

Shifting Perceptions: Using Stories to Understand Changes in Students' Attitudes After Completing an Introductory Mathematics Course

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Students' attitudes toward mathematics significantly influence their mathematical learning and achievement (Turgut & Bakir, 2024). Further, studies have suggested that mathematical achievement can be a predictor in whether students graduate from high school (McKee & Caldarella, 2016). These issues persist in college, with many students underprepared for their introductory mathematics coursework (Martinez et al., 2016) and drop/failure rates over 40% in these courses (Herriot, 2006). In a previous study (Reed & Worley, 2024), we investigated students' attitudes towards mathematics by examining their mathematical autobiographies or narratives in an introductory college mathematics course, akin to College Algebra. It was found that students' stories fit into four general categories: Friendly; Familial; Antagonist; and Frenemy, with a majority of students having a negatively leaning story (Reed & Worley, 2024).

The goal of this study was to examine and categorize the reasons which students expressed had shifted their attitude towards mathematics or their mathematical narrative in a more positive direction. To investigate this, we had students in a 'Launch into the University' initiative over the summer of 2024 to complete Pre- and Post-Narratives about their relationship with mathematics. The university offered introductory English and Mathematics courses, including English 101 and College Algebra, with integrated tutoring assistance. Many participants in these classes had experienced significant educational challenges during the COVID-19 pandemic disruptions, as mentioned in the Pre-Narratives. In examining these students' Post-Narratives, we found several factors which influenced their attitudes, and helped to promote a more positive outlook about themselves as mathematics learners. Despite the prevalent negative attitudes towards mathematics documented in prior research, our analysis of students' Post-Narratives revealed several key factors that contributed to positive attitudinal shifts. These factors included: (a) supportive and effective teaching approaches that create engaging learning environments, (b) students' development of resilience and help-seeking behaviors, (c) growing confidence and sense of mathematical empowerment, (d) recognition of mathematics' real-world relevance, and (e) challenging internalized negative perceptions about mathematical ability. By identifying these transformative elements, our study provides insights into potential interventions that may help mitigate the persistent challenges of mathematical anxiety and underachievement in higher education.

In this poster session, we hope to prompt the following discussion: *how do we leverage these results to continue to shift students' attitudes in a more positive direction?*

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