Mapping University Mathematics Assessment Practices

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Chapter 12
Group Projects with Individual Presentations

Abstract This case study presents the assessment of a third year project module. The assessment consists of combining a written *group* project with *individual* presentations of the same project.

12.1 Background and rationale

Before the introduction of the new form of assessment, the final year project had been done on an individual basis. The change to a group project was motivated by the workload that came with the need to supervise an increasing number of students in weekly one-to-one sessions. After a trial of assessing the groups for both the written output and the group presentations, staff decided to retain the group assessment for the written work but assess the students individually for presentations on aspects of the project. The idea of combining this group project with an individual oral presentation was motivated by concerns that individual contributions were not being suitably recognised. Group projects were also seen as a way to make projects more stimulating for both staff and students. Asking students to work in groups would also develop their employability skills.

12.2 Implementation

Groups of 4 to 6 students are assigned to supervisors and work with them towards the production of the report for the group projects. They meet weekly with the assigned supervisor, and produce a 40-page dissertation on the chosen topic. For the assessment of the individual presentations, each member of the group selects an aspect of the project and presents it orally for 10 minutes in front of a panel consisting of 3 members of staff including the supervisor. There are also an additional 5 minutes for questions from the panel to test their understanding.

Examples of projects are:

The shape of space Surfaces occur all around us in the real world. The idea of planes and spheres is familiar from an early age, but so too are more complicated surfaces such as the annulus (the shape of a ring doughnut). Is it possible to classify all possible surfaces? Surfaces can be much stranger than we might initially expect. The Möbius strip can be formed out of a piece of paper but only has one side, while the Klein bottle, although closed, does not separate its 'inside' from its 'outside'. The aim of this project is to introduce the area of maths which studies surfaces, called topology.

Barrier Options Under certain simplifying assumptions, the valuation of financial options on the stock market can be carried out by solving a partial differential equation known as the Black-Scholes equation. The main objective of this project is to obtain solutions of this equation for barrier options, where the asset price is constrained to lie between upper and lower bounds. Using techniques for solving partial differential equations, including coordinate transformation, Fourier series and separation of variables, it is proposed to obtain an analytical solution of the problem. Properties of this solution will then be examined to determine how the option value depends on the various financial parameters involved.

Key advantages of this assessment schedule are that students experience working in groups and presenting mathematics to an audience. The projects also foster independent thinking and communication skills. From the staff perspective, working with a group means that ideas need only be explained once, the supervisions can be more interactive and a good supervisor can foster a lively discussion between themselves and the group of students.

12.3 Assessment

Stage	No. of students	Assessment pattern
Year 3	90	50% written group project - group mark 50% individual presentation of the group project

12.4 Discussion, learning and impact

The lecturer believes that the new assessment structure for this module allows for a more realistic and finer assessment of the students' performance. The projects topics are changed every year and they are proposed by the staff involved with supervising the groups. The lecturer believes that this helps maintain staff interest in the projects. The main drawback of this assessment method had been the difficulty in assessing each student's individual contribution, but the individual presentations have now addressed this issue. The lecturer also reports a few instances where the groups of students were not functional because of personality clashes between members and adjustments had to be made by changing the composition of some of the groups.

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