The value of Mathematics: Optimising opportunity in higher education and beyond

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Abstract

As universities in the United Kingdom have begun to widen access over recent years, with 40% of young people entering higher education by age 19, new students arrive with a range of prior qualifications and grades. Compulsory education ends at age 16, and only 10% of students who went on to do Advanced 'A' levels chose to study Mathematics in 2014. These factors mean that students who go on to study subjects requiring quantitative methods and/or a mathematical basis may not have done A-level Mathematics, as it is not necessarily a prerequisite for certain Science and Social Science degrees. For example, in 2010 only 68% of those studying Economics, 42% studying Computer Science, 23% studying Business and 21% studying Psychology had done A-level Mathematics (Hillman, 2014). Furthermore, the mathematical entry requirement for these courses is often as low as a C in GCSE Mathematics, a grade bettered by 32% of candidates in 2014, meaning that each cohort can contain students with a wide range of abilities.

This presentation outlines a study into the mathematical preparedness of students who *did* study A-level Mathematics before going on to study Science and Social Science subjects at university in order to ascertain whether it had been useful and sufficient preparation for the mathematical components of their degrees. Over 3,000 students from more than 60 universities in the UK who had done A-level Mathematics completed an online questionnaire. The participants answered questions regarding their experiences of A-level Mathematics, their perceptions of it as preparation for their degree and any particular Applied Mathematics content (typically Statistics, Mechanics or Discrete Mathematics) which was relevant to their university studies.

Data suggest that A-level Mathematics was viewed as being useful preparation by the vast majority of participants studying all subjects, with each subject benefitting from prior study of certain Applied Mathematics content. For example, specialism in Statistics in A-level Mathematics was of particular use to students of Business Studies, Bioscience, Economics, Geography, Medicine and Psychology. Mechanics was useful for students of Architecture, Engineering and Physics and, despite being described as unhelpful by students of most other subjects, Discrete Mathematics was held in high regard by Computer Science undergraduates.

The value of Mathematics in both the workplace and higher education is not underestimated in society. Consequently, more students are being encouraged to study post-compulsory Mathematics. Alternative qualifications are being developed, such as Core Mathematics, which will target students who have achieved at least a C in GCSE Mathematics, but who do not wish to study A-level Mathematics. In order to give students the chance to succeed in subjects with a quantitative or mathematical component, good information needs to be accessible to enable them to make the best A-level subject choices according to their aspirations. Even though Mathematics may not be a compulsory requirement, it can be of significant benefit to students across a range of undergraduate subjects. One implication of this research is that

appropriate advice should be available to all students from universities, teachers and careers advisers so that informed decisions can be made on A-level subject choices.