

Impact of mathematics on academic performance of engineering students: A canonical correlation analysis

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Mathematics plays a key role in higher education as it is particularly essential to develop the analytical thinking of students. Mathematical skills would certainly assist to enhance students' knowledge in a wide range of disciplines, especially, in engineering sciences. Therefore, exploring the student academic performance has received great attention among researchers recently. The main objective of this study is to investigate the impact of mathematics on students' academic performance at the end of Level 2, in different engineering programs. The study was conducted with engineering undergraduates from seven different disciplines at the Faculty of Engineering, University of Moratuwa, Sri Lanka in academic year 2011/2012. Students' examination marks of mathematics courses in Level 1 and Level 2 and all compulsory engineering courses in Level 2 were used for the study. Explanatory data analysis techniques and canonical correlation analysis were used to achieve the objectives. Statistical testing confirmed that only the first canonical function is significant for all engineering disciplines. The amount of variance between the students' performance in mathematics and engineering courses in Level 2 explained is varied from 39% to 73%. The students' performance in engineering courses in both semesters of Level 2 is positively and strongly related to mathematics performance irrespective of the engineering disciplines. Furthermore, the combined effects of mathematics in Level 1 and Level 2 on students' performance in engineering courses in Level 2 are significantly higher compared with the individual effect of mathematics in Level 1 or Level 2. The combined effects of mathematics in both Level 1 and Level 2 are immensely beneficial to improve the overall academic performance at the end of Level 2 of the engineering students. However, the impact of mathematics varies among engineering disciplines. The students are encouraged to achieve high marks in mathematics courses for better performance in engineering courses.

Keywords: Canonical correlation analysis, Engineering mathematics, Students' academic performance

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