

A COMPARISON OF IMPLEMENTATION APPROACHES AND CRITICAL THINKING DEVELOPMENT IN INTEGRATED STEM PROJECTS

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THEME:

Innovative STEM pedagogy and curriculum.

BACKGROUND AND AIMS

Critical thinking is a central element of science, technology, engineering, and mathematics (STEM) education. Integrated STEM curricula approaches may assist development of critical thinking however many teachers seem reluctant to use an integrated approach due to lack of implementation guidelines (Toma & Greca, 2018). An integrated approach seeks to locate connections between STEM subjects and provide contexts to nurture learners' dispositions and competencies to understand and generate multiple solutions to complex ill-structured problems (Corrigan, 2020). The purpose of this study is to contribute to the development of critical thinking abilities in secondary school students by providing information and strategies for curriculum developers and teachers to engage and extend students with integrated STEM projects.

METHODOLOGY OR PROCESS(ES) UNDERTAKEN

An interpretive case study methodology was used to explore four secondary school teachers' approaches to developing critical thinking in integrated STEM projects. Four teachers who taught integrated STEM projects in Western Australia secondary schools were interviewed pre/post project and three classroom observations were conducted during each project. Teachers were interviewed regarding their thoughts on implementation approaches, teaching strategies, assessment and how students' critical thinking may have been developed. Classroom observations focused on teaching strategies to promote critical thinking and interdisciplinary teaching practices. Interview and observation data were analysed individually using thematic analysis and then compared.

RESULTS AND CONCLUSIONS

Findings were that integrated STEM projects implemented by the four teachers shared similar teaching strategies even though their implementation approaches differed. However, project assessment and how teachers developed critical thinking differed depending on their own teaching context. These findings provide insight into how different STEM curriculum may influence critical thinking development and can support teachers new to integrated STEM education.

REFERENCES

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