

# DO TEACHERS NEED A SHARED VISION OF STEM? COMPARING AUSTRALIAN AND TAIWANESE TEACHERS' CONCEPTIONS AND IMPLEMENTATION

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## THEME:

STEM professionals: pathways and experiences

## BACKGROUND AND AIMS

While the STEM agenda has been advocated internationally, each country has formulated own approaches to STEM-focused national statements, curricula and resources. Whether these differences lead to country-specific implementation practices and different conceptions of the role of STEM in education is unclear. To effectively support teachers' professional development for STEM education, it is critical to understand current STEM conceptions and practices in schools.

This study adopted a cross-cultural comparative approach to investigate the current status of STEM education (including the existing curriculum frameworks, teacher conceptions and implementation) across two culturally distinctive settings: Australia and Taiwan. Understanding country-specific similarities and differences could help to identify opportunities and challenges associated with current STEM practices within and across the two settings and highlight promising approaches to quality STEM implementation and teacher professional development.

## METHODOLOGY

This study adopted a qualitative design approach. A total of 8 teachers from four schools in Victoria, Australia, and 19 teachers from 19 schools in Taiwan, who have been involved in STEM programs, participated in this study. A semi-structured interview was conducted with each teacher focusing on their conceptions of STEM and how they implement STEM in their classroom and school. All the interviews were transcribed and analysed with a relevance framework (Xu et al., 2022). This data is contextualized within the national statements for STEM education of both countries.

## RESULTS AND CONCLUSIONS

Australia has formulated national statements for STEM education at the policy level. Neither Australia nor Taiwan have a national STEM curriculum framework, and their current curriculum frameworks provide little guidance to classroom implementation.

The interview analysis demonstrates that in both countries, STEM was interpreted as relevant for students, teaching practices, the curriculum, and the broader STEM context, but that there were different interpretations of the relevance of STEM and implementation practices. Even within the same education system and school, teachers had diverse conceptions of STEM education and implemented it in various ways. While the espoused implementation of STEM manifested the teachers' pedagogical intentions, they reflected on the constraints imposed by

available resources and educational contexts. This study problematises the idea of a shared vision of STEM and suggests that the variations in teachers' conceptions may empower teachers to innovate and transform their current teaching to align with the goals of STEM education. It also raises an issue of how to strike a balance between teacher agency and curriculum guidance to promote quality STEM implementation.

## REFERENCES

- Xu, L., Fang, S.-C., & Hobbs, L. (2022). The Relevance of STEM: a Case Study of an Australian Secondary School as an Arena of STEM Curriculum Innovation and Enactment. *International Journal of Science and Mathematics Education*. <https://doi.org/10.1007/s10763-022-10267-5>