PRIMARY AND SECONDARY TEACHERS AS STEM CURRICULUM DESIGNERS

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THEME:

Teacher education and professional learning in STEM

BACKGROUND AND AIMS

With reports into Australian students' falling performance, participation and engagement in STEM school subjects, careers and university programs, there has been increased attention on changing school STEM curriculum and pedagogy through the provision of quality teacher professional learning (PL) (Tytler, 2020). Addressing STEM engagement and achievement in schools requires designing curriculum that enthuses students, challenges their beliefs about the role of the STEM subjects in solving real-world problems, and inspires them to continue to study STEM into the future. With the recent interest in STEM education in Australia, more teachers are keen to investigate how integrated STEM curriculum can prepare students with 21st century skills and capabilities. To address these issues, separate year-long PL programs were developed to assist primary and secondary school teachers in designing and implementing integrated STEM curriculum for their students (Anderson & Tully, 2020).

METHODOLOGY OR PROCESS(ES) UNDERTAKEN

To evaluate outcomes of the PL, surveys of teachers and students were administered before and after the completion of each program to measure change in teacher efficacy, teacher outcome expectancies, pedagogical practices, and STEM career awareness. This presentation reports the teacher data from the 2018 and 2019 PL programs with analyses of Likert-scale items as well as open-ended questions helping to establish key factors impacting reported change in practices. We sought to identify any changes in teacher efficacy as well as the challenges faced by teachers in designing and implementing integrated STEM curriculum.

RESULTS AND CONCLUSIONS

Analyses of data from eight PL programs (two primary and six secondary) with 581 participants from 122 schools revealed statistically significant changes in teacher efficacy, outcome expectancies and STEM career awareness with large effect sizes. Additionally, significant changes in teaching practices were reported through changes in curriculum design and delivery, increased use of small-group problem solving through inquiry, increased student engagement, and increased opportunities for student reasoning.

REFERENCES

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