
Introduction

1. An internal review of degree programmes in Applied Statistics was held on Monday 7 and Tuesday 8 June 2010. The members of the Panel were:
   - Dr Martha-Marie Kleinhaus, Director of Teaching and Learning, Faculty of Social Sciences (Chair)
   - Dr Philip Beaman, School of Psychology and Clinical Language Sciences
   - Dr Peter Chamberlain, School of Mathematics, Meteorology and Physics
   - Dr Nick Fieller, School of Mathematics and Statistics, University of Sheffield
   - Sally Adams, Sub-Dean, Faculties of Science and Life Sciences (Secretary)
2. The Panel met with staff from Applied Statistics and with Programme Directors and members of the Boards of Studies for the following undergraduate and postgraduate programmes offered by the Section:
   - BSc Applied Statistics
   - BSc Business Statistics and Marketing
   - BSc Statistics
   - BSc Mathematics and Applied Statistics
     (joint degree with the Department of Mathematics)
   - BSc Mathematics and Statistics
     (joint degree with the Department of Mathematics)
   - MSc Biometry
   - Post-Experience Diploma in Statistics
3. The Panel met students who represented the following degree programmes:
   - BSc Applied Statistics
   - BSc Business Statistics and Marketing
   - BSc Statistics
   - MSc Biometry
   - Post-Experience Diploma in Statistics
The Panel also met with recent graduates who had completed the following degree programmes:

- BSc Applied Statistics
- BSc Statistics
- MSc Biometry

General observations

4. The Panel met with a range of staff and wished to express its gratitude to those who had participated in the review process. The documentation provided for the Review was comprehensive, much of the required information was provided via Blackboard. They commended the Section for the provision of the Blackboard Organisation which facilitated members’ access to documentation, both before and during the review.

The Panel welcomed the involvement of current and former students, who gave a very positive endorsement of the programmes under review, and wished to thank them for their input. The Panel was particularly impressed by the Section’s provision of pastoral care, and by the feeling students conveyed of having been cared for and valued whilst at the University. The Panel formed a very favourable overall impression of the teaching and learning on the programme.

The Panel noted that, although not necessarily unique in the UK, Applied Statistics as a discipline at Reading focussed particularly on the development and application of statistical methods for solving problems in the Life Sciences, rather than on the development of standalone theory per se. Over its 40-year history, Applied Statistics at Reading has developed a strong reputation, both nationally and internationally, and the Section offered the only MSc programme in Biometry in the UK.

The Panel also noted that, as a result of the ongoing re-shaping process across the University, Applied Statistics would be transferring from the School of Biological Sciences to merge with the Department of Mathematics (part of the School of Mathematical and Physical Sciences), with effect from 1 August 2010. The new Department would be called the ‘Department of Mathematics and Statistics’.

Academic standards of the programmes

Educational aims of the provision and the learning outcomes

5. The Panel noted that, at both undergraduate and postgraduate level, the degree programmes offered by Applied Statistics aimed to provide students with ‘the toolkit to go on to a successful career as a professional statistician.’ The BSc programmes in Applied Statistics and in Statistics, and the MSc in Biometry, are accredited by the Royal Statistical Society.

The Panel agreed that the aims and learning outcomes of the programmes under review were clear and appropriate, and were well communicated to students and staff in programme specifications, programme handbooks and other documentation. The learning outcomes were being met by the students, as confirmed by the programme External Examiners. The Panel was content that the intended learning outcomes of the programmes under review had been informed by relevant Subject Benchmarking Statements and by the Higher Education Qualifications Framework.
The undergraduate students met by the Panel indicated that detailed guidance had been provided to them during their module selection interview at the start of Part 1, and also in their programme handbooks, about the content of the Part 1 modules available to them, including the implications for progression to modules in Parts 2 and 3. Similar guidance was provided to students when selecting their modules for subsequent years.

The MSc students met by the panel reported that they were given a clear outline of the different pathways available within the programme, and the modules forming the steps in each pathway. The Panel noted that, in the case of the Post-Experience Diploma in Statistics, all modules were compulsory since the aim was to provide a foundation to qualify students for entry to the MSc in Biometry.

In relation to staff, the Panel noted that a mentoring system was in place whereby a senior member of staff acted as mentor for more junior staff. This was supplemented by a peer observation system whereby observers of probationary staff were chosen appropriately. New staff taking over existing modules were provided with course material on which to base their teaching, but were also free to make changes to suit their particular style or research interests. It was clear to the Panel that adequate procedures were in place to inform new staff of the aims and outcomes of the degree programmes and modules offered by the Section, and to instil a ‘house style’ amongst new staff.

Curricula and assessment

6. The Panel agreed that the curricula of the degree programmes, both at undergraduate and postgraduate level, were coherent and of appropriate breadth and scope, and that the programmes prepared students well for employment.

The Panel noted that the Section took steps to review its provision on a regular basis, and that new modules had recently been introduced on Practical Bayesian Data Analysis and Bioinformatics for the MSc Biometry, and Forensic Statistics and Genetics for the BSc programmes. A new problem-based module on Data Analysis for Part 1 undergraduates would be introduced for 2010/11 and the Panel commended this proposal.

The research interests of staff influenced the curriculum, particularly at MSc level, both in terms of topics for MSc projects as well as taught MSc modules. These research interests included capture-recapture methodology, methods for detecting gene-environment interactions, application of statistics in forensic identification, development and application of adaptive designs / sequential methods in clinical trials, dose-escalation in early phase trials, and the development of statistical methods for ecological applications. [Good Practice (a)]

The Panel noted that concerns had been expressed by some undergraduate students about two aspects of the curricula. First, there were, at present, only two compulsory Statistics modules at Part 1 and students were required to choose between a mathematics-focussed route or an economics-focussed route at that stage. The students met by the Panel indicated that, at Part 1, students might not know in which area they wished to specialise and that, having chosen to study a Statistics degree, they would prefer to have the opportunity to take more Statistics modules during their first year.

The Panel heard that, for cohorts entering from October 2010 onwards, the two compulsory Part 1 Statistics modules would be split into four, ten-credit modules, and that a new, problem-based Statistics module (AS11D Data Analysis) would be introduced, which students could take as one of their options. Whilst the Panel recognised that it was important for students to study a range of complementary modules from other
subject areas at Part 1, it agreed that it would be desirable for the Section to give thought to whether to offer more Statistics modules at Part 1. [Desirable recommendation (a)]

The second concern expressed by undergraduate students about the curricula was that those registered for the BSc Business Statistics and Marketing, the BSc Mathematics and Applied Statistics and the BSc Mathematics and Statistics were not able to take a full 40-credit project module at Part 3, unlike students registered for the BSc Applied Statistics and the BSc Statistics. Students on joint programmes with Mathematics could only take a 20-credit project and could only choose a topic in Mathematics; those registered for the BSc Business Statistics and Marketing took a project worth only 20-credits. The former group reported a lack of integration with respect to their Mathematics and Statistics modules, and the latter group felt that there was a case for giving the project a greater credit weighting. The Panel would encourage the Section to give thought to standardising the Part 3 project across its degree programmes, and was pleased to note that it was considering offering the choice of a project in Mathematics or Statistics for joint students for those entering Part 3 in 2012. [Desirable Recommendation (b)]

The Panel noted that, in its Self Evaluation Document, the Section had indicated that there was a feeling by some staff that ‘the content at Part 1 was too easy, and covered too much of the same ground as that covered at A-level and GCSE, and it was this fact that led to student disengagement’. However, feedback from students who had entered with A-level Statistics was that, even though ~60% of the material they encountered at Part 1 was generally familiar to them, they felt that the focus on statistical interpretation allowed them to learn in greater depth than at A-level, and that the use of statistical computing packages was new.

The Panel noted that the Section was catering for students who had studied a variety of subjects prior to joining the University (partly as a consequence of A-level Statistics not being offered in the majority of schools), and so some students might find the content of Part 1 easier than others. However, the Section was planning to address the concerns raised about the content of Part 1 being too easy by teaching the GCSE-level material delivered during the Autumn Term more quickly, to free-up space to teach additional content (e.g. non-parametric statistics).

In addition, the new problem-based Part 1 module (AS1D Data Analysis) would require students to use material taught in other modules to synthesise knowledge in order to answer more open-ended questions and problems, which was likely to provide greater challenge to students. Students would have to think actively about which statistical techniques to use to address a particular problem, and to devise and work-through the various steps involved. This module would provide a better reflection of the ‘real world’, and the Panel wished to highlight the introduction of this module. [Good Practice (b)]

The MSc students met by the Panel were very positive about the content of their degrees, and particularly appreciated the ability to choose modules suited to their own interests and the applied nature of the programme. It was clear to the Panel that students’ prior expectations were being met or exceeded; the graduates met by the Panel highlighted the value of many aspects of their MSc. Particular mention was given to projects involving interaction with professional statisticians and scientists from outside the University (e.g. with staff from companies such as GSK or Pfizer), and the opportunity to be involved in practical work of ‘real-world’ value. [Good Practice (c)]

In terms of assessment, the Panel noted that the Section aimed to return coursework within 2-3 weeks, but that there were sometimes delays for various reasons. Section 6 of the University’s Guide to Policy and Procedures for Teaching and Learning indicated that best practice was for feedback to be provided within 2 weeks of submission, accepting
that this might not be practicable for all pieces of coursework, depending upon factors such as the scale of the exercise, the type of work, unforeseen circumstances etc.

In its Self-Evaluation Document, the Section had indicated that the prompt provision of feedback was somewhat problematic in terms of the MSc module ASM10A Data Analysis. This particular module was continuously assessed, and because the reports were large and required ‘significant time and concentration to mark and annotate well, students have to submit two or three [pieces of work] before they have had one back’. Students had indicated that this was a problem, as the lack of early feedback meant they were unsure whether they were structuring their work correctly. Whilst the Section has tried to alleviate this by providing more support and guidance at the start of the module on report-writing, it recognises that further action needs to be taken. The Panel would support the Section in its plans to introduce peer/group feedback for this particular module and would encourage the Section to give thought to the greater use of this method of feedback for other modules. [Advisable Recommendation (c)]

The Panel noted that feedback had been highlighted as a particular issue across the University over a period of years by the National Student Survey. The University was seeking to enhance its feedback provision generally, and, in line with this intention, the Panel recommends that the Section explore how further opportunities for formative feedback and feed-forward could be introduced into its degree programmes. [Advisable Recommendation (d)]

The Panel noted that, in its Self Evaluation Document, the Section had indicated it did not generally mark coursework anonymously, citing that it would be ‘impossible’ to do so for some pieces of work such as projects and assignments where individualised datasheets have been provided to minimise copying. Whilst the Panel accepts that it is not always possible to mark work anonymously, and that student feedback had shown that marking within the Section was perceived to be fair, section 8 of the University’s Code of Practice on the Assessment of Taught Programmes did stipulate that, wherever possible, coursework should remain anonymous during the marking and moderation process. The Panel would encourage the Section to discuss this issue further with its External Examiners, and to investigate best practice adopted by Statistics departments elsewhere, as it had indicated it was planning to do in its Self Evaluation Document. [Advisable Recommendation (e)]

The Panel was pleased to note that staff within the Section had developed an Excel-based e-marking programme, which had been used effectively with large classes to perform timely marking of quantitative assignments. This had also enabled individualised assignments to be created through the provision of different data sets to students, and work was marked anonymously in the first instance by computer. This system limited the potential for plagiarism, and encouraged students to develop a better understanding of the material. The Panel wished to commend this practice and would encourage the Section to investigate whether any commercial opportunities exist for disseminating this tool elsewhere. [Good Practice (d)]

**Use of student management information**

7. The Panel noted that feedback from students, both from the National Student Survey and the Reading Student Survey, had highlighted that students were, in general, very satisfied with the degree programmes offered by the Section. In particular, Applied Statistics had been one of only two disciplines within the University to achieve a 100% satisfaction rate in the 2009 National Student Survey.
The Section collected student feedback in a variety of ways, including evaluation questionnaires at the end of each module and via the Staff-Student Liaison Committee (SSLC). This feedback was considered and acted upon by the Boards of Studies and during the annual programme review process.

The Panel admired elements of the Section’s practice around student information, including the use of annotation for minutes of SSLC meetings to communicate progress on actions raised, and the subsequent publication of the annotated minutes on the Blackboard Student Portal to which all students had access. This was a useful way of ensuring that actions taken were highlighted beyond the membership of the SSLC, and also enabled students to see progress on issues raised in previous years. The students met by the Panel confirmed that staff listened to comments made by them during the SSLC meetings, and that progress on actions was always reported back to the Committee.

It was observed that not all students took advantage of the opportunities to feed back through the SSLC, although in some cases this reflected satisfaction with existing arrangements. The students met by the Panel indicated that the identity of the student members of the SSLC could be better advertised (e.g. through the use of a bulletin board showing membership lists and photographs of members), so that students knew who to contact if they had a particular issue to raise. The Panel would also recommend that the Section consider inviting student representatives to sit on Boards of Studies.

[Desirable Recommendation (f)]

Discussions with staff and students revealed that actions taken in response to feedback on individual modules or other feedback from students which had not been reported via the SSLC were perhaps dealt with less consistently by individual members of staff. Descriptions of how previous feedback had been incorporated into existing modules were sometimes given when handing out module evaluation forms, but the changes made inevitably tended to affect the following cohort, so were not necessarily communicated to the students who had made the comments initially. This requires a certain degree of trust on the part of the students that comments will be taken on board and changes will be made. The Panel recommends that the Section develop a consistent practice for reporting back to all students the actions taken as a result of feedback, in order to ‘close the feedback loop’ and to keep students informed with regard to the impact of their feedback and the reasons for changes in practice. [Advisable Recommendation (g)]

The Panel was satisfied that the Section took active steps to review and enhance its provision as a result of feedback, both from External Examiners and from students. Recent examples included an increase in the number of problems for students to work through for module AS2A Statistical Theory and Methods, and the introduction of the skills-based module AS1D Data Analysis, to address concerns raised by students in the 2008 Reading Student Survey concerning the level of academic challenge at Part 1. The Panel was also pleased to note that MSc students were given the opportunity to have one-to-one ‘chats’ with staff at the end of each term, specifically to elicit more detailed feedback on individual modules, and that they were also able to meet with External Examiners to discuss their degree programme. Arrangements for responding to External Examiners’ reports were good.
Quality of learning opportunities offered by the programmes

Teaching and learning

8. The students met by the Panel confirmed that they were satisfied with the quality of the learning opportunities offered to them by their degree programmes. The students particularly appreciated the ‘applied’ nature of the teaching, and the graduates confirmed that their degrees had prepared them well for employment. The students were unanimous in their praise for the teaching and administrative staff within the Section, and it was clear to the Panel that there existed a very strong learning community within the discipline at Reading. [Good Practice (e)]

The Panel noted that, due to the limited number of staff in Applied Statistics, and the need to preserve research time especially for probationary lecturers, a small number of staff took-on a large number of key roles in teaching and learning. In its Self Evaluation Document, the Section had indicated that, whilst this did ‘facilitate easier management of the degree programmes, it could be perceived as a weakness, and we anticipate this position will change with the merger [with the Department of Mathematics].

The Panel recognised that all staff within the Section, both academic and administrative, played an important role in contributing to the success of Applied Statistics at Reading, but would particularly wish to highlight the invaluable role undertaken by the Executive Director of Teaching and Learning, Dr Karen Ayres. Dr Ayres had undertaken significant work in terms of programme management and programme enhancement, and it was clear to the Panel that both current students and graduates felt highly supported by her, and viewed her with respect and affection. The Panel was pleased to note that Dr Ayres would be taking on the role of Director of Undergraduate programmes for the new Department of Mathematics and Statistics. The Panel expected that the Section would take appropriate steps to ensure that the achievements of its staff were recognised within the University procedures for encouraging, recognizing and rewarding staff for their exceptional performance and their contribution to the University.

As indicated in Section 6 above, the Panel was pleased to note that the research interests of staff influenced teaching, particularly at MSc level. In addition, the close relationship between the Section and the Statistical Services Centre (SSC) helped to enhance the learning experience for students. The professional statisticians working in the SSC contributed to teaching at both undergraduate and postgraduate level and also to the work undertaken by the Statistical Advisory Service.

The Panel noted that the Section was giving thought to providing greater opportunities for students, particularly at undergraduate level, to participate in some Statistical Advisory Service sessions. This would enable them to acquire ‘work-shadowing’ experience, and give students ‘a greater insight into the varied role of a statistical consultant.’ The Panel recommends that the Section implement these plans, which might also help to address the concerns outlined below about the use of the post-examination period during the Summer Term. [Desirable Recommendation (h)]

The students and graduates met by the Panel who had undertaken the BSc Applied Statistics or the BSc Mathematics and Applied Statistics indicated that the industrial placement year had been a particularly important and useful element of their degree, and had, in some cases, led directly to employment post-graduation. Noting the increasing importance of work experience in enhancing graduate employability, the Panel recommends the Section investigate the possibility of introducing a placement-
year variant of the BSc Business Statistics and Marketing. [Desirable Recommendation (i)]

The students met by the Panel appreciated the flexibility allowed for in terms of transferring between degree programmes (particularly between the applied and non-applied variants of the degrees), and the Panel would wish to commend such flexibility. [Good Practice (f)]

The Panel noted that the Section did not, at present, make use of the period after the end of the Summer Term examinations for teaching and learning activities. This issue had been considered on a University-wide basis during 2009/10, and Schools which did not currently make use of this period were now being asked to do so. In its Self Evaluation Document, the Section had mentioned certain activities which could be considered, such as sessions on effective report writing, or modules on CV writing and interview technique, although the students met by the Panel did not appear to be enthused by these suggestions. The Panel would therefore recommend that the Section give further thought to this issue. [Advisable Recommendation (j)]

The Panel noted that, partly due to staff numbers, the Section had developed a research diary component (constructed as an e-portfolio on Blackboard) to support undergraduate students in completing their final year projects. This tool enabled students to ‘supervise themselves’ (with support from academic staff), and had proved highly successful - not least in terms of further enhancing students’ independent learning skills.

The Panel was also pleased to note the development of innovative practice in delivering and assessing other modules, including the MSc module ASM10A Data Analysis (which involved the analysis of ‘real-world’ problems) and the Part 2 Skills for Statisticians module (AS2G). In the latter module students worked in groups to learn a new statistical package, wrote a tutorial handout on its use, then led the rest of the class to work through the tutorial, produced a written report and gave a presentation to an external client on a particular statistical problem. The Panel wished to commend the Section on the way in which it supported the development of independent learners and the use of innovative practice in the delivery and, particularly, the assessment of individual modules. [Good Practice (g)]

Student admission and progression

9. The Panel noted that Applied Statistics at Reading was somewhat unusual in that it did not require a full Maths A-level for entry to its degree programmes (the Panel was aware of no other comparable example in the UK). Whilst many students who had entered without A-level Maths had successfully completed the programmes, and appropriate support was provided to students during Part 1 to bring them up to the same level, the Panel agreed that it might be preferable for the Section to attract more mathematically-able students in the first place. This might also enable the Section to increase its overall entry tariffs yet further, in line with University strategy. The Panel would therefore recommend that the Section give thought to this issue. [Advisable Recommendation (k)]

Recruitment to the Section’s undergraduate degree programmes was generally strong, with a significant increase in the number of applications for the BSc Business Statistics and Marketing following the addition of ‘and Marketing’ to the title in 2008. Whilst applications have fallen slightly in recent years for the MSc Biometry, recruitment was still strong, with many BSc graduates from the Section progressing to the MSc programme.
The Panel noted that the Section had expressed some concerns about its ability to market its degree programmes effectively whilst part of the School of Biological Sciences, due to a perception amongst some applicants that the degree programmes would be taught by biologists rather than expert statisticians. However, it was hoped that these problems would be alleviated following the merger with the Department of Mathematics.

The Panel was satisfied that student progression within degree programmes was satisfactory, although some concerns had been expressed by the Section at the relatively poor pass rate for Part 1 of the BSc Business Statistics and Marketing in 2008/9. This was a reflection of the fact that some students were unprepared for the mathematical content of this degree programme, despite the fact that it was made clear to applicants that the programme was primarily a statistics degree. The Panel was pleased to note that the Section was giving thought to personal tutors providing more academically focussed support for compulsory modules during Part 1, to improve student progression and attainment.

The Panel noted that employability figures for Applied Statistics were good, with many students progressing to successful careers as professional statisticians. A number of students had, however, indicated that they were not ‘keen’ on the Career Management Skills (CMS) module which was provided as part of their degree programme. Having said this, the graduates met by the Panel were positive about the actual external training they had received, even though they might not have appreciated the whole CMS module, as it had helped to guide their thinking about their future career options. The provision made for students to discuss career paths with representatives from industry was praised, although some of the students met by the Panel indicated that greater support should be provided for students who wished to progress to careers in areas other than medical statistics.

The Panel noted that the Section was considering how best to embed CMS training throughout its undergraduate degree programmes (rather than just providing it during Part 2), and was seeking advice from the Careers Advisory Service on this issue. The Panel would wish to encourage the School to take these plans forward.

Learning resources

10. The Panel agreed that the learning resources provided by the Section for its students were good. As mentioned above, staff operated an 'open door' policy which was highly appreciated by students, and made use of innovative technology (such as the e-marking programme and the e-portfolio tool on Blackboard for final year projects) in its teaching. Use of the VLE, in general, across the Section was good and the Panel wished to highlight the use of Blackboard (especially the Student Portal) to support individual modules and to facilitate communication with students and staff. [Good Practice (h)]

The Panel agreed that it might be beneficial for the Section to investigate whether the use of e-portfolios on Blackboard might be extended beyond self-supervision for final year projects, to act as an additional support mechanism for students undertaking an industrial placement year. The Panel would encourage the Section to give consideration to this possibility.

The Panel was pleased to note that the Section provided preparatory material for MSc Biometry students, which they were able to access via the web prior to enrolling at the University. The Panel wished to commend the provision of this resource. [Good Practice (i)]
In addition, the Panel noted that the Section provided a suite of dedicated PCs for use by MSc students, with appropriate statistical software. This area was adjacent to the offices of academic staff, which meant students were able to seek help and assistance quickly. The students clearly appreciated this resource, and the Section was to be commended for providing it given its downsizing in terms physical location over recent years.

Employer engagement

11. The Panel agreed that the Section’s engagement with employers was strong, with representatives from industry and the Statistical Services Centre contributing to teaching. In addition, some MSc students had the opportunity to work with industry on their dissertation projects, which was highly valued.

The Section has developed strong links with employers through its placement-year degrees and many employers were keen to meet with current students to discuss their company and current job vacancies. Whilst links with industry were strong, the Panel was content that the particular interests of individual companies did not unduly influence the curriculum: the Section was able to maintain its academic priorities. The Panel wished to commend the Section’s strong engagement with employers. [Good Practice (j)]

Given the very strong relationship between the Section and its alumni, and the high regard shown for it by its graduates, the Panel agreed that there was scope for the Section to investigate how more use might be made of its alumni – both in terms of contributions to teaching and learning and in financial terms. The Panel recommends that the Section to discuss this issue with the Development and Alumni Relations Office (DARO). [Desirable Recommendation (l)]

Enhancement of quality and academic provision

12. The Panel agreed that the Section took active steps to review and to enhance its programme provision on a regular basis, both in response to feedback from students and to reflect the research interests of staff. The Panel agreed that the Section had engaged well with the Pathfinder process and would wish to support the Section in taking forward the plans outlined in its Self Evaluation Document, including: expanding the Statistics content of its degree programmes, introducing a placement year variant of the BSc Business Statistics and Marketing, increasing the availability of non-medical options for the MSc programme, increasing engagement with the Statistical Advisory Service to enhance the learning experience for students, making more use of e-learning and e-marking, and exploring new ways of delivering timely and informative feedback to students.

Main characteristics of the programmes under review

13. The Panel agreed that the degree programmes under review helped students to gain both the academic and professional skills required to succeed and to become strong independent learners. The development of a strong co-curricular programme to support the learning outcomes of the degrees is to be commended.
Conclusions on innovation and good practice

14. The Panel commends the following as areas where the Section has particular strengths:
(a) The ways in which the Section ensured that teaching was research-led, particularly in its postgraduate provision;
(b) The introduction of the Part 1 problem-based module, to encourage the synthesis of knowledge from different modules and to provide greater ‘real-world’ challenges to students;
(c) The integration of external stakeholders into the curriculum in, particularly, the MSc;
(d) The development and use of e-marking tools created by staff in Applied Statistics, which allow for individualised data to be provided to students in assessments and limit the potential for plagiarism whilst encouraging a better understanding of the material;
(e) The strong pastoral support provided for students by both academic and administrative staff within the Section and the strong learning community which is highly valued by students;
(f) The flexibility allowed for in terms of transferring between undergraduate degree programmes, particularly between the applied and non-applied variants of the degrees;
(g) The way in which the Section supports the development of independent learners and the way in which it makes use of innovative practice in the delivery and, particularly, the assessment of individual modules;
(h) The use of Blackboard (especially the Student Portal) to support individual modules and to facilitate communication with students and staff;
(i) The provision of preparatory material for MSc Biometry students which is accessible via the web prior to enrolling at the University;
(j) The Section’s strong engagement with employers.

Conclusions on quality and standards

15. The Panel is assured of the quality and standards of the programmes that have been reviewed, that the intended learning outcomes of the programmes are being achieved by students and that the programmes specifications are appropriate.

Recommendations

16. The Panel recommends to the Joint Faculty Board for Teaching and Learning (Sciences and Life Sciences) that the following degree programmes be reapproved to run for a further six years:
- BSc Applied Statistics
- BSc Business Statistics and Marketing
- BSc Statistics
- MSc Biometry
- Post-Experience Diploma in Statistics
The Panel recommends to the Joint Faculty Board for Teaching and Learning (Sciences and Life Sciences) that the following degree programmes be reapproved to run until the next Periodic Review of degree programmes in Mathematics:

- BSc Mathematics and Applied Statistics
- BSc Mathematics and Statistics

17. The Panel does not consider that any recommendations must be addressed as a condition of reapproval.

The Panel makes the following recommendations to the Section:

**Advisable**

(c) The Section should implement its plans to introduce peer/group feedback for the MSc module ASM10A Data Analysis and should explore whether to make greater use of this method of feedback for other modules;

(d) The Section should explore how further opportunities for formative feedback and feed-forward could be introduced into its degree programmes;

(e) The Section should consider implementing greater anonymity in the marking and moderation of coursework;

(g) The Section should develop a consistent practice for reporting back to all students the actions taken as a result of feedback (particularly feedback provided outside of the Staff-Student Liaison Committee), in order to ‘close the feedback loop’;

(j) The Section should give further thought to how best to make innovative and exciting use of the period after the end of the Summer Term examinations for teaching and learning activities;

(k) The Section should reevaluate its entry requirements for its undergraduate programmes with a view to requiring A-level Maths, as well as considering whether to increase further its overall entry tariffs;

**Desirable**

(a) The Section should consider whether to offer more Statistics modules at Part 1 of its undergraduate degree programmes;

(b) The Section should give thought to standardising the Part 3 project across its degree programmes and should take forward its plans to offer the choice of a project in Mathematics or Statistics for joint students;

(f) The Section should consider how best to advertise the membership of the Staff-Student Liaison Committee and consider including student representation on Boards of Studies;

(h) The Section should implement its plans to enable undergraduate students to participate in Statistical Advisory Service sessions;

(i) The Section should give thought to introducing a placement-year variant of the BSc Business Statistics and Marketing;

(l) The Section should discuss with the Development and Alumni Relations Office how more use might be made of alumni, both in terms of contributions to teaching and learning and in financial terms.

18. The Panel does not have a recommendation to the Faculty Board for Teaching and Learning (Sciences and Life Sciences) as to whether any proposal(s) for new degree programmes should be approved as this is not applicable.