PATTERNS OF RETENTION INTO SECOND YEAR PHYSICS AND ASTROPHYSICS

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BACKGROUND

Improving completion of science majors requires an improved understanding of which students do and do not continue and why. Within physics, various international studies have explored demographic patterns in persistence, with some studies finding interactions between gender, self-efficacy, feelings of belonging, perceptions of learning environment, and social connections (Cwik and Singh, 2021; Franklin and Brewe, 2025; Sawtelle, Brewe, and Kramer 2012; Zwolak et al, 2017). These studies show mixed and inconsistent results, hinting that these patterns may be highly context-specific. What work exists within Australia has identified that intent to persist in science generally is related to science identity and feelings of belonging and that these relationships differed for men and women, with women less likely to express a desire to continue (Fisher, Brookes, and Thompson, 2022); however, actual retention was not measured.

AIMS

The present work is part of a longitudinal, mixed-method study of retention and experiences of students in physics and astrophysics in a large Australian University. Here, we present interim results on if gender plays a role into retention into second year studies in either physics or astrophysics.

DESIGN AND METHODS

At the start of the first semester in 2023, students enrolled in a first-year physics class designed for students intending to major in physics, astrophysics, or related sciences were given a survey asking them about their study intentions, demographics, self-efficacy, mindset, feelings of belonging, trust in instructors and peers, and demographics and family background. When indicating gender, students could identify as more than one gender including male, female and non-binary/other and did not have to select any gender. Questions were primarily drawn from previously validated surveys. Of 292 enrolled students, 229 consented to participate in the research study and passed the consistency tests used to check if students were reading the survey. Students were also asked to consent to data collection via the Learning Management System, which has allowed us to identify which students enrolled in second year physics studies within two years of completing the initial survey. Due to the binary nature of the data and relatively small numbers, two-tailed Fisher's exact tests were used to determine significance for the results by gender. We separately tested a 3x2 model (men, women, and non-binary/other genders) and a 2x2 model (men and women).

RESULTS

Within the valid data sample, 54 students identified as women,168 as men, and 10 as non-binary or another gender. All tests showed no statistically significant differences in continuation by gender. These results indicate that the first-year learning environment is unlikely to impact future study plans along gendered lines. We aim to explore other factors measured by the survey mentioned above in our future work.

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