



The Role of Mathematics Education in Developing Students' 21st Century Skills, Competencies and STEM Capabilities

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In order to discuss the role of mathematics education in developing students' 21st Century skills and STEM Capabilities, it is necessary to define what is meant by these terms given the extent to which they are broadly used in global contexts. This paper provides a working framework for defining 21st Century skills and STEM capabilities in the Australian context. The Australian Curriculum: General Capabilities (AC: GC) describe the knowledge skills and dispositions necessary for students to become lifelong learners and be able to deal with the complexity of living in the 21st century (Australian Curriculum Assessment and Reporting Authority [ACARA], 2020). In reviewing the literature (e.g., English, 2016; Griffin et al., 2012), skills associated with creativity, critical thinking, collaboration and communication are generally used to describe 21st Century skills. Students' STEM capability encompasses the discipline specific knowledge of the three learning areas Science, Technologies and Mathematics and the ability to apply this knowledge. The application includes using the various analytical thinking, reasoning, inquiry and problem-solving skills both within and across the learning areas, coupled with positive dispositions towards the STEM learning areas and future STEM pathways (ACARA 2020; ACARA 2016).

This paper presents initial findings of a study aimed at investigating secondary teachers' beliefs, attitudes and practices towards the role mathematics education plays in developing students 21st Century skills and STEM capabilities. Initial findings support that teachers generally agree with the importance of students developing sound STEM capabilities and the majority (88%) agreed that the use of real world and authentic contexts are important in mathematics education. In contrast when asked about their practices, only half of the respondents reported using real world contexts or applications and very few participants indicated that they regularly provide integrated STEM and other cross curricular learning opportunities, or use student-centred pedagogical approaches in their teaching programs.

References

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