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What Will it Take to Embed STEM Education Within the Curriculum for all Australian Students?

The findings from a recently completed PhD identified three challenges facing the implementation of STEM education in the Australian context. This paper presentation will suggest how these challenges could serve as pointers to embed STEM education in the Australian curriculum.

The research first investigated the factors and the role of key stakeholders in the emergence and subsequent prominence of STEM education internationally and in Australia. The factors included the changing political, economic and social conditions and approaches to curriculum design. The key stakeholders included governments, business and industry, professional organisations, researchers in the science, technology, engineering, mathematics and education. This research also showed how stakeholders could influence the design of education including curriculum policies and programs related to the implementation of new initiatives.

Three research methods were used to collect and analyse data.

First, to better understand how the key Australian stakeholders presented STEM education and how their stance was reflected in the expected outcomes, a document analysis of a selection of publications from the stakeholders was undertaken. The analysis included the status of the document for example, government or professional association, the type of document for example policy or program and the intended audience. Five themes emerged from the analysis of the documents: engagement of students, access and equity of access, curriculum, assessment and pedagogy.

Second, a Delphi study drawing on using these themes was undertaken by a selected group of participants (representative of Australian key stakeholders). The Delphi study (three questionnaires) was designed to determine both the similarities and differences in how the participants perceived the STEM education policies, programs and outcomes. The analysis of the responses from the participants led to the development of three visions for STEM education in the Australian context and a list of the requirements for their successful implementation.

Third, a set of semi-structured interviews with a larger group of participants was conducted to further explore how they conceptualised STEM education and how this was reflected in their choice of vision and the requirements for its successful implementation and its future directions. The analysis of the participants' responses identified that one vision was preferred by more participants but there was less consensus around requirements for its implementation and its future directions.

This research provided examples of people's conceptualisation of STEM education and practical insights as to how these can be harnessed to successfully implement programs developed at the local and system levels.