

**Symposium Title: Bridging Global Visions and Local Realities: Co-Creating
Research-Informed Educational Practices in East Asia**

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Discussant: Dr. Andrea Netten, IEA (International Association for the Evaluation of Educational Achievement)

Symposium Overview

Aligned with the 2026 TERA & WERA theme, “*Bridging Cultures, Co-creating Knowledge: Local Innovations and Global Visions in Education*,” this symposium explores how global educational visions can be translated into localized, research-informed practice. Drawing on data from international large-scale assessments, including IEA studies such as TIMSS and ICILS, the symposium interrogates tensions between mandates for inquiry-based learning and digital transformation and entrenched instructional norms in East Asian contexts. Using an ecological framework and large-scale assessment data, five integrated studies employ a macro-to-micro analytical funnel to address systemic socio-emotional resilience, adaptations in science inquiry, constraints on teacher professional development, student psychological agency, and formative cognitive mapping. By synthesizing empirical evidence from IEA studies with classroom realities, the symposium offers actionable blueprints for educators to co-create context-appropriate, equitable learning environments responsive to local diversity and scalable across systems.

Paper 1: Stability Amid Disruption: School Climate–Motivation–Achievement Pathways in East Asia Across TIMSS 2019 and 2023

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Paper 1 investigates school climate, motivation, and achievement pathways in East Asia using TIMSS 2019 and 2023. Grounded in Situated Expectancy Value Theory, it examines the temporal stability of instructional climates and motivational supports amid COVID 19 disruptions. Most structural pathways remained stable, but the link between school belonging and academic motivation intensified in Taiwan and Hong Kong after the pandemic. These divergent trajectories underscore that recovery policies must extend beyond academic remediation. Educational leaders should prioritize culturally responsive socio-emotional supports and foster inclusive school climates as essential conditions for sustaining STEM achievement and advancing equitable long-term outcomes.

keywords: situated expectancy-value theory, school climate, academic motivation, cross-temporal stability, TIMSS

Paper 2: Cross-National Heterogeneity in Inquiry-Based Teaching, Instructional Limitations, and Science Achievement: A TIMSS 2023 Analysis of Five East Asian Education Systems

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This study examines the instructional core by evaluating the practical efficacy of global advocacy for inquiry-based science teaching. Drawing on TIMSS 2023 data from five East Asian systems, it identifies an inquiry–limitations paradox: in highly tracked systems (e.g., Singapore), inquiry frequency predicts higher achievement when teachers successfully navigate substantial instructional constraints; in more comprehensive systems (e.g., Japan), inquiry under similar constraints correlates with lower achievement. These findings challenge the blanket assumption that “more inquiry is better.” For practice, they suggest inquiry must be adapted to classroom realities, systemic tracking structures, and students’ prerequisite knowledge through co-created, context-appropriate pedagogies.

keywords: inquiry-based teaching, instructional limitations, cross-national comparison, TIMSS

Paper 3: Analysis of Factors Influencing Digital Teaching Efficacy and Information Literacy Cultivation Among Taiwanese Teachers—Evidence from ICILS 2023

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This study investigates digital teaching efficacy and information-literacy development among Taiwanese middle-school teachers using ICILS 2023. Although teachers report strong self-efficacy with basic digital tools, pedagogical constraints limit creative instructional use: overloaded curricula and students' insufficient prerequisite knowledge hinder the translation of professional development into classroom practice. School-provided technical support alleviates teacher anxiety, yet hardware and training alone prove inadequate. Educational leadership must prioritize actionable pedagogical coaching, realistic curricular pacing, and scaffolded student readiness to achieve meaningful digital transformation. These measures align global visions for technology-enhanced learning with local instructional realities and sustain equitable, practice-driven innovation.

keywords: digital teaching self-efficacy, instructional limitations, information literacy, professional development, ICILS

Paper 4: Misalignment between Proficiency and Confidence: Exploring the Paradox of Digital Literacy Achievement and Self-Efficacy among Students in Taiwan and Korea Based on ICILS 2023 Data

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This paper investigates student agency by comparing objective digital literacy performance with subjective self-evaluations in Taiwan and South Korea using ICILS 2023. Despite world-leading achievement in computational thinking and information literacy, students report only moderate digital self-efficacy. We attribute this gap to a cultural modesty effect, wherein confidence lags behind competence in highly competitive contexts. Because low self-efficacy can deter pursuit of advanced STEM pathways, addressing this misalignment requires pedagogical shifts: moving beyond accuracy-focused instruction to foster creative autonomy, metacognitive reflection, and opportunities for risk-taking that build both competence and confidence for global engagement.

keywords: digital self-efficacy, computational thinking, computer and information literacy, high achievement low confidence, ICILS

Paper 5: From Summative Evaluation to Micro-Cognitive Diagnosis: Mathematical Attribute Hierarchies and Learning Pathways in East Asian Students

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Concluding at the micro-instructional level, this paper presents a methodology for translating broad international assessments into actionable formative practices. While TIMSS typically yields unidimensional proficiency rankings, we employ cognitive diagnostic modeling to derive multidimensional attribute hierarchies from mathematics data. The analysis maps individualized cognitive learning progressions, illustrating how foundational skills interact to produce advanced reasoning. For educational practice, this micro-level diagnosis reorients large-scale assessment from global comparison toward classroom empowerment. Using empirically derived cognitive blueprints, practitioners can co-create differentiated instructional interventions that scaffold specific learning bottlenecks within local instructional realities.

keywords: cognitive diagnostic modeling (CDM), mathematical attribute hierarchies, differentiated instruction, TIMSS