An Exploration of Math Attitudes and STEM Career Interests for Community College Students

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Survey data for community college algebra students reveals relationships between a student's attitudes towards mathematics and the student's STEM career interests. Results show that while students may not always have a clear understanding of the tasks related to a chosen STEM career area, the student's math interest predicts interest in some STEM careers and not others.

Keywords: STEM, career interests, algebra

In community colleges across America, students are struggling with mathematics. Mathematics has long been a stumbling block for undergraduates, including those pursuing science and engineering degrees (Harackiewicz et al., 2012). The school experiences that create this situation disproportionately affect students from groups underrepresented in science, technology, engineering, and mathematics (STEM) majors (Reardon, 2011), and can drive these students away from STEM fields (Moses & Cobb, 2001). Pass rates in math courses required for STEM careers like College Algebra are low (Howell, 2016). In the present study, we examine whether interest in math is predictive of College Algebra students' interest in STEM careers.

As part of a larger study, students enrolled in College Algebra (n = 367) at a mid-size community college in the southern United States were invited to take a survey regarding their STEM career interests, as well as their interest in algebra and mathematics in general. Male and female students were represented equally, and students were largely 18-24 years old. Respondents were 52% Caucasian, 29% Hispanic, 6% African-American, and 13% other races/ethnicities. The survey (drawn from the Basic Interest Scales; Liao, Armstrong, & Rounds, 2008) asked students to rate their interest in fourteen career areas, first using four questions related to activities one would perform in each area (e.g., "Build a structure to withstand heavy winds"), and then using the name of the career area (e.g., "Engineering"). Additionally, survey items asked students to rate their interest in algebra and mathematics in general using interest survey items from Linnenbrink-Garcia et al. (2010) and Renninger and Schofield (2014).

Analyses were conducted where the career activities aggregates were compared to the students' interest rating in the career area. Results showed these measures were consistently only moderately related, suggesting that students may not be clear on what different STEM careers entail. The relationship was particularly weak for physical science. The career ratings were then compared to student responses related to their level of interest in mathematics and algebra in general. The mathematics interest items were strong predictors of interest in careers in math/statistics and in STEM teaching, and were moderate predictors of interest in careers in engineering, finance, information technology, and mechanics/electronics. Interest in math did not predict interest in a variety of other STEM career areas, including life science, physical science, and social science. Finally, overall differences in math interest between student groups were explored. Results suggest that females in College Algebra have lower math interest than males, and non-Hispanic Caucasian students have lower math interest than other racial/ethnic groups.

The survey results indicate that students in the sample may not have clear ideas of the nature of specific STEM career areas, and their math interests do not align well with their intended career interests in many cases. The larger study hopes to improve learning outcomes for mathematics students by explicitly tying College Algebra course content to STEM careers.

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