

AN INVESTIGATION INTO THE IMAGE OF  
MATHEMATICS HELD BY 5TH-YEAR  
POST-PRIMARY STUDENTS

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This is an abstract of the PhD thesis *An Investigation into the Image of Mathematics held by 5th-Year Post-Primary Students* written by C. Lane under the supervision of Martin Stynes and John O’Donoghue at the School of Mathematical Sciences, University College Cork, and submitted in November 2012.

This research study investigates the image of mathematics held by 5th-year post-primary students in Ireland. For this study, “image of mathematics” is conceptualized as a mental representation or view of mathematics, presumably constructed as a result of past experiences, mediated through school, parents, peers or society. It is also understood to include attitudes, beliefs, emotions, self-concept and motivation in relation to mathematics. This study explores the image of mathematics held by a sample of 356 5th-year students studying ordinary level mathematics. In addition, this study examines the factors influencing students’ images of mathematics and the possible reasons for students choosing not to study higher level mathematics for the Leaving Certificate. The design for this study is chiefly explorative. A questionnaire survey was created containing both quantitative and qualitative methods to investigate the research interest. The quantitative aspect incorporated eight pre-established scales to examine students’ attitudes, beliefs, emotions, self-concept and motivation regarding mathematics. The qualitative element explored students’ past experiences of mathematics, their causal attributions for success or failure in mathematics and their influences in mathematics. The quantitative and qualitative data was analysed for all students and also for students grouped by gender, prior achievement, type of post-primary school attending, co-educational status of the post-primary school and the attendance of a Project

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Maths pilot school. Students' images of mathematics were seen to be strongly indicated by their attitudes (enjoyment and value), beliefs, motivation, self-concept and anxiety, with each of these elements strongly correlated with each other, particularly self-concept and anxiety. Students' current images of mathematics were found to be influenced by their past experiences of mathematics, by their mathematics teachers, parents and peers, and by their prior mathematical achievement. Gender differences occur for students in their images of mathematics, with males having more positive images of mathematics than females and this is most noticeable with regards to anxiety about mathematics. Mathematics anxiety was identified as a possible reason for the low number of students continuing with higher level mathematics for the Leaving Certificate. Some students also expressed low mathematical self-concept with regards to higher level mathematics specifically. Students with low prior achievement in mathematics tended to believe that mathematics requires a natural ability which they do not possess. Rote-learning was found to be common among many students in the sample. The most positive image of mathematics held by students was the "problem-solving image", with resulting implications for the new Project Maths syllabus in post-primary education. Findings from this research study provide important insights into the image of mathematics held by the sample of Irish post-primary students and make an innovative contribution to mathematics education research. In particular, findings contribute to the current national interest in Ireland in post-primary mathematics education, highlighting issues regarding the low uptake of higher level mathematics for the Leaving Certificate and also making a preliminary comparison between students who took part in the piloting of Project Maths and students who were more recently introduced to the new syllabus. This research study also holds implications for mathematics teachers, parents and the mathematics education community in Ireland, with some suggestions made on improving students' images of mathematics.

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