

MATHEMATICS BACKGROUND AND EARLY PERFORMANCE OF A SAMPLE OF FIRST YEAR CHEMISTRY STUDENTS

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BACKGROUND AND AIMS

The number of students taking the easier Maths A in Queensland exceeds that of the other two mathematics subjects combined, and there is a consistent drop out from Maths B into Maths A in year 12, with students presumably wishing to maximize their university entrance score. The decline in Australian students taking more advanced mathematics subjects has previously been highlighted (McPhan et al., 2008). Other studies have shown that students entering university are deficient in areas of mathematics deemed necessary in science based university subjects (Hoyles, Newman & Noss, 2001, Matthews, Hodgson & Varsavsky, 2013). The aims of this project were to examine the background of students enrolled in a first semester, first year chemistry course and to investigate the relationship between prior chemistry and mathematics studies, and students' results in early assessment items of the course. In addition student confidence in mathematics and chemistry and their perception of the importance of mathematical skills in their study were investigated.

METHODOLOGY

The students enrolled in the chemistry course ($n = 455$) were in various degree programs with different entry requirements and pre-requisite mathematical knowledge. The chemistry course provided the ideal case study for evaluation of the relevance of a student's mathematics background at the commencement of their studies. Some students ($n = 57$) from the total cohort, completed a voluntary survey which identified their perception of the importance of mathematical skills in their study and their confidence with mathematics. The survey data and the student mathematics and chemistry background (where available), was correlated with an early chemistry diagnostic test and the mid-semester examination results. We analysed student access to extra online mathematics support (c.f. Jackson & Johnson, 2013), which was provided to all students prior to the mid-semester examination in chemistry.

RESULTS AND CONCLUSION

The survey responses indicated that students generally did not have high confidence with their mathematical skills; especially those with poorer mathematics backgrounds. By contrast, students' perception of the importance of mathematical skills to their chemistry studies was high (average rating of 4.2 on a 5-point scale (5 = very important)). The correlation data revealed that prior achievement in mathematics impacted on performance within chemistry, despite prior studies in chemistry. A possible solution is to integrate foundational and enabling mathematical skills with curriculum, which would build student confidence and is more likely to have success in enabling science students to engage and succeed. However, preliminary results indicated that very few students (<26) accessed the extra maths support provided in the chemistry course. Further work is being undertaken to address this issue.

REFERENCES

- Hoyles, C., Newman, K., & Noss R. (2001) Changing patterns of transition from school to university mathematics. *International Journal of Mathematical Education in Science and Technology*, 32, 829-845.
- Jackson, D. C. & Johnson, E. D. (2013). A hybrid model of mathematics support for science students emphasizing basic skills and discipline relevance, *International Journal of Mathematical Education in Science and Technology*, 44(6), 846-864.
- Matthews, K. E., Hodgson, Y. & Varsavsky, C. (2013). Factors influencing students' perceptions of their quantitative skills. *International Journal of Mathematical Education in Science and Technology*, 44(6), 782-795.
- McPhan, G. Morony, W., Pegg, J., Cooksey, R., & Lynch, T. (2008) Maths? Why not? Canberra: Department of Education, Employment and Workplace Relations.

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