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ID 011 Anaerobic Digestion of Kitchen and Sewage Sludge Bio waste to Biogas using Engineered Bio catalysis

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ID 012 Operations improvement in a manufacturing business of make-to-order special vehicles

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ID 013 Methane Generation from Landfill Waste as a Resource Recovery Strategy

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ID 014 Environmental Impacts for Setting up a Waste to Energy Landfill Site

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ID 261 Modelling the Effects of Friction on Tool-Chip Interface Temperature During Orthogonal Cutting of Al6061-T6 Aluminium Alloy

Sunday Joshua Ojolo, Sikiru Oluwarotimi Ismail and Kelechi Ogbuanu, Department of Mechanical Engineering, University of Lagos, Akoka-Yaba, Lagos, Nigeria

ID 262 Reflections on Teaching, Research, and Service of a Faculty Member for Those Transitioning into a University Tenure Track Faculty Position

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ID 263 Micromechanism and Failure Analysis of INCONEL601

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ID 264 Multi-level network planning for blood supply for critical conditions

Sahra Mahdavi and Seyyed Mehdi Sajadifar, Department of Industrial engineering, University of Science and Culture, Iran

ID 265 Generalization Model for Product Development Time in various Market Properties

Mahmood Al Kindi, Ahm Shamsuzzoha and Emad Summad, Department of Mechanical and Industrial Engineering, Sultan Qaboos University, Oman

ID 266 Customer economics trust in Business using Instagram

Homa Atefyekta and Nasser Safaie, K. N. Toosi University of Technology, Tehran, Iran

ID 267 Selection and scheduling of interdependent projects using a modified genetic algorithm

Manish Kumar, M L Mittal, Gunjan Soni and **Dheeraj Joshi**, Department of Mechanical Engineering, Malaviya National Institute of Technology, Jaipur, India

ID 268 Random Location under Fixed Zone Storage Strategy – A Case Study of Automobile and Electronic Parts Manufacturing Factory

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ID 269 A Fuzzy AHP Approach to Evaluate Contributing Factors in the Occurrence of Adverse Events in Philippine Hospitals

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Michael Angelo Promentilla, Chemical Engineering Department, De La Salle University Manila

ID 270 Impact of Business Process Reengineering of Reverse Logistics for Improving Supply Chain Performance: A Conceptual Framework from a Systematic Review of Literature

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ID 271 Mathematical Model of Average waiting time for an Elevator Based on Stochastic Process

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ID 272 Optimization in Personnel Scheduling for Local Content Verification

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Modeling a Bi-Objective Multi-Skill Resource-Constrained Project Scheduling Problem to Minimize Project Makespan and Skill Divergence Span

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Abstract

In most of the multi-objective multi-skill resource-constrained project scheduling (MO-MSRCPSP) research works, it has been assumed that a staff member is able to exhibit different skills with the same proficiency or expertise. However, this is not true in real life. Usually, a person possessing various skills may be expert in one (or two) skill(s) but may only be moderately trained for performing other skills. The assignments of persons with less-skilled levels have to be kept as low as possible to achieve satisfactory quality targets. Under this motivation, this paper develops a mathematical model for a MSRCPSP with two objectives. In addition to the regular objective of minimizing the makespan, the second objective aims at minimizing the total time elapsed with the less-skilled resource assignments defined as 'skill divergence span'. A weighted sum teaching-learning-based optimization (TLBO) algorithm is employed to solve this complex problem. In addition to the TLBO, a multi-objective genetic algorithm (GA) is also developed as an alternative metaheuristic for the comparison purposes. The computational results are performed on 36 test instances with varying level of skill factors, resource strength and network complexity. The average % deviation from critical path based lower bound obtained is comparatively lower for the MO-TLBO as compared to the MO- GA. It is 62.17% for the proposed MO-TLBO while for MO-GA its value is 75.11% which shows that TLBO is an effective metaheuristic for solving such problems.

Keywords
Teaching-learning-based algorithm (TLBO), multi-objective multi-skill resource-constrained project scheduling (MO-MSRCPSP)