Journal of Research in Science, Mathematics and Technology Education
https://jrsmte.com/

EDITORIAL

2025 Annual Summary of and Commentary on Publications in the Journal of Research in Science, Mathematics and Technology Education

Gerald Tembrevilla & G. Michael Bowen

Mount Saint Vincent University, CANADA

Please note that the APA references are available at the article.

Here is our 2025 Annual Summary of Publications in JRSMTE. We tried synthesizing all publications for this year by volume and issue, with an overall look at the emerging themes.

In Volume 8, Issue 3 (September 2025), we find that three themes stand out. One is on equity-oriented and culturally responsive EdTech integration, foregrounding how "intentional" technology use must be aligned with inclusive and culturally relevant pedagogy (Gomez). Second is on evidence-informed science learning through hands-on/practical work, consolidating what practical work contributes to secondary learners via meta-analytic synthesis (Sanjito & Hyams-Ssekasi). Third is on student perceptions, motivation, and trust in science, emphasizing how learners' engagement and views about tentativeness/trust shape participation in science learning experiences (Nyutu et al.).

In Volume 8, Issue SI (June 2025 Special Issue), we also find that the special issue clusters around three themes. One is on STEM/STEAM pedagogy design and evaluation, ranging from inquiry-based teaching preferences (Goldberg & Darwin) and logic instruction (Benardini & Manghi) to game-based learning (Jonas & Ogodo) frameworks and transdisciplinary STEAM approaches (e.g., inquiry, logic, GBL, 5E/STEAM) (Mansouri). Another is on identity, equity, and belonging in mathematics and science pathways, highlighting self-efficacy, gender and values negotiations, instructors of color, science identity, and racially marginalized students within assessment and learning structures (Darwin & Pinheiro; Fogelman et al., Wambua). The third is on assessment and learning quality in authentic contexts, including criteria-based tools for chemistry explanatory videos (Merk et al.), collaborative/group testing (Dinglasan & Weible), authentic assessment in STEM programs (Marsh et al.), perceptions of calculus exams/test anxiety (Kenyon & Benson), and how representations (e.g., LEGO details) and prior domain knowledge influence mathematical reasoning (Tellos & Osana).

In Volume 8, Issue 2 (2025), we observe that three coherent themes also emerge. One is on socioscientific reasoning and civic-facing STEM learning, exemplified by photovoice as an action-oriented method to deepen preservice

teachers' socioscientific reasoning (Liu & Buck). Second is on equity and knowledge pluralism in STEM professional learning, particularly through systematic review evidence on integrating Indigenous Knowledge Systems in STEM PD (Shive). Third is on the human factors of learning with technology and conceptual difficulty in mathematics, spanning technostress/productivity in higher education (Deimeke et al.) and persistent misconceptions in calculus modelling/optimization (Machaba et al.), with a complementary focus on teacher wellbeing and induction as a condition for sustained STEM teaching quality (Luft).

Lastly, in Volume 8, Issue 1 (2025), we think three common themes also surfaced. One is on technology adoption gaps in classroom practice, contrasting teachers' perceptions versus actual ICT use in mathematics teaching (Dogbey & Kpadin). Another is on curriculum materials, task design, and learning progressions as levers for conceptual understanding, reflected in textbook comparisons (Canada–Japan) (Golafshani) and iterative design cycles supporting covariational reasoning (Paoletti et al.). The third is on scalable learning supports and knowledge mobilization, seen in evaluation-driven supplementary YouTube video lessons (Insorio & Manalo) and the editorial framing that positions JRSMTE's leadership and archival reflection as part of a broader research-to-practice agenda (Bowen & Tembrevilla).

Overall, we attempted to create a cross-issue synthesis connecting with STEAM education and the emerging GenAI. Taken together, Volume 8 (2025) shows a converging agenda on (a) equitable participation and identity-sustaining learning, (b) high-quality design of learning experiences (tasks, representations, practical work, game-based and transdisciplinary STEAM activities), and (c) robust assessment and evidence practices (meta-analysis, systematic review, mixed methods, phenomenography, and instrument development). We argue that these emphases map directly onto emerging STEAM research that treats STEAM as transdisciplinary problem-framing, authentic assessment, and culturally grounded participation.

In that landscape, we believe GenAI becomes valuable when positioned as a design-and-equity tool, one on supporting teachers' intentional differentiation (while auditing bias and access) or accelerating iterative task/design cycles (e.g., generating, critiquing, and refining representations/prompts aligned to learning progressions), and probably even on strengthening assessment ecosystems (e.g., rubric co-design, feedback quality checks, and multimodal explanation support) without replacing disciplinary reasoning. Our overarching argument is that the throughline from our 2025 issues is a clear caution and opportunity, that is, GenAI can amplify learning and productivity, but we at JRSMTE insist on continuing to be consistent with our commitments on equity, identity, authentic assessment, and principled pedagogy, which remain the non-negotiable "guardrails" for adoption and research.

Volume 8, Issue 3 (2025)

1. **Commentary Piece: There is no a Silver Bullet – Intentional Equity-Focused Technology Integration in Schools**
   Authors: Kimberley Gomez

Keywords: Equity-focused technology integration, culturally relevant pedagogy, inclusive pedagogy, computer-supported collaborative learning
DOI: https://doi.org/10.31756/jrsmte.831

2. **The Impact of Science Practical Work on Secondary School Students' Learning Outcomes: A Meta-Analysis**
Authors: Baraka Peter Sanjito, Denis Hyams-Ssekasi
Keywords: Meta-analysis, Science Practical Work, Student Learning Outcomes, Secondary Education, Experimental Learning
DOI: https://doi.org/10.31756/jrsmte.832

3. **Perceptions of Science amongst College Students: An Exploration of Tentativeness and Trust**
Authors: Eva N. Nyutu, Bill Cobern, Mina Maleki, Gregory Grabowski, Michelle Andrzejak
Keywords: Learning motivation; Active learning; Experiential learning; Student engagement; Perceptions
DOI: https://doi.org/10.31756/jrsmte.833

Volume 8, Issue SI, June 2025 - 4th Special Issue (JRSMTE Graduate Research)

1. **The Right Answer for the Wrong Reason: Preservice Science and Mathematics Teacher Preferences and Explanations of Inquiry-Based Teaching**
Authors: Elizabeth R Goldberg, Taylor Darwin
Keywords: preservice math and science teachers, inquiry-based teaching; misconceptions, student-centered instruction
DOI: https://doi.org/10.31756/jrsmte.411SI

2. **High School Students' Knowledge and Risk Perceptions of Climate Change: The Role of an Elective Environmental Science Course**
Authors: Osman Aksit
Keywords: Climate Change Education, Environmental Science, Risk Perception, Secondary Students
DOI: https://doi.org/10.31756/jrsmte.412SI

3. **Voices of Support: Community College Instructors of Color Reflections on Fostering Self-Efficacy in Corequisite Mathematics Students**
Authors: Taylor Darwin, Weverton Ataide Pinheiro
Keywords: mathematics education, self-efficacy, instructors of color, identity, corequisite mathematics
DOI: https://doi.org/10.31756/jrsmte.413SI

Keywords: Analytical thinking, mathematics teaching, Polya's method, problem solving, reflection as a learning method
DOI: https://doi.org/10.31756/jrsmte.4117SI

17. **Assessing What We Value: Engineering Students' Perceptions of Calculus Exams and Connections to their Future in Engineering**
Authors: Catherine M. Kenyon; Lisa C. Benson
Keywords: Calculus assessment, first-year engineering, math test anxiety, future time orientation, interpretative phenomenological analysis
DOI: https://doi.org/10.31756/jrsmte.4118SI

18. **Women-Identifying Graduate Students' Values of Mathematics Teaching and Learning: Illuminating Sites of Negotiation and Affirmation**
Authors: T. Royce Olarte, Ciera Street
Keywords: Graduate Students, Gender; Values, Equity, Postsecondary Education
DOI: https://doi.org/10.31756/jrsmte.4119SI

19. **Bridging Art and Science: Engaging Girls in the Physics of Sound Through a Transdisciplinary STEAM Approach**
Authors: Narges Mansouri
Keywords: 5E instructional model, Female students, Focused ethnography, Transdisciplinary STEAM
DOI: https://doi.org/10.31756/jrsmte.4120SI

Volume 8, Issue 2, 2025

1. **Using Photovoice to Promote Preservice Teachers' Socioscientific Reasoning Skills**
Authors: Conghui Liu, Gayle Buck
Keywords: Socioscientific issues, Socioscientific reasoning, photovoice, preservice teachers, action research.
DOI: https://doi.org/10.31756/jrsmte.821

2. **Equitable Integration of Indigenous Knowledge System in STEM Education Professional Development: A systematic review**
Authors: Elyssa Milette Cherry Shive
Keywords: STEM Education, Indigenous Knowledge Systems, Professional Development, Equity.
DOI: https://doi.org/10.31756/jrsmte.822

3. **Course Technology & First-year Undergraduates at an HBCU: Technostress, Role Stress, & Productivity**
   Authors: Elizabeth Deimeke, Therese Pigott, Reneé Schwartz
   Keywords: retention, course technology, technostress, role stress, productivity
   DOI: https://doi.org/10.31756/jrsmte.823

4. **Grade 12 Students' Misconceptions when Modelling their Calculus Ideas into their Learning of an Optimisation: A Real-Life Problem**
   Authors: M.F Machaba, G Jameson, Vojo George Fasinu
   Keywords: calculus, misconception, Grade 12, modelling, optimisation
   DOI: https://doi.org/10.31756/jrsmte.824

5. **Commentary Piece: Supporting and Ensuring the Well-Being of Early Career Science Teachers**
   Authors: Julie A. Luft
   Keywords: Teacher Induction, STEM, Early Career Success
   DOI: https://doi.org/10.31756/jrsmte.825

Volume 8, Issue 1, 2025

1. **The Perceptions versus Usage of Information and Communication Technology Tools Among High School Mathematics Teachers in The Northern Region of Ghana**
   Authors: James Dogbey, Hannah Nayempuan Kpadin
   Keywords: ICTs, Perceptions, Senior High School Mathematics Teachers, Mathematics Education, Ghana
   DOI: https://doi.org/10.31756/jrsmte.811

2. **Comparative Analysis of Content, Organization, and Presentation of Mathematical Concepts in Canadian and Japanese Grade Fifth Textbooks**
   Authors: Nahid Golafshani
   Keywords: Textbooks, Mathematics, Memorization, Content Comparison, Conceptual Understanding
   DOI: https://doi.org/10.31756/jrsmte.812

3. **Refining Progressions and Tasks: A Case Study of Design Cycles to Support Covariational Reasoning**
   Authors: Teo Paoletti, Allison L. Gantt, Madhavi Vishnubhotla, Steven Greenstein
   Keywords: Local Instruction Theory, Hypothetical Learning Trajectory, Teaching Experiments, Task Design, Covariational Reasoning
   DOI: https://doi.org/10.31756/jrsmte.813