



Promoting higher quality

**The Quality Assurance Agency
for Higher Education**

Subject Review Report

February 2000 Q192/2000

City University

Mathematics, Statistics and Operational Research

Reviewing the Quality of Education

The Quality Assurance Agency for Higher Education (QAA) was established in 1997. It has responsibility for assessing the quality of higher education (HE) in England and Northern Ireland from 1 October 1997 under the terms of a contract with the Higher Education Funding Council for England (HEFCE).

The purposes of subject review are: to ensure that the public funding provided is supporting education of an acceptable quality, to provide public information on that education through the publication of reports such as this one, and to provide information and insights to encourage improvements in education.

The main features of the subject review method are:

Review against Aims and Objectives

The HE sector in England and Northern Ireland is diverse. The HEFCE funds education in over 140 institutions of HE and 75 further education (FE) colleges. These institutions vary greatly in size, subject provision, history and statement of purpose. Each has autonomy to determine its institutional mission, and its specific aims and objectives at subject level.

Subject review is carried out in relation to the subject aims and objectives set by each provider. It measures the extent to which each subject provider is successful in achieving its aims and objectives.

Readers should be cautious in making comparisons of subject providers solely on the basis of subject review outcomes. Comparisons between providers with substantively different aims and objectives would have little validity.

Review of the Student Learning Experience and Student Achievement

Subject review examines the wide range of influences that shape the learning experiences and achievements of students. It covers the full breadth of teaching and learning activities, including: direct observation of classroom/seminar/workshop/ laboratory situations, the methods of reviewing students' work, students' work and achievements, the curriculum, staff and staff development, the application of resources (library, information technology, equipment), and student support and guidance. This range of activities is captured within a core set of six aspects of provision, each of which is graded on a four-point scale (1 to 4), in ascending order of merit.

The aspects of provision are:

- Curriculum Design, Content and Organisation
- Teaching, Learning and Assessment
- Student Progression and Achievement
- Student Support and Guidance
- Learning Resources
- Quality Management and Enhancement.

Peer Review

Reviewers are academic and professional peers in the subject. Most are members of the academic staff of UK HE institutions. Others are drawn from industry, commerce, private practice and the professions.

Combination of Internal and External Processes

The review method has two main processes:

- Preparation by the subject provider of a self-assessment in the subject, based on the provider's own aims and objectives, and set out in the structure provided by the core set of aspects of provision.
- A three-day review visit carried out by a team of reviewers. The review team grades each of the aspects of provision to make a graded profile of the provision, and derives from that profile an overall judgement. Provided that each aspect is graded 2 or better, the quality of the education is approved.

Published Reports

In addition to individual review reports, the QAA will publish subject overview reports at the conclusion of reviews in a subject. The subject overview reports are distributed widely to schools and FE colleges, public libraries and careers services. Both the review reports and the subject overview reports are available in hard copy and are also on the world-wide web (see back cover for details).

Introduction

1. This Report presents the findings of a review in February 2000 of the quality of education in mathematics, statistics and operational research provided by City University.
2. City University has its origins in the Northampton Institute, founded in 1894. In 1966, it received its Royal Charter awarding university status. Since then it has expanded considerably, both in size and subject range, building on close links with the City of London and its professions. St Bartholomew's and Princess Alexandra and Newham College of Nursing and Midwifery and Charterhouse College of Radiography were incorporated in 1995. There are currently 6,157 full-time and 2,078 part-time students registered on undergraduate and postgraduate degrees. The School of Mathematics comprises two departments, the Department of Mathematics and the Department of Actuarial Science and Statistics.
3. The School specialises in teaching and research in mathematical science, actuarial science and statistics. It offers taught courses at both undergraduate and postgraduate levels. There are approximately 370 students within the provision under review, of whom about three-quarters are undergraduates. There are 30 members of academic staff.
4. The following provision forms the basis of the review:
 - BSc (Hons) in Actuarial Science
 - BSc (Hons) in Statistical Science with Management Studies
 - BSc (Hons) in Mathematical Science
 - BSc (Hons) in Mathematical Science with Computer Science
 - BSc (Hons) in Mathematical Science with Statistics
 - BSc (Hons) in Mathematical Science with Finance and Economics
 - MMath in Mathematical Science
 - MMath in Mathematical Science with Computer Science
 - MMath in Mathematical Science with Statistics
 - MMath in Mathematical Science with Finance and Economics
 - Postgraduate Certificate in Actuarial Science
 - Postgraduate Diploma in Actuarial Science
 - MSc in Actuarial Science
 - Postgraduate Certificate in Actuarial Management
 - Postgraduate Diploma in Actuarial Management
 - MSc in Actuarial Management
 - Postgraduate Diploma in Quality Management, Statistical Methods and Reliability
 - MSc in Quality Management, Statistical Methods and Reliability.
5. The statistical data in this Introduction are provided by the institution itself. The aims and the objectives are presented overleaf. These also are provided by the institution.

The Aims and Objectives for Mathematics, Statistics and Operational Research

Aims

The mission of the University, from its Charter, is to advance knowledge, wisdom and understanding by teaching, research and professional training.

The aims in teaching provision of the Departments of Mathematics and of Actuarial Science and Statistics are to:

- A1) offer a range of applied courses, from ordinary and honours level undergraduate degrees through to MMath and MSc courses, where appropriate with professional accreditation;
- A2) offer specific courses which prepare undergraduate and postgraduate students for careers as actuaries, with opportunities for the maximum number of examination exemptions, through an education built upon fundamental principles;
- A3) offer courses which provide students with a wide range of career opportunities;
- A4) include provision for the enhancement of oral and written communication skills;
- A5) provide a high standard of teaching underpinned by scholarship and research appropriate to the needs of our students;
- A6) provide a supportive, stimulating and friendly environment in which our courses are delivered;
- A7) provide appropriate support and guidance mechanisms for our students;
- A8) provide learning resources appropriate to the courses offered;
- A9) provide effective systems for monitoring, assuring and enhancing the quality of the courses offered.

Objectives

Upon successful completion of their studies, all students will have:

- B1) appropriate written communication skills.

Undergraduate students will have in addition to B1:

- B2) appropriate oral communication and information technology (IT) skills;
- B3) an ability for rational thought and logical and evidence-based argument;
- B4) a sound theoretical knowledge and understanding of the fundamentals of mathematical, statistical or actuarial sciences, depending on their degree course;
- B5) a sound knowledge and understanding of applied aspects of these disciplines;

- B6) an ability for independent thought and the use of initiative;
- B7) the ability to plan and execute an open-ended task and to present a written report;
- B8) specialised knowledge based on the School's teaching and research strengths.

Additionally:

- B9) MMath students will have knowledge to an advanced level in at least one of the areas of specialisation, and a broader knowledge of the mathematical sciences generally.

Postgraduate students

In addition to B1:

- B10) students of the Diploma in Actuarial Science will have a sound knowledge and understanding of the fundamentals of actuarial science and statistics, together with the principal applications of actuarial science;
 - B11) students of the Certificate in Actuarial Science will have a sound knowledge and understanding of some of the fundamentals of actuarial science and statistics, together with some of the principal applications of actuarial science;
 - B12) students of the Diploma in Actuarial Management will have appropriate oral communication and IT skills;
 - B13) students of the Certificate and Diploma in Actuarial Management will have a sound knowledge and understanding of the principles of financial risk management and their application to areas of actuarial practice, together with an understanding of the interaction between actuarial concepts and the cultural, regulatory and legal framework in which they have developed;
 - B14) students of the Diploma in Actuarial Management will have specialised knowledge based on the School's teaching and research strengths;
 - B15) students of the Diploma in Quality Management, Statistical Methods and Reliability will have an understanding of the many facets of process improvement, the ability to act as a facilitator and the ability to underpin decision-making with sound statistical analysis based on efficient collection and analysis of reliability data.
- Additionally, MSc students will have:
- B16) an ability for rational thought and for logical and evidence-based argument;
 - B17) an ability for independent thought and enquiry;
 - B18) the ability to plan and execute a substantial open-ended task and present the results in written form.

Summary of the Review

6. The graded profile in paragraph 7 indicates the extent to which the student learning experience and achievement demonstrate that the aims and objectives set by the subject provider are being met. The tests and the criteria applied by the reviewers are these:

Aspects of provision

1. Curriculum Design, Content and Organisation
2. Teaching, Learning and Assessment
3. Student Progression and Achievement
4. Student Support and Guidance
5. Learning Resources
6. Quality Management and Enhancement.

Tests to be applied

To what extent do the student learning experience and student achievement, within this aspect of provision, contribute to meeting the objectives set by the subject provider?

Do the objectives set, and the level of attainment of those objectives, allow the aims set by the subject provider to be met?

Scale points

1

The aims and/or objectives set by the subject provider are not met; there are major shortcomings that must be rectified.

2

This aspect makes an acceptable contribution to the attainment of the stated objectives, but significant improvement could be made.

The aims set by the subject provider are broadly met.

3

This aspect makes a substantial contribution to the attainment of the stated objectives; however, there is scope for improvement.

The aims set by the subject provider are substantially met.

4

This aspect makes a full contribution to the attainment of the stated objectives.

The aims set by the subject provider are met.

7. The grades awarded as a result of the review are:

Aspects of provision	Grade
Curriculum Design, Content and Organisation	4
Teaching, Learning and Assessment	4
Student Progression and Achievement	3
Student Support and Guidance	4
Learning Resources	4
Quality Management and Enhancement	4

8. The quality of education in mathematics, statistics and operational research at the City University is **approved**.

The Quality of Education

Curriculum Design, Content and Organisation

9. The School of Mathematics, consisting of the Department of Mathematics and the Department of Actuarial Science and Statistics, offers a wide range of courses at both undergraduate and postgraduate levels in order to achieve its stated aims and objectives. The mathematical science degree scheme provides both three-year BSc and four-year MMath courses; the BSc Actuarial Science honours course is of three years' duration. A foundation course leading to entry to all undergraduate courses is currently available at Southwark College, but is scheduled for withdrawal next session. The BSc in Statistical Science with Management Studies has also recently been closed to new admissions due to the small number of students entering the course.

10. The majority of the modules in the first year of the mathematical science degree scheme are common to all courses; they are designed to aid the transition from school to university-level mathematics. In subsequent years, each degree has compulsory core mathematical components together with further appropriate prescribed modules and optional choices. A distinctive feature of all the undergraduate degrees is the compulsory third-year project. The reviewers recognised the distinctive contribution of the two-part project in the MMath degrees. However, the fourth year of the MMath course relies heavily on options offered in the third year of the BSc Mathematical Science. The reviewers expressed some concern at the relatively small number of modules specific to the MMath degrees.

11. The BSc Actuarial Science course provides a broadly based actuarial education that is not solely founded on the possibility of exemptions from the Institute and Faculty of Actuaries' professional examinations. It is based on the fundamental principles of financial risk management that are developed through the first and second years of the curriculum. This innovative approach enables students to acquire a deeper understanding of the subject area and its wider applications. In the third year, undergraduates have the opportunity to choose from a wide range of options, including some offered by the Business School.

12. An optional year of professional or business training (as appropriate) or a year abroad are available after the second year of study in all undergraduate courses. Although the take-up of this option is relatively small, undergraduates who had taken a year in business

commented that the curriculum in the first two years of their courses had provided an appropriate basis for their work placement.

13. The postgraduate course in actuarial science is a conversion course for those who wish to change careers or enhance their career prospects. Students value the postgraduate courses in actuarial science and quality management, statistical methods and reliability and spoke of their relevance to their work or future employment; those on the Postgraduate Diploma in Actuarial Science are very appreciative of the opportunity to gain exemptions from the professional examinations of the Institute and Faculty of Actuaries. The postgraduate courses in actuarial management have been designed for graduates with a substantial knowledge of actuarial techniques who have completed the fundamental subjects of the professional syllabus of the Institute and Faculty of Actuaries' professional examinations. These actuarial management courses are unique within the UK.

14. A number of courses have grown out of the research interests of staff and, in some cases, have been incorporated into the syllabuses for professional examinations. Former students spoke very positively about both the postgraduate and undergraduate degree courses and, in particular, commented on the large number of qualified actuaries on the academic staff and their standing within the actuarial profession.

15. This aspect makes a full contribution to the attainment of the stated objectives. The aims set by the subject provider are met.

Curriculum Design, Content and Organisation:
Grade 4.

Teaching, Learning and Assessment

16. The School aims to provide high-quality teaching underpinned by scholarship and research. Teaching and learning takes place through a combination of lectures, small-group tutorials, examples classes, seminars, practical computer laboratory sessions, coursework, projects and independent study. In undergraduate degrees most teaching is through lectures supported by tutorials. Tutorial arrangements vary between modules, but typically take the form of examples classes.

17. The reviewers observed 22 sessions, covering all courses and representing a range of teaching methods. The majority of sessions were of good quality and a significant number provided an excellent learning experience. The best teaching sessions were characterised by clearly stated aims and objectives; the content, delivery and pace were appropriate to the level

and ability of the students. Some sessions could have been improved by more active student participation, but all sessions consistently met their learning objectives. Lecturers demonstrated command of their subject, and were enthusiastic and committed.

18. All undergraduate modules are supported by coursework, including exercises, essays, and open or closed-book tests. Students give positive feedback on coursework as an aid to learning. Precise arrangements vary between modules, but care is taken to avoid bunching of assignments. Coursework is assessed and contributes significantly to final degree results. An innovative feature of the provision includes assessed student seminar presentations in the second-year undergraduate module in Actuarial Planning and Control. Students value the opportunity to make presentations during their course.

19. The quality of the undergraduate third-year project work is good; project reports are generally well presented and the objectives of the project are met in full. Students speak very positively about this part of their course. MMath students also undertake a more extensive project in the fourth year, including an oral presentation. External examiners have commented favourably on the quality of the project work and the care taken by staff in supervising the projects.

20. The Diploma in Actuarial Management is assessed through coursework and examination. The Diploma in Actuarial Science is designed to optimise opportunities for professional exemptions and is assessed only through written examination. In the Diploma in Actuarial Science, coursework is used entirely as an aid to learning, with many assignments self-marked by students. All the modules of the part-time Diploma in Quality Management, Statistical Methods and Reliability are taught in week-long blocks and assessed through examinations and coursework. With all three postgraduate diploma courses, appropriately qualified students can continue to obtain an MSc degree by submitting a dissertation.

21. Examination papers and module assessment procedures are appropriate to module objectives. For modules with assessed coursework and written examination, students are required to pass the written examination components to pass the module, and to pass the coursework components in aggregate across all modules. Marking and other assessment is undertaken consistently and conscientiously. Students have a clear understanding of assessment procedures. Courses run by the Department of Actuarial Science and Statistics, seeking exemptions from the professional examinations of the Institute and Faculty of Actuaries, take into

account the Institute and Faculty of Actuaries' guidelines in the assessment procedures.

22. This aspect makes a full contribution to the attainment of the stated objectives. The aims set by the subject provider are met.

Teaching, Learning and Assessment:
Grade 4.

Student Progression and Achievement

23. The majority (92 per cent) of undergraduates enter the courses with GCE A-Levels; the entry requirement for all undergraduate courses includes GCE A-Level in mathematics at grade B or equivalent. Entrants to the mathematical science degree courses have an average GCE A-Level points score of 19.7, whilst those admitted to the BSc in Actuarial Science have an average points score of 25.7. Mature entrants form 13 per cent of the undergraduate intake. The ratios of applications to places for the undergraduate and postgraduate courses are 5.9:1 and 2.4:1 respectively; 62 per cent of entrants to all courses are men. Overseas students of actuarial science form about 35 per cent of the intake on the BSc, and 50 per cent of those on the Diploma. About six students have been admitted each year to the foundation course at Southwark College; on average, 56 per cent of those admitted have progressed to the first year of a degree course. Those students who successfully completed the first year have progressed well, with good results at graduation. The normal entry requirement to the postgraduate courses in actuarial science is a Lower Second class degree or its equivalent. On average, some 82 per cent of entrants have at least this or a postgraduate qualification. The School can pride itself that it recruits a well-balanced mix of lively and articulate students.

24. The reviewers were concerned at the poor progression rates for the undergraduate mathematical science courses. Over the last three years, average progression rates at the end of the first year have been 77 per cent and 72 per cent for the BSc in Mathematical Science and the BSc in Mathematical Science with Finance and Economics respectively. Over the last three years, 35 per cent of those completing mathematical science based courses obtained a First or Upper Second class degree. The reviewers acknowledge that the School has made considerable efforts in addressing these first-year progression rates. In contrast, 87 per cent of first-year actuarial science undergraduates progressed to the second year of their course and 63 per cent obtained either a First or Upper Second class degree.

25. Subject to performance within specific examinations, graduates from the BSc in Actuarial Science can obtain exemptions from a number of the examinations of the

Institute and Faculty of Actuaries. Over the last three years, an average of 44 per cent of these graduates obtained between six and eight exemptions, where eight is the maximum number of exemptions, with around 30 per cent receiving two or less.

26. The Certificate and Diploma conversion courses in Actuarial Science also focus on achieving Institute and Faculty of Actuaries exemptions. Over the last three years, 32 per cent, on average, obtained six or more exemptions, whilst 40 per cent gained two or less. In 1998-99, 12 students passed these postgraduate courses with Distinction. In contrast to the Certificate and Diploma in Actuarial Science, the equivalent actuarial management courses do not currently provide exemptions, although this is under discussion with the Institute and Faculty of Actuaries. Completion rates have been 100 per cent for the two years of the course, with three Distinctions. Former students commented enthusiastically that they value the Institute and Faculty of Actuaries exemptions gained from all the actuarial science courses.

27. The proportion of students failing or withdrawing from the earlier versions of the postgraduate courses in quality management, statistical methods and reliability has been of the order of 30 per cent. The course is currently part-time and has been restructured recently around the requirements of the Ford Motor Company, whose employees form the majority of the students. Early indications are that this is effective; all the students who entered in 1998 have progressed from Part I to Part II of the course.

28. External examiners' reports on students' work at all levels indicate that the best students achieve a very high level. This was confirmed in the samples of work read by the reviewers, which included projects, group seminar assessments, coursework and examination scripts.

29. Overall, 83 per cent of graduates enter employment, and 14 per cent continue in further study. The unemployment rate is low. Despite the apparently vocational nature of the actuarial science courses, the broad-based education provides opportunities for graduates to find employment in a variety of other professions. Employers spoke very highly of the graduates they had recruited.

30. This aspect makes a substantial contribution to the attainment of the stated objectives; however, there is scope for improvement. The aims set by the subject provider are substantially met.

Student Progression and Achievement:
Grade 3.

Student Support and Guidance

31. An effective system for the support and guidance of students is provided by the University's central services and the School of Mathematics. The main strategy revolves around the School's personal tutor system, and this is supplemented by the extensive written guidance available in departmental and university handbooks and leaflets. Overall, both undergraduate and postgraduate students are very satisfied with these support and guidance mechanisms.

32. The School invites applicants to open days; students identified these as having a very positive impact upon their decision to study at City University. Several students had applied to study the actuarial courses following personal recommendation. During induction, students meet staff, in particular their personal tutor, and are provided with helpful information about the University, including the university handbook 'A Guide for Students' and further course-specific information. Students are issued with course handbooks, which they find particularly useful. As part of their induction, postgraduate students are offered supplementary courses in mathematics to bring all students to the requisite level.

33. All academic staff set aside at least three hours each week for discussions with students, and they are usually available at other times. The departmental offices provide an effective and friendly point of contact for a variety of information. Students commented favourably on the availability and approachability of staff, and their willingness to provide individual assistance and advice when required.

34. Students are allocated a personal tutor for the duration of their studies. Contact with personal tutors varies between courses and is generally more frequent during the early stage of the course, but the students the reviewers met were unanimous in valuing the advice and support provided by their personal tutors. This makes a major contribution to the provision of a friendly, supportive environment for students. In mathematical science degrees, small-group tutorials with personal tutors in the first term help with the transition from school to university mathematics. Tutorial arrangements vary between modules, and both Departments have arranged additional tutorial support for modules where students are experiencing difficulties.

35. A comprehensive range of centrally provided support and guidance services is available to all students; this includes counselling, accommodation, careers and a student health service. There is effective liaison between the personal tutors and the centrally provided student services. The careers advisory service is used extensively

and effectively by both undergraduate and postgraduate students. The Department of Actuarial Science and Statistics invites employers and graduates to give career talks, and the reviewers would encourage the Department of Mathematics to do likewise.

36. This aspect makes a full contribution to the attainment of the stated objectives. The aims set by the subject provider are met.

Student Support and Guidance:
Grade 4.

Learning Resources

37. The School of Mathematics is located in the Tait Building, where staff and departmental offices are situated. Timetabling of rooms is organised centrally and all the lecture rooms are generally well equipped and arranged. Small classes and laboratory sessions are normally timetabled to be close to the School, helping students to identify with their department. Students appreciate the support given by the school administrative staff.

38. The provision of university-wide computing facilities is the responsibility of the computing services department. Computing laboratories can be booked for classes, but any spare seats are available for use by others. All rooms in the halls of residence are networked with the central computing system. Students experienced no difficulty in accessing computers, all of which provide appropriate mathematical software.

39. The University's main library has recently been extended and refurbished. The library holds a substantial stock of some 9,000 volumes and 100 current journal titles to support teaching and research in the mathematical and actuarial sciences. A total of 905 study spaces are available, including accommodation for quiet study and an area in which students may confer and undertake group activities.

40. Recommended texts are held as multiple copies and in the short-loan collection. The usage of texts is closely monitored and additional copies are purchased when the need is indicated. Each Department has set up its own library, with a collection of books, specialist journals, dissertation and project material, currently available to postgraduate students. It is planned that these libraries will be available to final-year undergraduates with effect from the academic year 2000-01. Examination papers and some course materials are also available on the University's web site.

41. Both the library and the computing services department conduct yearly customer surveys. This is effective in providing feedback, and recently led to the revision of Saturday opening hours of the library. The library and computing services provide student learning support, for example induction courses, self-paced learning and computer training. Student opinion was very supportive of the computing and library provision.

42. Undergraduates commented that the Students' Union has 'plenty of social events' and that the two refectories are well used. The students also appreciated that some of the University's sports facilities are very convenient, being close to Northampton Square.

43. This aspect makes a full contribution to the attainment of the stated objectives. The aims set by the subject provider are met.

Learning Resources:
Grade 4.

Quality Management and Enhancement

44. Effective mechanisms exist at school and university levels to monitor and enhance quality in the provision of degree courses. An annual review of each course monitors student admission, progression and achievement and reports to the School Board of Studies. The University conducts major course reviews, considering all aspects of the degree provision, on a five-year cycle. Input to these reviews is received from staff, former students, employers and professional bodies as well as students and external examiners.

45. External examiners scrutinise all examination papers and moderate results for individual module examinations and the award of honours. They are also consulted in the approval of new modules. The University's central quality assurance procedures require a response from the School Board of Studies to all external examiners' reports. Changes are made in response to external examiners' comments: for example, a review of coursework in statistics was undertaken and a wider range of assessment was introduced; this included individualised sets of problems and seminar papers with oral presentations.

46. Each course has a staff-student liaison committee, which normally meets once a term and reports to course management teams. Minutes of the meetings are made available to students, either by being displayed on the School's web site or notice-boards, or by copies being distributed to students. Students commented that the staff-student liaison committees are effective; they identified improvements that had resulted from the work

of these committees, such as support for placements and the provision of extra material for a module. Student opinion is also solicited through a questionnaire on the quality of modules and degree courses. This feedback has prompted a number of changes to modules and courses.

47. The School has an effective programme of peer review of teaching, which has been in existence since 1995. Each member of staff is observed once a year, with a different reviewer in subsequent years. The sharing of good practice has led to teaching innovations, for example, the undergraduate seminar presentations. The School Teaching and Learning Committee also identifies good practice; this has led to internal workshops for the dissemination of best practice in teaching and learning. This committee, which also has student representation, additionally provides a forum for liaison with central university services, including counselling, careers, library information services and the computing services department.

48. Each new member of staff is assigned a mentor as part of an induction programme that identifies initial training needs. The University encourages staff to become members of the Institute for Learning and Teaching. There is an annual staff appraisal scheme to aid in personal and career development; in particular, actuarial staff are required to maintain continuing professional development. Staff are encouraged to apply for sabbatical leave for purposes that include curricular and course development as well as updating teaching methods.

49. The self-assessment document provided an accurate and useful basis for the review but it could have been improved by a more evaluative content. However, additional documentation provided was both informative and well organised.

50. This aspect makes a full contribution to the attainment of the stated objectives. The aims set by the subject provider are met.

Quality Management and Enhancement:
Grade 4.

Conclusions

51. The quality of education in mathematics, statistics and operational research at City University is approved. All aspects make at least a substantial contribution to the attainment of the stated objectives and the aims are at least substantially met. The reviewers come to this conclusion, based upon the review visit together with an analysis of the self-assessment and additional data provided.

52. The positive features of the education in mathematics, statistics and operational research in relation to the aspects of provision include the following:

- a. The wide range of applied courses at both undergraduate and postgraduate level, which all have well-designed curricula (paragraphs 9 to 14).
- b. The compulsory third-year BSc project and the extensive two-part project in the MMath degrees, which are distinctive features of the undergraduate courses (paragraph 10).
- c. The innovative approach to the design of the curriculum for the BSc in Actuarial Science that provides a broad-based actuarial education but also offers opportunities for students to obtain exemptions from some of the examinations of the Institute and Faculty of Actuaries (paragraph 11).
- d. The uniqueness of the postgraduate courses in actuarial management (paragraph 13).
- e. High-quality teaching by enthusiastic and committed staff (paragraph 17).
- f. The opportunities provided for undergraduates to make oral presentations during their courses (paragraphs 18; 19).
- g. The good progression rates for students on the actuarial courses and the high level of achievement of these and MMath students (paragraphs 24 to 26).
- h. The high regard of employers for all graduates employed (paragraph 29).
- i. The accessible and friendly staff, who provide a supportive and caring environment for students (paragraphs 31 to 34).
- j. The overall high quality of the learning resources (paragraphs 37 to 41).
- k. The effective university and school quality management and enhancement system, particularly the internal monitoring procedures (paragraphs 44 to 48).

53. The quality of education in mathematics, statistics and operational research could be improved by addressing the following issue:

- a. The disappointing first-year progression rates for undergraduates on the mathematical science courses, with the relatively low proportion of students subsequently obtaining First or Upper Second class degrees (paragraph 24).