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EDITORIAL

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As we close another year in STEM education, the December 2024 issue of the Journal of Research in STEM Education (J-STEM) presents four groundbreaking studies that highlight the evolving landscape of STEM and STEAM education. These contributions reflect the diversity of approaches, the importance of self-efficacy in engineering and STEM learning, and the critical role of educators in fostering future-ready skills.

In "The Development and Validation of the Children's Engineering Self-Efficacy Scale (CESES)," Amy Catalano addresses a crucial gap in the literature by developing an instrument to measure children's engineering self-efficacy. With growing emphasis on engineering design in K-12 curricula, this study not only highlights the role of self-efficacy in fostering problem-solving and innovation but also provides a robust tool for evaluating the effectiveness of STEM interventions. The implications of this research extend to both formal and informal learning environments, reinforcing the importance of self-belief in shaping young learners' engagement with STEM disciplines.

Stuart Kent White and Timothy J. Newbya's contribution, "Exploring Pre-Service Elementary Educator Anxiety for Facilitating Science Teaching Contexts Integrating 3D Modeling," shifts the focus to teacher preparation and the role of technology in reducing instructional anxiety. By examining the use of Tinkercad, a 3D modeling software, within pre-service teacher programs, the study reveals that while such tools help alleviate anxiety, their effectiveness in enhancing self-efficacy and teaching competence remains limited. This underscores the need for holistic professional development programs that not only introduce technological tools but also provide sustained pedagogical support for integrated STEM education.

"Exploring Evolving Perspectives: Research Trends in Attitudes toward STEAM Education" offers a meta-perspective on the field's rapid evolution. By analyzing publications from 2020 to 2024, this study identifies key trends, including the rising contributions from Spain, Taiwan, and Turkey, alongside continued leadership from the USA, China, and Jordan. A significant takeaway is the increasing focus on educators' attitudes toward STEAM, reflecting a shift in research priorities towards teacher readiness and pedagogical practices. This comprehensive review serves as a valuable resource for researchers and policymakers aiming to understand the global trajectory of STEAM education.

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"Broadening Perspectives of STEM Education: A New Conceptual Framework" by Anwar Rumjaun and colleagues offers a critical synthesis of existing STEM frameworks. Drawing from diverse global contexts, the authors propose a new conceptual model that integrates epistemological, psychological, and didactical dimensions of STEM education. This work addresses the need for cohesive policies and practices that reflect the interdisciplinary nature of STEM, emphasizing the importance of aligning educational goals with broader societal challenges.

The final paper, "Supporting BIPOC Males in STEM: Insights from a Case Study on Online Peer Mentoring" by Jillian Wendt and Vivian Jones, provides an in-depth look at the role of online peer mentoring in fostering self-efficacy, belonging, and retention among BIPOC male students at HBCUs. By exploring the lived experiences of these students, the study identifies key themes of identity formation, increased confidence, and the drive to make an impact, reinforcing the importance of culturally responsive mentoring initiatives in supporting underrepresented populations in STEM fields.

As we look ahead, the insights provided in this issue reinforce the necessity of fostering self-efficacy, reducing instructional barriers, and reimagining STEM education through interdisciplinary frameworks. We are proud to announce that J-STEM is in the process of applying for index inclusion, a significant step towards expanding the journal's reach and impact. With a strengthened editorial team and enriched vision for 2025, we are excited to continue supporting innovative research and contributing to the global STEM education discourse.

We extend our deepest gratitude to the authors, reviewers, and the entire editorial board for their unwavering dedication to advancing STEM education research.