

ICPE 2022 Special Issue – Editorial

Special Issue Guest Editor:

Dr Margaret Wegener^a

^aSchool of Mathematics and Physics, The University of Queensland, Brisbane QLD 4072, Australia

This special issue, in multiple parts, celebrates The International Conference on Physics Education which was held online in late 2022. Its theme was Physics Education: Preparing for the future.

In this first part of the special issue, international contributions include Brazil, Czech Republic, Germany, Mexico and U.S.A. This set of papers showcases diverse approaches to physics education studies, from varied perspectives. Investigations include local interventions and reflections, surveys involving hundreds of participants, nationwide audits, and statistically-assisted searching for causal links.

A common theme of the papers is ‘thinking and feeling’. How a student engages with physics, and ultimately their success doing physics, is partly determined by whether they self-identify as a ‘physics person’, and by their beliefs about their capability to learn physics. Li and Singh explore relationships between factors that affect physics identity in university students; Goldhorn et al aim to train a physics-specific growth mindset in school students. Developing capability is also the focus of Salazar et al, who have designed a strategy to develop skills in critical thinking and problem-solving in engineering students. Such skills and a positive mindset are highly valuable when facing the inevitable challenges of study and careers.

Multiple authors acknowledge perceptions of difficulty as problematic for physics students and instructors. Aiming to connect to the real world of learners, making physics more meaningful, is a strategy to engage students which is discussed in multiple papers. Holubova offers a learning module that relates thermal physics to the achievement of comfortable, energy-efficient buildings for the students’ local environment, after having identified high-school curriculum topics that are the most difficult to teach and learn. Fagerstrom argues for the inclusion of medical physics topics in introductory-to intermediate physics for a range of students, and discusses suitable examples.

How humans relate to our universe is a basic spark of connection to physics in many societies. Dos Santos and Nardi contend that emerging research in cultural astronomy has implications for training teachers, in encouraging education that respects cultural differences.

Collectively, this group of papers analyses the existing educational situation and contributes strategies to positively affect physics learning outcomes – helping individuals feel that physics is a place for them, and instilling beneficial ways of thinking within the physics space.

Thank-you for the efforts of all the authors and reviewers, and the organisers of the conference that inspired these papers.

I hope you find this collection of articles stimulates your own thinking about the future of physics education.