Contents

Section I Special Issue Variation and Prospects of PBL in Engineering Education

Guest Editors

Xiangyun Du – Qatar University and Aalborg PBL Centre, Aalborg University, Denmark Juebei Chen – Aalborg PBL Centre, Aalborg University, Denmark Aida Guerra – Aalborg PBL Centre, Aalborg University, Denmark Anette Kolmos – Aalborg PBL Centre, Aalborg University, Denmark

Editorial Ahmad Ibrahim	875
Guest Editorial Juebei Chen, Aida Guerra, Xiangyun Du and Anette Kolmos	876–878
Trends in Using Student-Centred Approaches in Mathematics and its Connection with Science, Technology, and Engineering Drobnič Vidic	879–891
Repeated Use of Adaptive Comparative Judgment to Develop Student Understanding of Artificial Intelligence in Problem Based Learning Assignments Lisa Bosman, Aasakiran Madamanchi, Scott Bartholomew and Vetria Byrd	892–904
Collaborative Graphic Simulation Experience Through Project-Based Learning to Develop Spatial Abilities Vicente López-Chao, Jose Luis Saorín, Jorge De La Torre-Cantero and Dámari Melián-Díaz	905–916
From Initiators to Free-Riders: Exploring the Spectrum of Female Engineering Students' Functional Roles in Project-Based Learning using Phenomenography Juebei Chen, Jiabin Zhu and Tianyi Zheng	917–933
Variation of PBL in Higher Education Within Engineering, Science and Mathematics Bettina Dahl and Annette Grunwald	934–946
Challenges Faced by Students in Adopting PBL in Environments of High Social Inequality: An Instructors' Perspective From a Latin American Case Carolina Rojas-Córdova, Moira Negrete-Fernández, Ariel Areyuna-Santiago, María Hilda Flores, Mariela Tapia and Ariel Salazar-Araya	947–958
Engineering Teachers' Professional Learning and Role Identity Change in An Intercultural (Study-Abroad) PBL Programme Niels E. R. Lyngdorf, Youjin Ruan, Juebei Chen, Xiangyun Du and Anette Kolmos	959–973

 A PBL-Based TRIZ Training Approach for Improving Inventive Competency of Engineers in Workplace
 974–989

 Wei Liu, Runhua Tan, Zibiao Li and Bojun Yang
 974–989

Section II

Contributions in: Active Learning, STEM, Problem Solving, Gender, First Year Students, Living Community, Diversity, PBL, Quality Assurance, Faculty Development, Assessment, Prediction Model, Retention, Interdisciplinary, Extended Curriculum Program Blended Learning, Electrical Engineering, Material Science and Engineering

nalysis of an Instructional Development Workshop to Promote the Adoption of Active Learning in STEM:	990-1009
Potential Implications for Faculty Developers	
Laura J. Carroll, Cynthia J. Finelli, Michael J. Prince, Matthew C. Graham, Jenefer Husman, Madison E. Andrews and Maura Borrego	
Characterizing Back-of-the-envelope Problem-solving in Engineering Gabriel Murillo-Gonzalez and Eric W. Burkholder	1010–1020
Impact of Grade Penalty in First-Year Foundational Science Courses on Female Engineering Majors	1021-1031

Alysa Malespina and Chandralekha Singh

The Impact of a Living Community for Women Engineering Undergraduates Siqing Wei, Kerry L. Meyers, Victoria Goodrich and Jazmin Jurkiewicz	1032–1043
Student Experiences with Problem-Based Learning: Findings from an Electrical Engineering Course Songxin Tan and Zixing Shen	1044–1055
Managing the Industrial Engineering Cooperative Program Process Using a Standardization Process Model Emad Hashiem Abualsauod and Asem Majed Othman	1056–1072
Engineering Deans' Perspectives on the Current State of Faculty Development Programs in Engineering Education Mark Huerta, Jeremi London and Ann Mckenna	1073–1091
An Integrated Approach for Assessing Graduate Engineering Management Programs Timothy G. Kotnour, John V. Farr and Catherine Vergopia	1092–1105
Practical Prediction of Overall Performance from Formative Assessment Results of Engineering Students Stephen O. Ekolu	1106–1115
Retaining Engineering Students: A Case Study at Aalborg University Henrik Worm Routhe and Pia Bøgelund	1116–1129
Students' Attitudes Toward Interdisciplinary Learning: A High-School Course on Solar Cells Aharon Gero, Heba Essami, Ofer Danino and Lior Kornblum	1130–1140
Materials Selection by Competitive Analysis of Properties: A Laboratory PBL Experience in Materials Science and Engineering José A. Pardo	1141–1150
Improving Student Preparedness to Study Engineering: A Case Study in South Africa Arthur James Swart and Danri Delport	1151–1158
Continuous e-Assessment of Student Learning Outcomes in a Multi-Agent Blended Learning System Salah Hammami	1159–1178
Guide for Authors	1179