SUCCESSFUL Transitions into STEMM STUDIES AND ADVANCING STEMM DIVERSITY

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Project Summary

Despite declining STEM (Science, Technology, Engineering, Mathematics) participation in schools and tertiary education, there has been steady growth in the number of students returning to study STEMM (Science, Technology, Engineering, Mathematics, Medicine) in Australian 'enabling' (university access) programs over the last 5 years.

The aim of this project was to identify the equity and opportunity issues that influence students' decisions to engage/reengage in science-based study with limited science background and to use the findings to inform and develop innovative pedagogical strategies to improve outcomes for students who choose to study science after completing school.

We also sought to address a gap in the current understanding of how equity issues and other social axes influence aspirations to study science, focusing on enabling students in foundational and undergraduate university programs and examining what pedagogical experiences help sustain interest and passion for the sciences for these students. This study will help to inform future enabling and undergraduate science course design.

Key Points

This study has employed a mixed method approach, using both quantitative and qualitative data in order to deepen the understanding of the responses from the study group of 1120 students at UON.The profile of the students in the study returning to study science indicated the following:

- Limited or no science and or mathematics at HSC level.
- Educational disadvantage- regional, remote disadvantaged school.
- Limited support network- no family members in science-based study of career.
- Financial constraints -working to support their study

The findings of our study indicated that over 80% of the students surveyed chose to return to study a science course to improve their career prospects within the STEMM field and to make a positive societal contribution.

The demographic data of the enabling students has provided, for the first time, an insight into the profile of the post school /mature age students returning to study science and has highlighted the diversity of backgrounds as well as the variety and extent of impacts on their science choices during their time at school while at the same time highlighting the students' shift in attitude to science after leaving school.

One of the key insights gained from our study was the acknowledgment by the students of an increased confidence to study science and that life experience had helped them overcome earlier doubts regarding capability. Students also felt they had a greater knowledge of STEMM fields, the contribution STEMM careers make to society, as well as more realistic expectations and understanding of their own capability.

Our study presents important new findings that indicate a return to the sciences is possible regardless of previous exclusion or lack of engagement in early childhood. Furthermore, given appropriate resources and support students can rediscover science and successfully continue into Undergraduate STEMM fields and beyond.

The research has:

- Set the terms for a more robust debate around an appropriate pedagogy for students transitioning into the sciences.
- Built expertise beyond an individual to a community of science educators at UON

Recommendations for Policy or Practice

Policy

- The information gained from this project emphasises the importance of recognising that It is possible to return to the sciences regardless of science background or age and that
- these educational options/opportunities in STEMM remain available for all students across the sector.

Practice

- Recognising the challenges which face our students as they return to study science will help create the most appropriate interventions to enhance the science experience and provide more successful outcomes for science students at the University of Newcastle.
- Building stronger collaborative efforts between enabling and undergraduate science educators to develop better strategies for teaching and transitioning students from a diversity of backgrounds into the sciences.

Recommendations for Future Research

The research team would like to extend this study further into a longitudinal study which would track the success or otherwise of students entering the sciences through an enabling program.

It would also be beneficial to extend this study to other enabling programs across the sector in a cross institution collaborative project.

References

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