

ASSESSMENT PRACTICES IN STEM HIGHER EDUCATION – WHAT DOES THE LITERATURE SAY?

Agnes Bersee^{a,b}, Jacob Pearce^a, Sara H. Kyne^b

Presenting Author: Agnes Bersee (agnes.bersee@acer.org)

^aAustralian Council for Educational Research, Camberwell, Victoria 3124, Australia

^bSchool of Chemistry, Faculty of Science, University of New South Wales, UNSW, Sydney, NSW 2052, Australia

KEYWORDS: Assessment, Assessment for learning, Discipline-based education research, STEM education

SUB-THEME: Assessment

It is well documented that the number of occupations in Australia requiring STEM related skills and STEM literacy is increasing (Office of the Chief Scientist, 2020; Science & Technology Australia, 2023). This has placed pressure on the Australian workforce as there is an increase in demand for people with STEM qualifications. Research has also reported the high levels of student attrition in STEM related higher education courses, noting that many students may transfer to non-STEM disciplines or leave further study altogether (Belser et al., 2017; Hedge, 2024; Li et al., 2022). Engaging students in STEM disciplines is therefore essential to supporting future careers in the Australian STEM workforce.

This presentation will explore how current assessment practices influence teaching and learning in STEM-based higher education degrees, and what potential impact this may have on students (and further, industry). It will do this by discussing recent literature, examining how assessment is viewed, its utility, and any gaps identified between graduate skills and what industry requires. We are particularly interested in how assessment supports or disadvantages different cohorts of students within STEM disciplines, including student engagement and science identity. The review will explicitly investigate the influence of under-represented groups (such as gender, neurodiversity, and First Nations identity) on students' interactions with assessment.

We present initial insights from our systematic review of the literature on current STEM assessment practices in tertiary education, conducted following the PRISMA guidelines (Page et al., 2021). The findings will inform our design of innovative and effective assessments that will help engage STEM higher education students, and ultimately, support diversity of students to succeed in STEM courses.

REFERENCES

- Belser, C. T., Prescod, D. J., Daire, A. P., Dagley, M. A., & Young, C. Y. (2017). Predicting Undergraduate Student Retention in STEM Majors Based on Career Development Factors. *The Career Development Quarterly*, 65(1), 88–93. <https://doi.org/10.1002/cdq.12082>
- Hedge, B. (2024). Persistence of STEM Majors in Higher Education. *Journal of Research in Science, Mathematics and Technology Education*, 27–41. <https://doi.org/10.31756/jrsmte.312SI>
- Li, C., Herbert, N., Yeom, S., & Montgomery, J. (2022). Retention Factors in STEM Education Identified Using Learning Analytics: A Systematic Review. *Education Sciences*, 12(11), 781. <https://doi.org/10.3390/educsci12110781>
- Office of the Chief Scientist. (2020). *Australia's STEM Workforce*. Australian Government. Accessed at: https://www.chiefscientist.gov.au/sites/default/files/2020-07/australias_stem_workforce_-_final.pdf
- Page, M. J., Moher, D., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... McKenzie, J. E. (2021). PRISMA 2020 explanation and elaboration: Updated guidance and exemplars for reporting systematic reviews. *BMJ*, n160. <https://doi.org/10.1136/bmj.n160>
- Science & Technology Australia. (2023). *STEM Career Pathways: A report to the National Science and Technology Council*. Australian Government. Accessed at: https://www.chiefscientist.gov.au/sites/default/files/2024-02/STEM%20Career%20Pathways%20-%20STA%20for%20NSTC_0.pdf

Proceedings of the Australian Conference on Science and Mathematics Education, The University of Melbourne, 30 September - 2 October 2025, page 13, ISSN Number 2653-0481.