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EDITORIAL

Preface

It is with great pleasure that we present Volume 35, Issue 3 of *Science Education International*, which continues to bring together diverse perspectives, innovative approaches, and groundbreaking research in science education from around the world. This issue underscores the ever-evolving nature of science education as it responds to the needs of our global society, the challenges of emerging technologies, and the growing recognition of environmental and sustainability issues.

This edition is particularly significant as it features 11 insightful articles from researchers and educators across the globe, representing countries such as the Croatia, Denmark, Ethiopia, Indonesia, Japan, Morocco, Palestine, Philippines, Turkey, and the USA. The international scope of these contributions reflects the dynamic and interconnected nature of science education today, as educators from diverse regions explore common challenges and share creative solutions.

We are especially pleased to open this issue with an article from the USA, titled *"Investigating Factors that Predict Japanese Science Teachers' Job Satisfaction: Evidence from TIMSS 2019"*. This study draws on international assessment data to explore the key factors influencing science teachers' job satisfaction in Japan, offering valuable insights into the global conversation around teacher well-being and educational quality.

The second article, *"Science Teachers' Beliefs on Science Teaching and Learning for Implementing in STEM Education"*, comes from authors in Japan and Denmark. This research explores science teachers' perceptions of Science, Technology, Engineering, and Math (STEM) education and how their beliefs influence their teaching practices, providing a crucial perspective on the alignment between pedagogical beliefs and STEM implementation across different educational contexts.

Our third article, *"Developing an Augmented Reality-based Board Game for Teaching Atomic Models,"* hails from Palestine. It introduces an innovative approach to teaching atomic models through an augmented reality (AR) board game, showcasing the potential of AR technologies to enhance engagement and conceptual understanding in science education.

The fourth article, *"Pre-service Teachers' Preparedness for In-service Science Teaching in Primary Education – A Case Study in Croatia"*, focuses on pre-service teacher education in Croatia, assessing how well-prepared future teachers feel for their roles in teaching science. This study provides valuable insights into teacher training and the challenges faced by novice educators as they transition into the classroom.

The fifth article, *"Primary School 4th-Grade Students' Attitudes Toward Socioscientific Issues and Question Asking: Philosophy for Children"*, from Turkey, explores the attitudes of primary school students toward socioscientific issues and the impact of the "Philosophy for Children" approach on their ability to ask meaningful questions. This research highlights the importance of fostering critical thinking and ethical reasoning in young learners through open discussion of real-world issues.

The sixth article, *"Unlocking the Power of Togetherness: Exploring the Impact of Cooperative Learning on Peer Relationships, Academic Support, and Gains in Secondary School Biology in Gedeo Zone, South Ethiopia"*, examines the effectiveness of cooperative learning strategies in fostering peer relationships, academic support, and student achievement in biology. Conducted in Ethiopia, this research emphasizes the value of collaborative learning in enhancing both social and academic outcomes in secondary school education.

The seventh article, *"Empirical Analysis of Physics Test Instruments to Measure Graphical Representation Abilities in 'Temperature and Heat' Topics"*, comes from Indonesia. This study focuses on the development and evaluation of assessment tools designed to measure students' abilities to understand graphical representations in the context of temperature and heat. By addressing the intersection of assessment and physics education, this research provides valuable insights into effective measurement practices in science teaching.

The eighth article, *"Impact of Alternative Learning Activity Program on Student Leadership Development in a Science, Technology, Engineering, and Mathematics School"*, from the Philippines, explores the influence of an alternative learning activity program on student leadership development within a STEM-focused school. This research highlights the importance of engaging students in leadership opportunities to enhance their personal and academic growth in the STEM fields.

The ninth article, *"Boosting Student Motivation in Chemistry: A Study on the Integration of Educational Robotics and Mobile Technology for pH Instruction"*, from Morocco, investigates the use of educational robotics and mobile technology to enhance student motivation in chemistry education, particularly in the context of teaching pH concepts. This study demonstrates how integrating technology into the curriculum can foster student engagement and improve learning outcomes in science education.

The tenth article, *"Bibliometric Analysis of Virtual Reality in Science Education over the Three Decades (1993–2023)"*, also from Indonesia, presents a comprehensive bibliometric analysis of the literature surrounding virtual reality in science education over the past three decades. This research offers valuable insights into trends, gaps, and future directions for the use of virtual reality technologies in science teaching and learning.

The eleventh article, *"Exploring Filipino Students' Critical Thinking Skills: Basis for Enhancement of Science Laboratory Class Delivery"*, also from the Philippines, examines the critical thinking skills of Filipino students and discusses implications for enhancing the delivery of science laboratory classes. This study emphasizes the importance of fostering critical thinking within the laboratory setting to improve students' overall scientific literacy.

The articles in this issue highlight key trends and best practices in areas such as curriculum design, the integration of digital tools, inquiry-based learning, and equity in STEM education. Together, they provide a critical reflection on how science education can not only meet the needs of today's students but also prepare them to be the innovators and problem-solvers of tomorrow.

As you explore the contents of this issue, we hope that they ignite new ideas, encourage thoughtful discussion, and offer practical guidance to enhance science education in your own context. We are deeply grateful to the authors, reviewers, and the editorial team whose efforts have made this issue possible.

Thank you for your continued support and engagement with *Science Education International*. We hope you find this issue both enlightening and inspiring.

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