

Comparison of 1st Year Calculus I Engineering Students to Pre-Med, STEM and Non-STEM Students for Student Success

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Abstract

- In a study of freshman engineering success at the University of Michigan, Engineering freshman were compared to Pre-Med, STEM and Non-STEM students. Would engineering students have a higher or lower first year GPA and retention than other students at Michigan? In this poster, the results of the study of Calculus I students is discussed. Since Calculus I is a gateway course to Engineering, this group of students is of particular research interest. A better understanding may lead to better student intervention

Methods

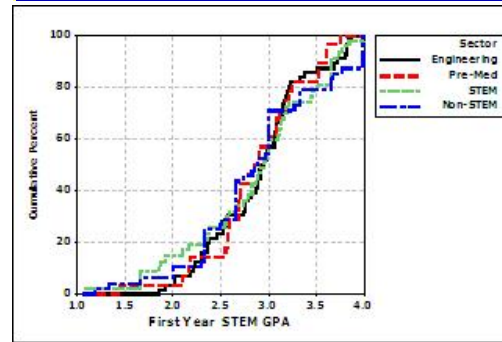
Data was collected from the CIRP and MAIS databases. The CIRP survey is a survey given to students during freshman orientation that asks questions on the students' attitudes and high school experiences. The MAIS database contains student performance data such as the course grades. IRB approval was granted. Using distribution plots, comparison were made of the four student groups: Engineering, Pre-Med, STEM and Non-STEM.

The STEM GPA was defined as the Grade Point Average (GPA) for all freshman level STEM courses (math, science and engineering courses) taken in the first year.

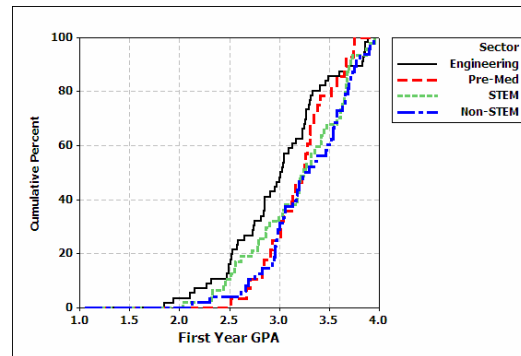
The First Year GPA is the GPA for ALL courses taken in the first year.

Logistic Regression was used to study student retention.

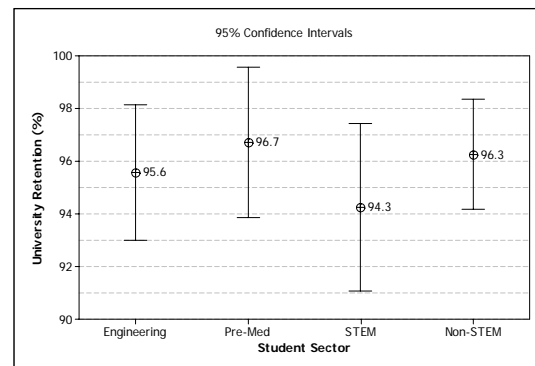
Results



Comparison of the Distributions of the First Year STEM GPA



Comparison of the Distributions of the First Year GPA



95% Confidence Intervals on the University Retention Rate

Discussion

- No Statistical Difference exists in First Year STEM GPA among student groups.
- There is a Significant Difference among the student groups for First Year GPA
- No Significant Difference exists in the University Retention Rates. High School Rank and Concern about Finances were the best predictors of One-Year Retention within the University of Michigan for Engineering students.

Conclusion

- Engineering students have the lowest Average First Year GPA. 18% of the Engineering Students, who enrolled in Calculus I, earned a first year GPA less than 2.5 compared to 4% for the Non-STEM Students. This is hypothesized to be due to Engineering Students taking the most STEM Courses.
- No Differences exists in the Retention Rate for the Freshman Year.

Acknowledgements

- We wish to thank Dr. Malinda Matney of the Student Affairs Office for her generous time and support and Andrew Cameron of the University of Michigan Registrar's Office for the development of the research database.