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(U*) Student Preparedness and Motivations in Introductory Physics Courses

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Introductory physics courses are required at McMaster for students in three different streams: physical sciences, engineering, and life sciences. While students in the engineering stream are required to take the physics course for their stream, most students in the Faculty of Science can choose between taking physics for life sciences or for the physical sciences, where both options meet all upper-year physics requirements. Examining students' self-evaluations of their preparedness and motivations provide insight into their experiences, preferences, and reasons for choosing their stream of physics.

In this study, online surveys were distributed to students in all three streams of introductory physics. End-of-term surveys were collected in Dec. 2021 (N=182) and April 2022, and an entry survey was collected in Sept. 2021 (N=239). From these results, we examined students' study habits to see if there are trends across different streams, genders, or other demographic groups that may influence course performance. These results show that most students emphasize retrieval practices such as practice problems and practice tests in their studying, while there are some differences between different demographics and streams. Additionally, students were asked to rate their preparedness and change of preparedness throughout the semester. Interestingly, preparedness in the life sciences stream follows a unique trend because the cohort contains students with varying high school physics backgrounds. Preparedness is also compared to students' predictions of their final grades and their comfort with the mathematics taught in the course to look at any trends between these factors. Additionally, the motivation of students in the life sciences and physical sciences streams are examined to see what influences them when choosing their stream of physics. For these students, external recommendations and previous high school physics experiences are prominent factors in their decision.

These results provide insight into the background of students and factors that influence their performance and enjoyment of introductory physics courses at McMaster. We can utilize these results as a tool for improving the performance and experience of students taking these courses.

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