Identities and Transformational Experiences for Quantitative Problem Solving: Gender Comparisons of First-Year University Science Students

Peter Hudson  
Queensland University of Technology  
Kelly Matthews  
University of Queensland

Women are underrepresented in science, technology, engineering and mathematics (STEM) areas in university settings; however this may be the result of attitude rather than aptitude. There is widespread agreement that quantitative problem-solving is essential for graduate competence and preparedness in science and other STEM subjects. The research question addresses the identities and transformative experiences (experiential, perception, & motivation) of both male and female university science students in quantitative problem solving. This study used surveys to investigate first-year university students’ (231 females and 198 males) perceptions of their quantitative problem solving. Stata (statistical analysis package version 11) was used to analyse gender differences in quantitative problem solving using descriptive and inferential statistics. Males perceived themselves with a higher mathematics identity than females. Results showed that there was statistical significance (p<0.05) between the genders on 21 of the 30 survey items associated with transformative experiences. Males appeared to have a willingness to be involved in quantitative problem solving outside their science coursework requirements. Positive attitudes towards STEM-type subjects may need to be nurtured in females before arriving in the university setting (e.g., high school or earlier). Females also need equitable STEM education opportunities such as conversations or activities outside school with family and friends to develop more positive attitudes in these fields.

Key words: Gender; Problem solving; Transformational; STEM: First-year students