic
Prof. Lucyna Nyka
Prof. Derek O. Northwood
A/Prof. Arthur J. Swart
Prof. Steven Thatcher
Prof. Jacek Uziak
Prof. Algirdas V. Valiulis
Dr Aji P. Wibawa
Indiana University-Purdue University Fort Wayne, Fort Wayne, Indiana, USA
University of Ljubljana, Ljubljana, Slovenia
International School for Social and Business Studies; College of Industrial
Engineering, Celje, Slovenia
Glasgow Caledonian University, Glasgow, Scotland, UK
Ming Chi University of Technology, New Taipei City, Taiwan
Yorkville University, Toronto, Ontario, Canada
Slovak University of Technology in Bratislava, Bratislava, Slovakia
Cracow University of Technology, Kraków, Poland
University of Ljubljana, Ljubljana, Slovenia
University of West Attica, Piraeus-Athens, Greece
University of South Australia, Mawson Lakes, Adelaide, Australia
University of South Australia, Mawson Lakes, Adelaide, Australia
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
University of Botswana, Gaborone, Botswana
Vilnius *Gediminas* Technical University, Vilnius, Lithuania
State University of Malang, Malang, Indonesia

Contents

Z.J. Pudlowski	Editorial	126
L. Oberfrancová, J. Legény & R. Špaček	Critical thinking in teaching sustainable architecture	127
J. Gyurkovich	RIBA accreditation of architectural studies at Cracow University of Technology: history and importance for education quality standards	134
P. Gregor & J. Legény	Role of research in architectural education at FA-STU	140
D. Pusca & D.O. Northwood	Creativity and its constraints in engineering education	146
L.B. Bosman, W. McDonald & K. Paterson	A collaborative multi-faculty approach to increase engineering competency through on-line discussions	152
J. Borucka	City walk: a didactic innovative experiment in architectural education	158
T. Widiyaningtyas, F.A. Dwiyanto & A.P. Wibawa	CDIO-based data structure practical coursebook	164
R. Zieliński & M. Wójtowicz	BIM maturity levels in teaching the design process	170
K. Romaniak & S. Filipowski	Calculus in the visual aspects of teaching architecture students	176
P.E. Hertzog	Effective use of video lectures for design project students	181
H. Suswanto, A.M. Nidhom, A. Dardiri, A.B.N.R. Pratama, A.A. Smaragdina & K. Asfani	Integrated reality-entrepreneurship project-based learning model to increase the skills of students	187
D. Kuswandi	Effect of a flipped mastery classroom strategy assisted by social media on learning outcomes of electrical engineering education students	192
T. Harsiati, I.M.P. Pradana & H. Amrullah	Information literacy and self-regulation in the context of the creative thinking of prospective engineers	197
L. Nyka	Bridging the gap between architectural and environmental engineering education in the context of climate change	204
Index of Authors		210