Like it or Love it: Exploring Elements Affecting Student's Mathematical Achievement

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Mathematics achievement, both in high school and early in college, is one of the strongest predictors of college completion. Research conducted within the framework of expectancy-value theory has shown that math interest, utility, engagement, self-efficacy, and identity are related to mathematics achievement. Hence, this study uses structural equation modeling to evaluate Ford's (2017) empirical model linking mathematics beliefs and achievement with a sample of students enrolled in multiple sections of two algebra-focused remedial math courses at a community college near a midsize metropolitan southern city in the United States.

Keywords: remedial mathematics, expectancy value theory, community college, mathematics achievement list

Chen (2016) documents that mathematics achievement early in college is one of the strongest predictors of college completion and community college students complete remedial mathematics courses and graduate at a significantly lower rate than students who start at traditional four-year colleges and universities. Expectancy-value theory (EVT; Wigfield & Eccles, 2000) provides a framework for exploring how students' beliefs and perceptions influence their mathematics achievement. Building on Eccles' EVT model of achievement-related choices (2005) and Middleton's model of mathematics achievement (2013), Ford (2017) proposed an empirical model of mathematics achievement using a nationally representative sample of 9th graders from the High School Longitudinal Study (HSLS: 09; Ingels et al., 2011). This study seeks to evaluate Ford's proposed model linking mathematics beliefs and achievement with a sample of community college students enrolled in sections of algebra-focused remedial math courses near a midsize metropolitan southern city in the US.

Structural equation modeling was implemented using MPlus. Results are shown in Figure 1 with dashed lines indicating non-significant pathways. Similar to Ford (2017), positive pathways linked (1) interest to utility, self-efficacy, and utility, (2) utility to self-efficacy, and (3) self-efficacy to identity; engagement and math achievement were negatively related. In this study, the pathways between (1) efficacy and engagement and (2) identity and achievement were not significant, whereas they were in Ford's study. Additionally, the R² for achievement was lower.



Figure 1. Model with Standardized Estimates

Implications for community college instruction, including ways to increase interest in mathematics, and future research plans with community college students will be discussed.

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