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The Mathematician Educator Special Issue: Mathematics Instruction for the Future

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Editorial Foreword

The theme of this special issue is "Mathematics Instruction for the Future", which was also the theme of the Mathematics Teachers' Conference (MTC) 2022. As mentioned in the forward of the previous issue (Toh & Cheng, 2022), the Association of Mathematics Educators has decided to dispense with the publication of the yearbook but to produce a special issue with the same theme of the conference to be released in the following year. The speakers of MTC were invited to submit their articles for the conference. Some local scholars and educators were also invited to submit their work which are relevant to the theme of the special issue.

The intention of the theme "Mathematics Instruction for the Future" is to bring together scholars to contribute and present ideas on how to prepare our students to be ready for the future. The notion of future-ready is so crucial that researchers such as Wong and Ng (2020) asserted that an education system can only be considered successful if it can develop future-ready learners. Technology easily creeps into one's mind when discussing future-ready teaching and learning. Beyond technology, the trend of Artificial Intelligence (AI) has entered various fields of research, including education (e.g., Nurhasan et al., 2022). This issue of five articles comprises five articles: two articles on AI and technology by Araya (2023) and Santos-Trigo (2023); and the other three articles by Yeo and Choy (2023), Ng (2023), and Toh et al. (2023) on various aspects of "deeper learning" in mathematics. It provides a spread of various issues pertaining to future-ready instructions.

Araya (2023) stressed the importance of learning a core set of mathematical and computational models about how the learning behaviour of AI agents, whose interaction with human beings have increased and will likely explode in the near future. Thus, the new mathematics curriculum must include these models. Araya advocated that the best way to prepare teachers to teach this new curriculum is through lesson studies which are enhanced with the AI agents.

In an attempt to address the question of identifying the important research findings in problem solving and translating them into teaching practices, Santos-Trigo (2023) analyzed the affordances of digital technologies under the three themes: (1) seminal conceptual frameworks which characterize problem solving approaches; (2) methods that problematize the problem solving activities of students; (3) the influence of tasks to frame the curriculum and mathematics instruction.

In the recent emphasis in the mathematics curriculum of teachers and students perceiving the dual nature of mathematics as a tool and a discipline, Yeo and Choy (2023) stressed that

designing and implementing inquiry-based learning is crucial. Yeo and Choy elaborated on the meaning of "thinking like a mathematician" and illustrated three inquiry-based teaching approaches with exemplars.

In the next paper, Ng (2023) argued that the Constructivist Learning Design (CLD) is instrumental to assist teachers to plan for deep learning among the students. The CLD was presented as a design for teaching through problem solving, and, complemented by differentiated instruction, for engaging diverse learners to construct knowledge. An exemplar of a CLD task used with Secondary Two students in Singapore schools was also presented.

In the last paper, Toh et al. (2023) argued that, with the broader framework of mathematical contextualization, comics have a crucial role to play in developing future-ready learners: it is valid for the entire spectrum of the students in developing their higher order thinking skills and awareness of environmental issues. Toh et al. illustrated with authentic exemplars used in mathematics classrooms. This is an extension from the earlier intention of focusing on lower achieving students (e.g., Toh & Lui, 2014).

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