

DOCTORAL DEFENSE

Investigating Gender Differences in Course Relationships, Self-Efficacy, and Identity in Physics and Promoting Equity in Learning Outcomes

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Abstract: Research in physics education faces a challenge of low sample size when focusing on issues pertaining to physics majors. However, with the continued collection of data over the past decades we are now reaching a point where there is sufficient statistical power to investigate crucial issues such as inequities within the physics curriculum. In recent years there has been a push towards identifying these inequities, especially with regards to gender or race, in introductory physics classes. The research presented here extends this work by utilizing 15 years of institutional data and 5 years of survey data in order to reveal inequities in the education of physics majors. These investigations will primarily consider gender differences wherein we find troubling trends in introductory physics grades that may be a factor in women's decisions whether or not to pursue a major in physics. In addition, parallel investigations of engineering students provide context of how these same gender differences in introductory physics are entirely opposed to the trends of non-physics majors in other STEM disciplines and may be driven by stereotype-driven gender differences in physics self-efficacy. We further find in an investigation of the motivational characteristics of physics majors that there is a decline in physics majors' self-efficacy and physics identity over time, both during the tumultuous first-year of study and even as the physics students progress to quantum mechanics. Moreover, investigations of STEM enrollment patterns will further situate physics as having a uniquely inequitable environment for women and underrepresented minority students, where student attrition from physics is more prevalent than in any other STEM major. Finally, we will present a study into self-paced online learning tools that can be useful in future investigations of how these inequities influence learning throughout a course, which can provide even more direct and immediate feedback to instructors.

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Zoom ID: 521 823 7540

Non-department members:
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