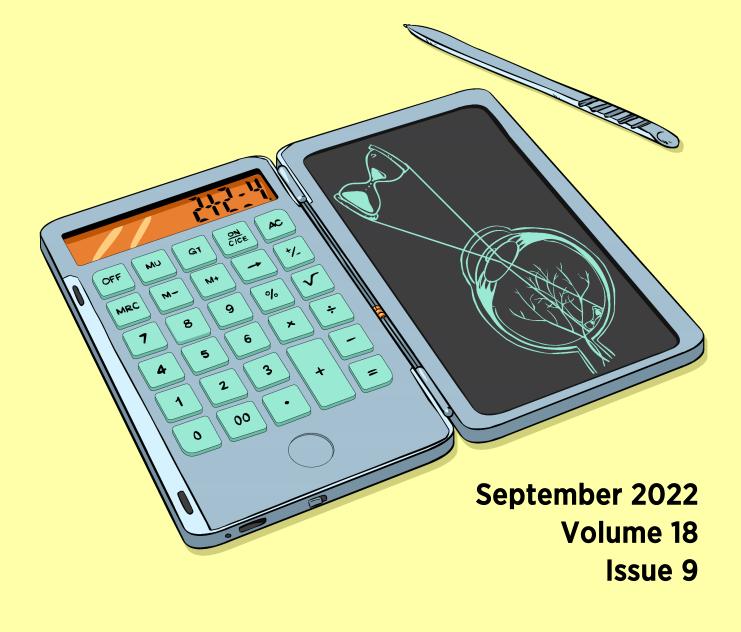
ISSN: 1305-8223

EURASIA JOURNAL OF MATHEMATICS, SCIENCE AND TECHNOLOGY EDUCATION



Published by: Modestum

Publication Office: Modestum LTD, 29 Gildredge Road, Eastbourne, East Sussex, BN21 4RU, United Kingdom

Serbia Office: Modestum DOO, Bulevar Mihajla Pupina 10i, 3. Sprat, Stan 133, Belgrade, SERBIA

Phone: +381 61 6600107

Email: publications@modestum.co.uk

Publisher: https://modestum.co.uk

Journal Web: https://www.ejmste.com

Twitter: https://twitter.com/ejmste

Facebook: https://www.facebook.com/ejmste

© 2005-2022. All rights reserved by Modestum. Copyright for Open Access Content is Retained by Authors. Also, authors continue to hold the copyrights of their own papers by acknowledging that their papers are originally published in the Eurasia Journal of Mathematics, Science and Technology Education. Hence, articles published are licensed under a "Creative Commons Attribution 4.0 International License."

ISSN: 1305-8223 (Online)

EURASIA JOURNAL OF MATHEMATICS, SCIENCE AND TECHNOLOGY EDUCATION

September 2022 Volume 18 Issue 9



This page is intentionally left blank

EURASIA JOURNAL OF MATHEMATICS, SCIENCE AND TECHNOLOGY EDUCATION

The Eurasia Journal of Mathematics, Science and Technology Education (Abbrev. EURASIA J. Math., Sci Tech. Ed. or EJMSTE) is an English Open Access peer-reviewed journal publishing articles on all aspects of Mathematics, Science and Technology Education with ISSN: 1305-8223 (online). The journal is published 12 times in a year, and strictly adheres to the principles of the peer review process.

EURASIA Journal of Mathematics, Science and Technology Education encourages submissions from all authors throughout the world. Manuscripts are judged by two experts solely on the basis of their contribution of original data, ideas and their presentation. All manuscripts must comply with Manuscript Preparation Guidelines. Submitted manuscripts must not have been published, accepted for publication or be under consideration elsewhere.

Submissions: EJMSTE has a fully online review system. This system offers authors the convenience of submitting their manuscripts via **EditorialPark**. Please send your manuscripts an MS Word attachment to the editors via the following address: https://www.editorialpark.com/ejmste/

Eurasia Journal of Mathematics, Science and Technology Education (EJMSTE) is a monthly journal published online 12 times annually in January, February, March, April, May, June, July, August, September, October, November, and December.

EJMSTE is indexed and/or abstracted in

- ROAD
- ERIC
- ERIH PLUS
- Google Scholar
- Genamics JournalSeek
- PsycINFO
- SCOPUS
- Scimago

Publication of any material submitted by authors does not necessarily mean that the journal, publisher, editors, or any of the editorial board members endorse or suggest the content. Publishing decisions are based and given only on scholarly evaluations. Apart from that, decisions and responsibility for adopting or using partly or in whole any of the methods, ideas or the like presented in EJMSTE pages solely depends on the readers' own judgment.

EDITORIAL BOARD

Editors-in-Chiefs

Chun-Yen CHANG, National Taiwan Normal University (NTNU), TAIWAN

Lianghuo FAN, University of Southampton, UNITED KINGDOM & East China Normal University, CHINA

Editors

Engineering Education

Teen-Hang MEEN, National Formosa University, TAIWAN

Xiangyun DU, Qatar University, QATAR & UNESCO PBL Center for Engineering and Science Education, Aalborg University, DENMARK

Mathematics Education

Chunxia QI, Beijing Normal University, CHINA Der-Ching YANG, National Chiavi University, TAIWAN Joohi LEE, University of Texas at Arlington, USA Kwok Cheung CHEUNG, University of Macau, MACAU Mei-Shiu CHIU, National Chengchi University, TAIWAN Oh Nam KWON, Seoul National University, SOUTH KOREA Sandra NITE, Texas A&M University, USA **Science Education** Hayat HOKAYEM, Texas Christian University, USA Jan Alexis NIELSEN, University of Copenhagen, DENMARK Jana FANCOVICOVA, University of Trnava, SLOVAKIA Jing LIN, Beijing Normal University, CHINA Mariusz PANCZYK, Medical University of Warsaw, POLAND Milan KUBIATKO, Jan Evangelista Purkyně University, CZECH REPUBLIC Onofrio Rosario BATTAGLIA, University of Palermo, ITALY Ozcan GULACAR, University of California, Davis, USA Sarantos PSYCHARIS, School of Pedagogical and Technological Education, GREECE Silvija MARKIC, University of Education Ludwigsburg, GERMANY Vanda JANSTOVA, Charles University, Prague, CZECH REPUBLIC

STEM Education

Eila JERONEN, University of Oulu, FINLAND

Federica VALLONE, University of Naples Federico II, Naples, ITALY

Technology Education

M. Shane TUTWITER, University of Rhode Island, USA

Tzu-Hua WANG, National Tsing Hua University, TAIWAN

Yi-Shun WANG, National Changhua University of Education, TAIWAN

Zacharia ZACHARIAS, University of Cyprus, CYPRUS

Editorial Board Members

Agustin ADURIZ-BRAVO, Universidad de Buenos Aires, ARGENTINA Alipasa AYAS, Bilkent University, TURKEY Anjum HALAI, Aga Khan University, PAKISTAN Anna Maria GRUGNETTI, University of Pavia, ITALY Charis VOUTSINA, University of Southampton, UNITED KINGDOM Chin-Chung TSAI, National Chiao Tung University, TAIWAN Colleen T. DOWNS, University of KwaZulu-Natal, SOUTH AFRICA Do-Yong PARK, Illinois State University, USA Fouad ABD-EL-KHALICK, University of Illinois at Urbana-Champaign, USA Gert KADUNZ, University of Klagenfurt, AUSTRIA Gregory J. KELLY, The Pennsylvania State University, USA Gurol IRZIK, Sabanci University, TURKEY Ingo EILKS, University of Bremen, GERMANY Jan H. VAN DRIEL, University of Melbourne, AUSTRALIA Jari LAVONEN, University of Helsinki, FINLAND Kamisah OSMAN, Universiti Kebangsaan Malaysia, MALAYSIA Kenneth TOBIN, The Graduate Center of CUNY, USA Kyriacos ATHANASIOU, National and Kapodistrian University of Athens, GREECE Lung Hsiang WONG, Nanyang Technological University, SINGAPORE Lyn ENGLISH, Queensland University of Technology, AUSTRALIA Lynn A. BRYAN, Purdue University, USA

Eurasia Journal of Mathematics, Science and Technology Education

- Mailizar MAILIZAR, Syiah Kuala University, INDONESIA
- Marika KAPANADZE, Ilia State University, GEORGIA
- Martin RUSEK, Charles University, CZECH REPUBLIC
- Michael ALLEN, Kingston University, UK
- Monika Szczygieł, Pedagogical University of Krakow, POLAND
- Nélio BIZZO, Universidade de São Paulo, BRAZIL
- Pavol PROKOP, Trnava University, SLOVAKIA
- Paul PACE, University of Malta, MALTA
- Pernilla NILSSON, Halmstad University, SWEDEN
- Peter C. CORMAS, California University of Pennsylvania, USA
- Rachel MAMLOK-NAAMAN, Weizmann Institute of Science, ISRAEL
- Rohaida Mohd. SAAT, University of Malaya, MALAYSIA
- Rolf V. OLSEN, University of Oslo, NORWAY
- Sarantos PSYCHARIS, School of Pedagogical and Technological Education ASPETE, GREECE
- Sarika KEWALRAMANI, Monash University, AUSTRALIA
- Sonya N. MARTIN, Seoul National University, REPUBLIC OF KOREA
- Uwe GELLERT, Freie Berlin University, GERMANY
- Vanessa KIND, Durham University, UK
- Vincentas LAMANAUSKAS, University of Siauliai, LITHUANIA

CONTENTS

Professional noticing as student-centered: Pre-service teachers' attending to students' mathematics in 360 video	em2145
Karl W. Kosko, Maryam Zolfaghari, Jennifer L. Heisler https://doi.org/10.29333/ejmste/12267	
Ibrohim Ibrohim, Endang Purwaningsih, Munzil Munzil, Erry Hidayanto, Ahmad Kamal Sudrajat, Muhammad Saefi, Zainudin bin Hassan	
https://doi.org/10.29333/ejmste/12282	
A Rasch modeling approach for measuring young children's informal mathematics in Peru	em2147
Martín Malaspina, Benito Arias	
https://doi.org/10.29333/ejmste/12303	
Problem-based learning with metacognitive prompts for enhancing argumentation and critical thinking of secondary school students	em2148
Angsoka Dwipayana Marthaliakirana, Hadi Suwono, Muhammad Saefi, Abdul Gofur	
https://doi.org/10.29333/ejmste/12304	
Python-based simulations of the probabilistic behavior of random events for secondary school students	em2149
Supot Seebut, Patcharee Wongsason, Dojin Kim, Thanin Putjuso, Chawalit Boonpok	
https://doi.org/10.29333/ejmste/12309	
Content modules as sites for developing science teacher identity in pre- service teachers: A case of one South African university	em2150
Hlologelo Climant Khoza	
https://doi.org/10.29333/ejmste/12319	
Meanings of mathematics teaching forged through reflection in a lesson study	em2151
Adriana Richit, Mauri Luís Tomkelski	
https://doi.org/10.29333/ejmste/12325	
High school science teachers' acceptance of using distance education in the light of UTAUT	em2152
Ehab Gouda Tolba, Nasser Helmy Youssef	
https://doi.org/10.29333/ejmste/12365	
Measurement model testing: Adaption of self-efficacy and metacognitive awareness among university students	em2153
Chan Choon Tak, Hutkemri Zulnaidi, Leong Kwan Eu	
https://doi.org/10.29333/ejmste/12366	

Pre-service teachers' self-concept and views toward using ICT for teaching em2154 science

Thuthukile Jita, Edgar J. Sintema https://doi.org/10.29333/ejmste/12396