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Educational commitment and attitudes: The Social Network Perspective[1]

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From industry to government to academia, attracting and retaining science, technology, engineering, and mathematics (STEM) majors is recognized as a key element of the 21^{st} century knowledge economy. However, increasing students' persistence has been and still remains one of the major challenges for universities. The ability to retain students seems to be intimately tied with understanding their immersion into the academic and social system of an institution. Past research suggests that students social and academic community, as well as interactions with peers, are likely to influence whether they remain in a class/major or in school altogether. With nearly half of first-time students who leave a university by the end of the freshman year never coming back to college, the importance of understanding experiences in introductory courses as a means for improving students' persistence is particularly pronounced.

We investigate students' experiences in highly interactive Modeling Instruction introductory physics courses through the lens of social network analysis. Using the so-called centrality measures we analyze how ones' position within an in- and out-of-class networks predicts persistence in taking a subsequent physics course. We find that students who become immersed within a community of well-connected peers tend to be more likely to continue in the active engagement introductory physics sequence. Moreover, for students whose grades fall in the "middle of the pack," position within the out-of-class network – not grades – is the most significant predictor of persistence. Finally, with the networking of students being such an important factor in predicting persistence, we also looked at students' self-reported perception of the values of and attitudes towards out-of-class collaborations. We find that, even though students consider the out-of-class collaborations to be important for success, it takes a relatively long time – basically an entire semester – before they start seeking benefits of collaborative learning, i.e., translating their attitudes into practice.

These results give a quantitative connection between student social integration and persistence in STEM fields. They suggest that active engagement may improve persistence. Due to the discrepancy between attitudes and practice, however, students need time to increase social ties and become more embedded in the academic environment. This discrepancy should be taken into account when making the transition from traditional teaching to peer-to-peer learning.

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