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Students Attitudes And Perceptions of Mathematics Through The Lens of The PISA Analysis Trends from 2003 To 2022

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Abstract

Throughout the past, present and future of education, students' attitudes, behaviours and perceptions has impacted their academic performance, and has influenced quality of teaching and learning in the educational setting (Mazana, et al., 2019). The link between students' attitudes and students performance is more evidently seen in the subject of mathematics. This literature review sets out to investigate and critically analyse the trends in students' attitudes and perceptions of mathematics, and the impact past and current curriculum reform have for students at second-level in Ireland. This literature review compares the results of Ireland's non-cognitive outcomes (self-efficacy, motivation, and anxiety) through the Programme of International Student Assessment (PISA) from 2003 through to 2022. The 2022 report is the most recent analysis by PISA of the non-cognitive outcomes linked to mathematics in schools. The findings show the responses of students through their perceptions and attitudes of mathematics, and the policymakers actions such as curriculum reform like Project Maths (phased in 2008-2014), and the Junior Cycle mathematics implementation in 2018. Findings show that students have a higher anxiety level towards mathematics compared to the average OECD's score. Additionally, female and male students score equally in mathematical performance at Junior Cycle, however males outperform females at Leaving Certificate level. This plays into the differences between genders for mathematics anxiety, and mathematical self-efficacy where males score higher. Compared internationally, students self-responsibility towards mathematics was in line with countries such as Hong Kong, and Australia. Thus, reflection on these PISA's findings can further highlight gaps and limitations of mathematics curriculum reform in Ireland. Findings call for future developments in responding to students perceptions and attitudes, and to discuss the responses by policymakers on previous PISA results.

Keywords: Mathematics education, PISA, secondary school, perceptions, attitudes