CONCEPTUALISING THE RELATIONSHIP BETWEEN MATHEMATICAL MODELLING AND INTERDISCIPLINARY STEM EDUCATION

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Around the world, STEM education is promoted by governments as a means of addressing social and economic challenges and creating a scientifically, mathematically, and technologically literate citizenry. In many countries, policies and reports by governments and business groups aim to incorporate STEM into the school curriculum, encourage young people to engage in STEM education, and advocate for STEM careers. Yet, STEM education research is still in an embryonic state and the field lacks a scientific evidence base that can inform theory, policy, and practice (Maass et al., 2019). It is also unclear how mathematical concepts and practices contribute to a better understanding of the other STEM disciplines; nor do we understand well enough how STEM education enhance students' learning of mathematics (English, 2016).

One way of exploring the role of mathematics in interdisciplinary STEM education is to examine synergies between STEM and mathematical modelling. For example, both approaches may involve making connections between mathematics and other disciplines (Goos, 2020). In STEM education, however, the disciplines connected to mathematics are science, technology, and engineering, while many real world situations to be modelled need not be related to such disciplines, despite the argument that mathematical modelling is inherently interdisciplinary (Stillman et al., 2023). Some perspectives see the engineering design process as foundational in STEM tasks (English, 2016), while others have proposed to articulate the design and the modelling cycles (Baioa & Carreira, 2021). In this presentation, we will consider the impact of the STEM education movement on interdisciplinary curriculum development, ask whether good interdisciplinary "M in STEM" tasks are also good modelling tasks (and vice versa), and compare the influence of STEM and mathematical modelling on school mathematics education.

References

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