

MATHEMATICS CONFIDENCE AND APPROACHES TO LEARNING: GENDER AND AGE EFFECTS IN TWO QUITE DIFFERENT UNDERGRADUATE MATHEMATICS COURSES

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I describe early findings from research into mathematics confidence and learning orientations in two very different early undergraduate courses in an Australian university: an introductory statistics service course for students in Science, Business, Commerce and Information Technology (N=179), and a smaller (second) course in calculus and linear algebra mainly for mathematics majors and engineers (N=61). I reflect on age and gender findings in particular. Older students in the bigger class indicated deeper approaches than did younger. Females choosing traditionally very male-dominated courses may be predisposed to the more academic learning approaches, or may assume them in response to the context in which they study.

BACKGROUND FOR THE STUDY, INSTRUMENTS, AND FINDINGS

Wider access to higher education in many countries is increasing the diversity of the student body and changing profiles of gender, age and learning background. Educators seek ways to measure and describe a range of student attributes, and to embed support for the development of desirable approaches to learning. Trends found in recent research support the inclusion of mathematics confidence as a valuable construct in assessing student learning in undergraduate mathematics.

To facilitate meaningful comparisons with the literature, well-researched instruments were used for this study. Mathematics confidence was measured using the USQ scale (developed by the author and others) which demonstrates high internal consistency, test-retest reliability, and validity. Approaches to study were measured using not only the widely used and reported Entwistle-Ramsden Approaches to Study Inventory (ASI), but also scales derived therefrom that are also claimed to measure *meaning*, *achieving* and *reproducing* learning orientations which encompass *deep*, *strategic* and *surface* approaches, respectively.

Findings from the data collected at the end of the second semester, 2002, are described and compared. The reliability of some of the learning scales is questioned, but robust variations illuminate just how different the profiles of students are in these two early undergraduate mathematics classes. As expected, mathematics confidence is much higher in the smaller major/engineering class. The few females (8) indicated significantly higher mathematics confidence and lower levels of surface and achieving approaches on average than the 51 males. However, these gender effects were reversed in the bigger service class (88 females, 71 males). Significant age-group effects were noted in the bigger service class, with the older students declaring on average deeper learning orientations, but variable mathematics confidence levels.