

UNIVERSITY OF GLASGOW

Academic Standards Committee - Friday 28 May 2010

Departmental Programmes of Teaching, Learning and Assessment: Report of the Review of Department of Statistics held on 11 and 12 February 2010

Ms Fiona Dick, Clerk to the Review Panel

Review Panel:

Professor Graham Caie	Clerk of Senate and Vice Principal, Convener
Professor Byron Morgan	University of Kent, External Subject Specialist
Mr Gavin Carre	Students' Representative Council
Dr Martin Hendry	Dept. of Physics and Astronomy, Cognate member
Dr Olwyn Byron	Senate Assessor on Court
Dr Velda McCune	Learning and Teaching Centre
Ms Fiona Dick	Senate Office, Clerk to Review Panel
Mrs Jacqueline Williamson	For the Senate Office, Observer

1. Introduction

- 1.1 The Department of Statistics is one of four Departments in the Faculty of Information and Mathematical Sciences (FIMS).
- 1.2 The Department occupies the lower two floors of the Mathematics Building, which is shared with the Department of Mathematics. Physical resources include two teaching laboratories, along with a third teaching laboratory which is situated in the Boyd Orr Building, the use of small group tutorial and meeting rooms, and a small library. There is also a Common Room for the use of Honours and postgraduate students and staff from both departments.
- 1.3 The previous internal review (DPTLA) of the Department was undertaken in March 2004. It concluded that the provision was of a high quality overall and identified a number of areas for development to further strengthen its provision.
- 1.4 The Self Evaluation Report (SER) was prepared by Professor John McColl (Head of Department), Professor Marian Scott (Convener of the Department's Learning and Teaching Committee); and Mrs Kathleen Mosson (Teaching Administrator). The preparation process was supported by Dr Vicky Gunn from the Learning and Teaching Centre, who facilitated a meeting in November 2009 for Departmental Staff, Graduate Teaching Assistants (GTAs) and student members of the Staff-Student Committee, to draft the initial report. All staff and GTAs were invited to comment on further drafts. This inclusive approach had resulted in an exemplary document which was clear, comprehensive and demonstrated an honest, reflective and critical

analysis of the Department's strengths, as well as identifying some areas for improvement. The Review Panel **commends** the Department on this achievement.

- 1.5 The Review Panel met with the Dean of Information and Mathematical Sciences, Professor David Fearn; the Head of Department, Professor John McColl, and the Head of Learning and Teaching, Professor Marian Scott. The Panel met with 12 members of staff, 4 probationary members of staff, 25 Graduate Teaching Assistants (GTAs) and 23 undergraduate students representing all levels of the Department's provision.

2. Background Information

- 2.1 The Department has a total of 26.1 FTE members of staff, of which 14.0 are academic staff and include: 5 Professors; 3 Senior Lecturers; 7 Lecturers; 1 Teaching Fellow and 2 Teaching Assistants.

- 2.2 Student numbers for Session 2009-10 are as follows:

Students	Headcount	FTE
Level 1	852	157
Level 2	322	27
Level 3	102	30
Level 4	27	21
Level 5	0	0
Undergraduate Total	1,303	235
Postgraduate Taught	90	9
Postgraduate Research*	19	15

*(for information only - research is not covered by the Review)

- 2.3 The Review Panel considered the following range of provision offered by the Department (a full list with notes is attached as Appendix 1):

- M.Sci. in Statistics *†;
- M.Sci. in Applied Mathematics and Statistics *†;
- M.Sci. in Mathematics and Statistics *†;
- M.Sci. in Pure Mathematics and Statistics[†] [new in 2008-09];
- B.Sc. (Hons) in Statistics *†;
- B.Sc. (Hons) in Applied Mathematics and Statistics *†;
- B.Sc./M.A. (Hons) in Mathematics and Statistics *†;
- B.Sc. (Hons) in Pure Mathematics and Statistics[^] [new in 2008-09];
- B.Sc. (Hons) in Accounting and Statistics [new for entrants in 2008-09];
- B.Sc. (Hons) in Finance and Statistics [new for entrants in 2008-09];

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- B.Sc. (Hons) in Geography and Statistics [new in 2008-09];
- B.Sc. (Hons) in Business & Management and Statistics;
- B.Sc. (Hons) in Business Economics and Statistics;
- B.Sc. (Hons) in Computing Science and Statistics;
- B.Sc. (Hons) in Economics and Statistics;
- B.Sc. (Hons) in Mathematical Sciences;
- B.Sc. (Hons) in Psychology and Statistics.

All of the above programmes were paralleled by three-year BSc (designated) degrees. An additional three year BSc (designated) degree was also available:

- B.Sc. Mathematical and Statistical Studies;
- B.Sc. Psychological and Statistical Studies.

In addition to the Level 1 and 2 provisions, for students in Science, Arts and Social sciences, the Department contributes to the following undergraduate programmes:

- Service teaching for the Department of Psychology;
- Service teaching for the Faculty of Biomedical and Life Sciences.

Although the Department does not offer a taught M.Sc. programme, it contributes to the following postgraduate programmes offered with other departments or other institutions:

- Service teaching for the Section of Public Health & Health Policy;
- Service teaching for the Faculty of Biomedical and Life Sciences
- Service teaching for the Faculty of Engineering;
- Scottish Mathematical Sciences Training Consortium (SMSTC).

Programmes marked with a dagger (†) are available as faster route degrees and programmes marked with an asterisk (*) are currently accredited by the Royal Statistical Society (RSS). The SER stated that all of the remaining Honours programmes would be considered at the next RSS accreditation scheduled for 2011 (to be confirmed) and that informal feedback had indicated they were expected to meet the criteria. The Review Panel **commends** the accreditation of programmes by the RSS for the courses undertaken by the majority of students.

The Review Panel **commends** the wide ranging and challenging suite of programmes offered by the Department, which is one of only a few UK departments which continue to offer a Single Honours degree in Statistics.

3. Overall aims of the Department's provision and how it supports the University Strategic Plan

- 3.1 The Review Panel was satisfied that the aims of Department's provision, as detailed in the SER, were appropriate and supported the University's Strategic Plan. In particular, the Panel considered the Department's approach to enquiry-based learning and integration of research-led teaching, with a strong emphasis on the development of graduate attributes, to be closely linked to the University's Learning and Teaching Strategy.
- 3.2 The SER stated that provision at Levels 1 and 2 was in part preparation for entry to Honours degrees, but also offered an introduction to the subject area for students making their choice of programme. Given the lack of experience of statistics at school level, most students were recruited via the Faculty entry system, so this introduction was crucial to the overall success of the recruitment of students to the Department. At Levels 3 and 4, course aims were more focused and specialised, with a greater emphasis on the practical application and interpretation of statistical methods.
- 3.3 The Review Panel noted the substantial service teaching provision, which aimed to introduce students to the concepts and tools of statistical methods used within their own disciplines, and to develop their skills in the practical application and interpretation of sets of data. Given that the majority of this provision was aimed at Psychology students, the Review Panel was keen to explore the Department's views regarding future provision in the new University structure. The Department acknowledged that the current commitment to the Department of Psychology was significant and confirmed they were considering diversifying into other subject areas, which included Bio-medical and Engineering. However, discussions around tailoring a more focussed provision for Psychology students were ongoing, and staff members were hopeful that they would continue to further cement this relationship.

4. An Evaluation of the Student Learning Experience

4.1 Aims

The Review Panel was provided with details of the programme aims as part of the SER and noted that all took account of the QAA benchmark statement for Mathematics, Statistics and Operational Research (MSOR), the RSS accreditation criteria and the Scottish Credit and Qualifications Framework (SCQF) and were clearly communicated to all students via course handbooks and the MOODLE site. The Panel considered that the programmes fitted well with the MSOR requirement for programmes to be characterised by a blend of methodology (or theory) and applications, and highlighted the cumulative nature of learning in the subject.

4.2 Intended Learning Outcomes (ILOs)

- 4.2.1 The Review Panel noted that statements of course-level Intended Learning Outcomes (ILOs) were provided to students via the course handbooks and through the MOODLE site.
- 4.2.2 The SER indicated that, at Honours level, the ILOs were designed to provide coverage of statistical methods in terms of depth and scope. ILOs were reviewed as part of each course team's annual review meetings and any amendments were finalised and approved at the Learning and Teaching Committee. The Review Panel

was pleased to note that all teaching staff (including GTAs), student representatives and the external examiner had the opportunity to feed into the process.

4.3 *Assessment, Feedback and Achievement*

Code of Assessment

4.3.1 The Review Panel noted from the SER, the Department's acknowledgement of the University's Code of Assessment (CoA) but sought clarification about the use of percentage marking and the rounding of aggregation scores. The Head of Department reported that numerical based examinations and other assessments were marked on a proper percentage scale. In sub-Honours courses, all assessment was of this kind; individual marks were weighted in accordance with the published assessment scheme and aggregated to give final percentage marks which were then converted to grades and bands in accordance with the verbal descriptors in Schedule A of the University-wide CoA (2003). At Honours level, the same system was used to determine aggregation scores for individual courses (with the exception of the Honours Project, which was marked directly on the basis of a grade and band). The final Honours class was determined by averaging these aggregation scores, as laid down in the CoA, though, in order to inform discussion at the Examiners' Meeting, the Department did operate a parallel system of aggregating all the proper percentage scores before converting the weighted total to an overall aggregation score at the end. The Panel noted that External Examiners had previously raised concerns (2007-08 and 2008-09) in relation to the practice of converting individual percentage marks to aggregation scores, due to the capricious effect of combining multiple grading: an effect that could potentially disadvantage candidates and increase staff members' workload. The Head of Department pointed out that the CoA appeared to give the Department no alternative to its current method of aggregation at Honours level, since individual grades and bands for Honours courses were published, but he reassured Panel members that the parallel system was helpful for avoiding unfairness in borderline cases.

Assessment methods

4.3.2 The SER referred to a wide range of assessment methods employed by the Department to measure the achievement of the breadth of abilities detailed in the ILOs. The Review Panel was particularly interested to learn that assessment methods included: open-ended approach to specifically address higher level practical and investigative skills required (in particular the Analysis of Data courses); mock practical examinations to aid students in their preparation for end-of-course examinations; continual assessment for two of the Honours courses and through the laboratory reporting requirements across all Levels; and the introduction this session of fortnightly homework exercises to Level 2 probability courses. Undergraduate students spoke positively about the fortnightly assessment exercises, which they felt consolidated learning of a 'difficult' subject, increased their confidence in terms of examination preparation and contributed to their final assessment. The Review Panel was pleased to note that previous concerns expressed by the DPTLA review in 2004 regarding the need for an appropriate balance between coursework and examinations, had been satisfactorily addressed by the Department.

Feedback on Assessment

4.3.3 The Review Panel noted from the SER that there were a range of opportunities for timely formative feedback to students. In light of the large increase in recruitment to Statistics 1Y in the current session, the Panel was keen to explore with staff and students if this had affected the Department's stated aim to return feedback within a two-week period. Undergraduate students who met with the Panel reported feedback

had been satisfactory, although for Levels 1 and 2 there could have been more consistency between lecturers, and for Levels 3 and 4 some assessments had taken more than three weeks to be returned, which they felt had impacted negatively on other assessed work. Staff members conceded that there were challenges relating to the promptness and the level of detail of assessment feedback, due to the logistics of teaching larger student numbers and the effective shortening of the academic year (discussed further in the following section 4.3.4). The Head of Department confirmed that the Department was aware of the issues and was working continuously to improve the situation. The Panel **recommends** that the Department continues its plan to review assessment feedback processes and to improve the timescales for and quality of the feedback provided to students. The Department should seek the support and guidance of the Learning and Teaching Centre at an early stage of its review.

Impact of Changes to the Structure of the Academic Year

4.3.4 Undergraduate students, who met with the Review Panel, raised some issues in relation to timetabling, following the restructuring of the academic year in 2008-09. Students with experience of the previous structure reported some negative effects of the subsequent changes which included: shorter teaching period; reduced period of study available for the December examinations; more concentrated examination period and the dropping of class tests. Overall students felt that the new system favoured certain learning styles, like rote learning, and disadvantaged weaker students, who had benefited from class tests and extra time afforded for study. Teaching staff shared these concerns, particularly in relation to the probability courses, which traditionally students had found the most challenging. It was noted that due to timetabling clashes with the Department of Psychology, the teaching period had been further compressed to ten weeks this session and that the last examination had been scheduled at 6.00pm on 19 December 2009. This was considered by staff and students to be too close to the Christmas holiday, making it more difficult for students to travel home. The Head of Department reassured the Panel that despite the challenges arising from structural changes to the academic year, examination results had not been negatively impacted and the Department would continue with its efforts to ensure students were given due notice of examination scheduling, to maximise the effectiveness of their study time.

Curriculum Design, Development and Content

Ethical Considerations

4.4.1 It was noted from the SER that the ability to understand and operate ethical guidelines were essential requirements for professional statisticians, and that these skills were developed through many of the courses within the degree programmes offered by the Department. The Review Panel members were keen to explore with the Head of Department if and how students were encouraged to discuss and debate ethical considerations. The Head of Department reported that ethical considerations were specifically addressed in the Biostatistics course for Single Honours, and although students were provided with detailed guidance, there was limited opportunity for active debate. There was a suggestion from the Panel that this could be usefully included in the week-long student induction for Honours students going on to Level 3 and the Panel encouraged the Head of Department to liaise with staff and students to consider the inclusion of appropriate learning opportunities to promote and facilitate active participation of students in relation to ethical issues.

Employability

4.4.2 The SER indicated a national shortage of statisticians and first employment destination statistics included in the documentation, and that 96% of the responding First Degree leavers for 2006-2009 were in employment or further study, using subject-specific and/or generic skills from their degree programme. Undergraduate students who met with the Review Panel confirmed that the Department's employability strategy was well embedded within the curriculum and sustained across all Levels. In particular, Panel members were interested to hear about a series of short talks given by graduates on their job experiences, which students had found stimulating and motivational. The Department also utilised its numerous research resources to offer career development opportunities through summer projects, which included Biotechnology and Biological Sciences Research Council and the Nuffield and Carnegie Undergraduate Research Schemes. The Review Panel **commends** the Department's concern for, and awareness of employability of its graduates, which it promotes through its strong links with potential employers.

Work Placements

4.4.3 The Review Panel was pleased to note that during each of the last four sessions the Department had supported one final year student to present their summer placement experience at Universitas 21 International Conferences, reflecting the Department's commitment to the development of graduate attributes. Given the Department's excellent research contacts, the Panel was therefore somewhat surprised to find that participation in longer, year long placements was limited to only one or two students a year. The Head of Department acknowledged that work placements provided an excellent opportunity to gain experience of alternative programmes and larger datasets but identifying and securing the support of suitable organisations had proved challenging. The Department recognised that there was potential scope to develop the MSci provision to include a work placement at Level 4, which might be more attractive to prospective students. This view was confirmed by students who met with the Panel. It was noted that the Department was keen to utilise contacts made by other departments and was currently liaising at Faculty level and externally with Information Services Division and Scottish Government. The Head of Department reported that colleagues were very receptive to the proposal and that the Department was currently progressing plans to introduce work placements at Level 4 by 2011. The Review Panel **recommends** that the Department continues to develop the variety of work placement activities available for students, which draw on the research strengths of the Department, enhance learning and employability and enrich the student learning environment.

Student Ambassador Scheme

4.4.4 In light of the substantial number of B.Sc. graduates proceeding to a Postgraduate Diploma in Education and the relative lack of exposure to statistics in the school curriculum, the Review Panel was interested to know the Department's views on the Student Ambassador Scheme, which is organised through the Recruitment and International Office, to facilitate student interactions with pupils in local schools. The Head of Department confirmed that the Department was aware of the initiative but had ruled out getting involved meantime. It was important that students were not overloaded in their final year, but it was considered vital for students graduating with a degree in Statistics to undertake a project so there was no room for a classroom placement as well. The Ambassador Scheme might be more appropriate for some students in the Combined Honours programmes with Mathematics, but this had not been pursued so far. The Review Panel encouraged the Department to continue to explore ways of promoting and contributing to the Student Ambassador Scheme.

Plagiarism

- 4.4.5 The Review Panel took the view that the Department's efforts to combat plagiarism were sensible and appropriate. However, students and staff members who met with the Panel raised an issue in relation to the availability of the Self-Declaration of Originality forms, which were sometimes in short supply and could potentially delay submission of assessments. There was a suggestion that the form could be accessed through the MOODLE site but the students were concerned that the extra paper sheet was wasteful of resources. The Review Panel agreed that advice would be sought from the Senate Office to ascertain if the wording might be incorporated within the departmental title page to minimise wastage. The Senate Office confirmed that departments are permitted to customise the Self-Declaration of Originality form, as long as the wording remained unaltered.

Curriculum development

- 4.4.6 It was noted from the SER that minor course changes were proposed by course teams in response to student, staff and external examiner feedback, on an annual basis. More substantive curricula reviews took place on a six or seven year cycle. Review groups were appointed by the Head of Department and reported to the departmental Learning and Teaching Committee and to the Staff Meeting. Reviews took cognisance of a wide range of evidence which included evolving staff research interests and experience elsewhere and the Department's interaction with external bodies such as: the Scottish Qualifications Authority; the RSS; the Higher Education Academy MSOR Network and outcomes of the National Student Survey. The Review Panel was pleased to note the inclusive approach taken by the Department but was concerned how this impacted on staff workloads, particularly for probationary members of staff. However probationers who met with the Panel explained that the review systems employed provided flexibility and responsiveness and were not perceived as a burden on workload but worthwhile and valued.
- 4.4.7 The issue of potential overlap between Levels 1 and 2, a consequence of allowing direct entry to Level 2 Statistics to students who had satisfactorily completed Mathematics Level 1 but not necessarily Statistics Level 1, and the 'largely cumulative' nature of the subject, was described by the Head of Department as an ongoing challenge, and the Department was continuing to address this problem in the latest round of course revision. It was noted that Level 1 and 2 courses were taught differently with a more axiomatic and mathematical approach at Level 2. The Head of Learning and Teaching reported that this year the Department had brought forward some more advanced ideas to first semester, Level 2 courses. She indicated that the Department would consider changing its long-standing policy of allowing direct entry to Level 2 if growth of student numbers at Level 1 was sustained. It was also suggested that a possible upside of University restructuring could be a more rationalised approach to student recruitment, which might include more statistics in the Level 1 and 2 curricula of all students intending to pursue Mathematics degrees.

4.5 Student Recruitment

Undergraduate students

- 4.5.1 A significant increase in student numbers recruited to Level 1 (from 80 to 130 students) this session was noted and the Review Panel was keen to explore how this had impacted on the Department. The Head of Department explained that the Department had been in the fortunate position to recruit a qualified teacher at

relatively short notice, who had assisted with laboratories and tutorials. He confirmed that the Department had a proactive recruitment strategy that had been greatly enhanced by the appointment of a young female Statistics alumnus, who had brought a fresh, enthusiastic perspective and liaised with fellow staff members to 'modernise' recruitment methods and target publicity materials at the 16/17 age-group, given their limited exposure at schools. The Panel was pleased to note that the strategy was effective. Concern was raised in respect of the ability of the Department to sustain a high standard of provision across all Levels. Staff members who met with the Panel confirmed that there was sufficient capacity at present but if growth was sustained it would be problematic. Fluctuations in student numbers were always challenging but in particular for Level 3 and above, which required consistent and appropriate learning support for practical and project work. Teaching staff were also reluctant to take on more supervision than normal due to concerns in respect of potential changes to the management structure. It was noted that the Department had considered commencing project work for Combined and Single Honours at the beginning of Level 4 to spread the load. The Review Panel **commends** the Department's ability to effectively mobilise resources to maintain a high standard of provision despite significant increase in student numbers at the start of 2009-10.

Postgraduate Provision

- 4.5.2 It was noted that relatively low numbers of students had progressed to MSci in the last few years. The Head of Learning and Teaching reported that funding was the key issue and that the Departmental strategy involved recruiting excellent B.Sc. Honours graduates to the M.Sc by Research, which was more likely to attract funding. Potential future sponsorships via departmental research links had been identified to support postgraduate study.
- 4.5.3 The SER reflected upon the recommendation from the previous review in 2004 for taught postgraduate provision. It was noted that a review was ongoing and that the current provision had been relatively successful in attracting high calibre students who could then be recruited into research, with stronger students progressing directly to PhD programmes and others to specialist MSc courses. Review Panel members asked whether the Department had explored the feasibility of utilising existing courses from MSci programmes. The Head of Department reported that the MSci had a strong research base and potentially there might be only four 10 credit courses available and due to the large range of combined programmes, it was anticipated that scheduling would be problematic. Staff members were also reluctant to incur capital costs because of the perceived risk of negative impact on staff workloads within an uncertain climate. It was noted that senior staff felt under considerable pressure, in terms of extra load carried for new lecturers, who were on reduced teaching loads and needed mentoring. However staff members acknowledged that there was a national lack of taught MSc programmes in Statistics, with the University of Lancaster being the nearest institution, and that a merged school might offer increased flexibility to minimise perceived risks.
- 4.5.4 The Dean was supportive of taught postgraduate provision, which he regarded as a major opportunity to both unify with the Department of Mathematics and feed into other research areas across the University, and from which the Department could gain strength. He encouraged the Department to be open to a wide range of options, making use of core modules and considerable experience gained from its service provision. The Head of Department reported that the Department, cognisant of the impact on staff workload, continued in the process of identifying potential inter-departmental (i.e. Biomedical Sciences) and external collaborations to attract high

quality students. The Review Panel **recommends** that further consideration be given to the possibility of expanding provision into the taught postgraduate area with a view to establishing an MSc in Statistics and joint MSc in areas of mutual interest.

4.6 *Student Progression, Retention and Support*

Attendance Monitoring

4.6.1 The Review Panel noted that student attendance was monitored routinely in tutorials and laboratories and for some lectures (Level 3 and 4). Absences were monitored and coordinated by the Teaching Administrator, who liaised with academic Heads of Courses. The Panel learned that students identified as at risk were initially contacted informally by email, to clarify the problem and encouraged to meet with their Adviser of Studies and/or referred to appropriate University support services. The Review Panel considered that the Department's proactive approach to identify and support students with attendance problems was laudable.

Support

4.6.2 The Review Panel considered the Department's commitment to small group teaching in the early years of degree programmes was important in a cumulative subject area. Staff and students who met with the Panel were asked how the Department had coped with the recent increase of Level 1 students, in light of their commitment to small tutorial groups and medium sized laboratories. The Review Panel was impressed to learn that the Department had responded effectively and efficiently to an increased demand and that provision had not been adversely affected. Students were very enthusiastic about the tutorials and laboratories, which they considered effective mechanisms to consolidate and develop lecture themes. The Review Panel **commends** the Department for its effective and valued tutorial and laboratory provision.

4.6.3 It was noted from the SER that all undergraduate students were encouraged to seek summer placements and that language and other training and support were readily available. Students who met with the Review Panel reported that, in general, the Department provided very good support but felt that the preparatory process would benefit from the provision of more detailed information on living conditions and cultural aspects. It was suggested that previous placement students could usefully disseminate their experiences. The Panel was satisfied that the level of support provided by the Department was appropriate and encouraged the continued development of training and support for work placements.

4.6.4 The Staff: Student Liaison Committee (SSLC) minutes and the National Student Survey results indicated widespread student satisfaction of staff support. The pastoral care provision by the Adviser of Studies was explored further with the undergraduate students and was described as supportive, reactive to their needs, and highly accessible with 'an open door policy'. The Review Panel **commends** the Department on exemplary feedback on staff support as confirmed by undergraduate students and GTAs who met with the Panel. Some students felt that more information could be provided regarding other University support services but on the whole got help when they needed it. The Review panel encouraged the Department in the promotion of relevant support services, including the Student Representative Council, Recruitment and International Office and Language Centre.

4.7 *The Quality of Learning Opportunities*

- 4.7.1 The SER had described how heavy involvement in interdisciplinary research and applications had impacted on teaching. Undergraduate students who met with the Review Panel reported that the Department's teaching provision was of a very high quality and they valued the more modern approach: problem-solving in real life contexts; innovative teaching (see paragraph 4.7.2); smaller class sizes; open door access; and informal use of forenames, which they maintained enhanced the learning experience. The Review Panel **commends** the Department's emphasis on enquiry-led learning, effectively and enthusiastically delivered by committed research active academic staff, reflecting a strong tradition of multi-disciplinary research of international renown.

Innovation in Teaching

- 4.7.2 The Review Panel was pleased to note examples of innovation in teaching and in particular the development of the web-based quiz system, which provided students with context-sensitive informative feedback on the Statistics 1C course, and rpanel, an interactive graphics package which facilitated teacher's ability to interface with the standard statistical computing environment. This was confirmed at the meetings with staff members and students, who rated the experience very highly and that rpanel improved the learning of more difficult concepts. The Panel was pleased to note that these initiatives had attracted widespread external interest and publicity and the Department planned to roll out the quiz to Level 2 which, it was hoped, would alleviate the marking burden. The Review Panel **commends** the Department's committed approach to the student learning experience that includes many examples of good practice and innovation in the delivery of teaching, learning and assessment in a mathematically intensive environment.

Internationalisation

- 4.7.3 The Review Panel was interested to meet with incoming Erasmus students, who were included in the group of undergraduates who met with the Panel. They identified the Department's reputation and research links as the main motivating factors in their choice of destination for study abroad. The Panel was pleased to note that a member of staff had been a former Erasmus student and that the Department had an effective proactive internationalisation strategy for incoming student mobility.
- 4.7.4 It was noted that only a few students had made reciprocal visits abroad and the Panel explored with the Head of Department, staff members and students how the Department encouraged and supported students for study abroad. The students identified cost and language considerations as the main deterrents and suggested there could be more flexibility in terms of shorter-term outgoing study trips, more effective advertising of study abroad opportunities and increased guidance and support regarding pragmatic issues such as accommodation. It was noted that the Department could usefully tap into the experience of incoming Erasmus students to help address practical challenges. The Head of Department confirmed the importance of accrediting outgoing experience and the need for assessment parity. It was noted that the issue was being considered at Faculty level, that faster route programmes were already in place and that the Department was currently negotiating new European partnerships for study abroad, including La Grande Ecole de la Statistique et du Traitement de L'Information and a new Double Degree with the University of Bologna, which included an agreement that courses would be taught in English. The Review Panel **commends** the Department's strong links with the University of Bologna. The Review Panel **recommends** that the Department continues to progress internationalisation plans in the promotion, support and

facilitation of outgoing student mobility, which would include consideration of the viability and appropriateness of shorter term study abroad.

4.8 Resources for Learning and Teaching

Departmental Management

- 4.8.1 It was apparent to the Review Panel that restructuring was the most pressing issue facing the Department, in light of reduced funding following the 2008 RAE outcome and the future merger with the Department of Mathematics into the School of Mathematics and Statistics. Specific concerns related to: the potential loss of the Department's unique identity and the need to maintain the broad range of current provision, and in particular the Single Degree; reduced staffing complement as evidenced by experience elsewhere, whereby Edinburgh and Dundee Universities had adopted a school structure and lost staff; the need for a Subject Head to acknowledge that the subject area was a distinct discipline in terms of theory and application within the broader framework of mathematical sciences; and accreditation implications. Students who met with the Panel strongly identified with the Department's ethos of an informal, close knit community and were worried that the atmosphere would be diluted. Staff members wanted clarity as the School moved forward, in terms of future role and how this fitted in with other teaching duties, to avoid disparities in terms of teaching and research activities. It was noted that the Department was monitoring the developing model with unease although, on a more positive note, the merger would provide an opportunity to get to know the staff in Mathematics. The Dean confirmed that the college issue was under discussion and that there could be potential benefits to Statistics, in terms of increased student numbers and shared resources. The Dean confirmed that he was open to a Head of Subject role, as it was important to have mechanisms that recognised and maintained the unique identity of the discipline. Whilst he acknowledged the Department's distinct and separate identity, he hoped they would collaborate in a merged School. The Review Panel recognised that it was of paramount importance to maintain the iconic identity of the Department and the Single Honours degree and **recommends** this be taken into account during the restructuring process to retain a Head of Subject.
- 4.8.2 Another major issue raised by staff members who met with the Panel concerned potential changes in staff roles, in terms of the ability of the Department to maintain research activity of staff and the capacity to deliver at current levels. There was deep concern that the new structural process might dilute efforts if there were staff movements to Research Institutes. The Dean confirmed that there was not yet a clear understanding of how Research Institutes would be constituted or how they would interact with subject areas. It was noted that discussions were ongoing but current thinking suggested there was not an appetite for research institutions as hard-wired self-funded units. The Review Panel, cognisant of the University's goal to be a leader in research-led teaching, **recommends** the Head of School ensures the active participation of all teaching staff in their areas of research strength, regardless of the structure that might develop as the University reorganises.

Staff Workload

- 4.8.3 The Review Panel noted that the staff workload model was unevenly distributed and did not include details of research leave. The Head of Department explained that the workload model employed had not recognised time spent on research and consultancies and so was not an accurate representation. It was noted that despite relatively small staff numbers, the Department had a well-developed system that typically allowed each member of staff research leave for six months in a seven year

period. The SER had stated that the current staff: student ratio was 'rather high' at approximately 1:17 and had identified a number of factors that negatively impacted on staff workload, which included: smaller teaching ratios of tutorials and laboratories; flexible and intensive student support policy; the burden of redistributed load and mentoring four probationers out of a total of fourteen academic staff members. It was noted that there would be further pressure on staff workloads with forthcoming retirements and known difficulty of recruiting in the subject area.

- 4.8.4 Staff members who met with the Panel reported that the administrative staff had a pivotal and vital role liaising between staff and students and providing an essential overview that facilitated the effective and efficient organisation in the management of the Department. The Head of Department was determined that the provision remained student facing and hoped that the provision was close to the current level in the new University structure. The Dean reported that the issue of administrative support was being considered at University level and although he was aware that some functions would be centralised, the broader structure would ensure consistent cover. The Review Panel was impressed with the level and quality of support provided by the Department's administrative support, including two administrators and two secretarial staff, which enhanced academic performance and **recommends** that this level of support be maintained in the future model of a merged school.

Succession management

- 4.8.5 The forthcoming retirement of the holder of the Chair of Statistics, a research leader of international standing, was viewed by the Department as a crucial staffing issue, a concern shared by the external Panel member. The future merger with the Department of Mathematics presented significant challenges in relation to the maintenance of the integrity and research reputation of the Department, compounded by reported further pressures to meet a Faculty requirement for reduction in staff costs. The Head of Learning and Teaching explained that, in filling the Chair, it was vitally important to maintain a balance between methodological and applied research. Staff members anticipated that this would not be an easy appointment, given the timescale (18 months) and small number of statisticians currently circulating for recruitment. The Head of Department reported that they were progressing plans to bring forward appointment and early indications were that there was some support at Faculty level. It was noted that the Department was awaiting a response from the Scottish Funding Council, in terms of future funding allocations which would influence the outcome in respect of future appointments. The Dean acknowledged that it was important to maintain the iconic status of the Department and confirmed that the appointment of the Chair in Statistics would be included, as a matter of priority, in current college/school plans. The Review Panel **recommends** that longer term succession management planning should take account of the national shortage of statisticians and bring forward plans for the appointment of the replacement Chair in Statistics.

- 4.8.6 The Review Panel had noted from the SER the high workload of the Head of Department, who sat on all of the Departmental committees. The Head of Department reassured Panel members that, in preparing to become Head of Department, he had relieved himself of external responsibilities including committee convenor-ships.

Probationary Staff

- 4.8.7 Three members of the Review Panel met with four probationary members of staff, who reported that they had integrated well with other staff members, whom they

regarded as friendly, and they were supportive of the culture of the Department. Interactions with students were also viewed very positively, who in their view responded well to the less formal and innovative teaching styles, which characterised the Department's ethos. It was noted that: formal and informal arrangements for mentoring were appropriate and consistent over the period of probation; workloads were reasonable and took account of training requirements; there were opportunities for curriculum development/reviews and participation in Departmental level decisions.

- 4.8.8 Probationers were less enthusiastic about the New Lecturer and Teacher Programme (NLTP), although the practical elements of the training, such as the peer observations and the assessment exercises were valued and seen as worthwhile. Overall the NLTP was considered too generic and did not justify the time and effort spent on it. By comparison, a two day training event organised through the MSOR Network was reported as relevant and stimulating. Furthermore part of the HEA subject centre was located in the Department. Staff members were reassured that the Learning and Teaching Centre (LTCentre) was aware of specificity concerns, which had been addressed in a recent review of the provision and it was hoped that improvements would filter down in time. The Head of Department reported that he was also aware that the Royal Statistical Society Centre for Statistical Education ran a Diploma course which included a portfolio, which might also offer appropriate training. The Dean confirmed that the issue of the NLTP provision would need to be addressed at College level. In view of the concerns raised by probationary staff, the Review Panel **recommends** that there be detailed discussion at College level and with colleagues in the Learning and Teaching Centre, to consider the relative merits of and recognition of more specific and suitable probationer training for Statistics staff, to replace certain aspects of the generic New Lecturer and Teacher Programme.

Graduate Teaching Assistants

- 4.8.9 The Review Panel met with 25 postgraduate research students and postdoctoral researchers who had taken on roles as Graduate Teaching Assistants (GTAs). They confirmed that two of the GTAs were contracted as part-time teaching assistants with a more developed role but most were involved in tutorials, laboratories, invigilation and some marking. It was noted that GTAs were restricted to Levels 1 and 2 and limited to six hours a week to ensure that their duties did not detract from their research.
- 4.8.10 The GTAs who met with the Panel confirmed that, in addition to the statutory training provided by the LTCentre, they had received excellent support by course/laboratory coordinators, which was appropriate to their experience and specific to their roles. The Panel noted that students were shadowed by teaching staff during their first year, gradually developing more responsible roles by Level 2. The GTAs confirmed that they were represented on the relevant committees and that the Department encouraged feedback. There was a sense that they were listened to, and able to effect change. Staff reported that in response to a recent issue highlighted by the GTAs which involved the self-instruction of the document preparation system LaTeX, the Department intended to formalise support with away-days planned for later in the 2009-10 session.
- 4.8.11 The Review Panel was pleased to note that the GTAs whom they met reported that they had received excellent support from the Department including: regular emails detailing graduate opportunities, useful contacts/ mailing lists; presentations by ex-graduates; help with publishing papers and attending conferences. It was also noted that GTAs met regularly and socialised as a group and with staff members on a formal and informal basis. The Review Panel **commends** the informal and

supportive approach by the Department to its staff and students, inculcating a warm and friendly atmosphere that encourages social interaction.

Computer Laboratories

4.8.12 Undergraduate students, who met with the Review Panel, highlighted an issue in relation to access to the Computer Laboratories, due to heavy use by timetabled classes and the requirement for a member of the teaching staff to be present when students were using two of the laboratories. It was noted that students in Level 1 courses were given a list of accessible hours at the start of the semester, which typically involved seven hours use per week with staff or GTA support, although this was considered insufficient for students seeking to work on projects and assignments. Students confirmed that datasets could be remotely accessed but did not include the full set of functions. Students in courses from Level 2 upwards had access to one of the computing laboratories in the Mathematics Building whenever it was not being used for timetabled classes; this included out-of-hours access for Honours students. The issue was explored during the meeting with GTAs who suggested that the Department could consider issuing key fobs giving access to the other computing laboratories to Level 3/4 students and/or install Closed Circuit Television monitors, to increase access. The Head of Department confirmed that the Department had already taken restorative measures by re-locating some teaching, to free up an additional four to five hours a week, but acknowledged that access was still problematic. The Review Panel **recommends** that the Department liaises with the Mathematics Information Technology Committee, in a review of shared resources to maximise student access to the computer laboratories; this meets increasing demand, particularly for students undertaking research.

Disabled Access

4.8.13 During a tour of the Department, the Review Panel was encouraged to note the recent installation of an electronic chair ramp but was concerned that there were no fire evacuation chairs available for the stairwells. The Teaching Administrator, who acts as the departmental Disability Coordinator with the Student Disability Service and departmental academic staff, confirmed that fire evacuation chairs had not yet been provided from Estates and Buildings, although two members of staff had been trained in their use. The Review Panel referred the matter to the Senate Office who duly sought advice from Mr David Mclean, Deputy Director, Safety and Environment Protection Service (SEPS) and Ms Shona Robertson, Senior Student Disability Adviser, Student Disability Service. The Panel encouraged the Department's Disability Co-ordinator to continue to liaise with SEPS and if appropriate Estates and Buildings, to resolve the issue as a matter of priority [Clerks note: Fire Evacuation Chair now in situ].

Departmental Website

4.8.14 Although it was not discussed during the Review visit, the Panel **commends** the Department on their website, which was informative, easy to navigate and featured a video, aimed at prospective students, which included testimonials from current and alumni students describing their experiences as a student in the Department of Statistics.

5. Maintaining the Standards of Awards.

External Examiners' Reports

- 5.1 The External Examiner's reports, which were included in the supporting documentation, indicated widespread satisfaction with the Department's teaching, particularly of practical Statistics, and that students were 'privileged to have access to well-constructed courses and a wealth of topics in projects and case studies, and they benefit from the evident effort and care devoted to the application of Statistics by teaching staff'. However, Review Panel members were concerned about perceived students' weakness, in relation to students' understanding of the more abstract aspects of probability theory and, albeit to a lesser extent, the logic of simple statistical inferences. The Head of Department conceded that the effective student engagement in teaching of theoretical skills presented specific challenges, compounded by dual entry level in terms of cumulative learning of the subject and the potential risk of de-motivating and losing students. However Panel members were reassured that the Department continued its efforts to embed these essential skills within the curricula, with the recent introduction of workshops at Level 2, featuring increased student support, which had contributed to subsequent improvement in examination results. The Review Panel was cognisant that this experience was shared with other Higher Education Institutes and confident that the Department would continue to develop courses to ensure optimal student learning experiences and specifically in relation to the teaching of probability theory and the logic of statistical inferences.

6. Assuring and Enhancing the Quality of the Students' Learning Experience

Student Feedback

- 6.1 The Review Panel took the view that the Department operated robust mechanisms for maintaining the effective delivery and high quality of its teaching, by responding quickly and effectively to student feedback and that the recommendation of the 2004 DPTLA Review to report back to the student body details of action taken, consistently and timeously, had been followed.
- 6.2 It was noted from the documentation that the student feedback questionnaires had mostly been very positive despite a low response rate, which the Department intended to address. Although student feedback questionnaires were not discussed on the day of the review, Panel members welcomed the inclusion of separate questionnaires to assess students' project experiences and encouraged the Department to also consider the inclusion of student feedback on work placements in future.

Staff: Student Liaison Committee (SSLC)

- 6.3 The Review Panel was pleased to note from the supporting documentation that lines of communication between staff and students were functioning in an open and efficient manner with regular meetings of the SSLC. Undergraduate students who met with the Panel confirmed that the SSLCs were functioning effectively and that relatively minor issues raised had been dealt with expeditiously. The Panel also took the view that having a SSLC student Convener was a reflection of the level of commitment and enthusiasm between student representatives and the Department.

7. Summary of Perceived Strengths and Areas for Improvement in Learning and Teaching

Key strengths

- Wide ranging and challenging suite of programmes offered by the Department, which is one of only a few UK departments which continue to offer a Single Honours degree in Statistics;
- Accreditation of programmes by the Royal Statistical Society for the courses undertaken by the majority of students;
- Research-led teaching with an emphasis on enquiry-led learning, reflecting a strong tradition of multi-disciplinary research of international renown;
- Committed approach to students' learning experience that includes many examples of good practice and innovation in the delivery of teaching, learning and assessment in a mathematically intensive environment;
- Exemplary feedback by undergraduates and GTAs on staff support;
- Effective mobilisation of resources to maintain high standard of provision, despite significant increase in student numbers at the start of 2009-10;
- The Department's concern for, and awareness of employability of its graduates, which it promotes through its strong links with potential employers;
- Strong links with the University of Bologna;
- Valued and effective tutorial and laboratory provision;
- Informative, easy to navigate website that included a video on student experiences;
- The informal and supportive approach by the Department to its staff and students, inculcating a warm and friendly atmosphere that facilitated social interaction.

Areas to be improved or enhanced

- Retention of Head of Subject in new University college/school structure;
- Maintenance of teaching in areas of research strength in new structure;
- Provision of postgraduate taught programmes;
- Maintenance of current administrative staff support;
- Feedback on assessment;
- Succession management: Chair of Statistics;

- Introduction of MSci with work placement;
- Internationalisation: promotion and support of out-going student mobility;
- Relevance of certain aspects of probationary training;
- Maximise student access to the computer laboratories.

Conclusions and Recommendations

Conclusions

Members of the Review Panel enjoyed their visit to the Department of Statistics, where arrangements made for their comfort and the conduct of the meetings were exemplary. The Panel was impressed by the dedication and progressive attitude of staff and graduate teaching assistants within the Department, and with the focus on research-led teaching. The undergraduate students who met with the Panel were enthusiastic and very positive about their learning experience and the sense of community fostered by the Department. A number of recommendations have been made to support staff in enhancing the quality of the student experience and the management of teaching and learning in the Department.

Recommendations¹

The recommendations interspersed in the preceding report are summarised below. It is important to note that the majority of these recommendations refer to issues identified by the Department for action either prior to the Review or in the SER. The recommendations have been cross-referenced to the paragraphs in the text of the report to which they refer and are not ranked in any particular order.

In light of the restructuring of the University, recommendations have been redirected to the appropriate designates. Please note that the text of the recommendations has not been updated.

University Restructuring

Recommendation 1

The Review Panel recognised that it was of paramount importance to maintain the iconic identity of the Department and the Single Honours degree and recommends this be taken into account during the restructuring process to retain a Head of Subject [*paragraph 4.8.1*].

For the attention of: **Head of School of Mathematics and Statistics**
and **Dean (Learning and Teaching), College of Science and Engineering**

¹ Recommendations will be re-directed, as appropriate, once roles in new University structure have been finalised.

Recommendation 2

The Review Panel, cognisant of the University's goal to be a leader in Research Teaching, recommends the Head of School ensures the active participation of all teaching staff in their areas of research strength, regardless of the structure that might develop as the University reorganises [*paragraph 4.8.2*].

For the attention of: **Head of School of Mathematics and Statistics**
and **Dean (Learning and Teaching), College of Science and Engineering**

Recommendation 3

The Review Panel recommends that further consideration be given to the possibility of expanding provision into the taught postgraduate area with a view to establishing an MSc in Statistics and joint MSc in areas of mutual interest [*paragraph 4.5.4*].

For the attention of: **Head of School of Mathematics and Statistics**

Recommendation 4

The Review Panel was impressed with the level and quality of support provided by the Department's administrative support, including two administrators and two secretarial staff, which enhanced academic performance and recommends that this level of support be maintained in the future model of a merged school [*paragraph 4.8.4*].

For the attention of: **Head of School of Mathematics and Statistics**

Feedback on Assessment

Recommendation 5

The Panel recommends that the Department continues its plan to review assessment feedback processes and to improve the timescales for and the quality of the feedback provided to students. The Department should seek the support and guidance of the Learning and Teaching Centre at an early stage of its review [*paragraph 4.3.3*].

For the attention of: **Head of Subject**
and **Head of School of Mathematics and Statistics**
and **Director, Learning and Teaching Centre**

Succession Management

Recommendation 6

The Review Panel recommends that longer term succession management planning should take account of the national shortage of statisticians and bring forward plans for the appointment of the replacement Chair of Statistics [*paragraph 4.8.5*].

For the attention of: **Head of School of Mathematics and Statistics**
and **Head of College of Science and Engineering**

Work Placements

Recommendation 7

The Review Panel recommends that the Department continues to develop the variety of work placement activities available for students, which draw on the research strengths of the Department, enhance learning and employability and enrich the student learning environment [*paragraph 4.4.3*].

For the attention of: **Head of Subject**
and **Head of School of Mathematics and Statistics**

Internationalisation

Recommendation 8

The Review Panel recommends that the Department continues to progress internationalisation plans in the promotion, support and facilitation of outgoing student mobility, which would include consideration of the viability and appropriateness of shorter term study abroad [*paragraph 4.7.4*].

For the attention of: **Head of Subject**
and **Head of School of Mathematics and Statistics**

Probationary Training

Recommendation 9

The Review Panel recommends that there be detailed discussion at College level and with colleagues in Learning and Teaching Centre, to consider the relative merits of and recognition of more specific and suitable probationer training for Statistics staff, to replace certain aspects of the generic New Lecturer and Teacher Programme [*paragraph 4.8.8*].

For the attention of: **Head of Subject**
and **Dean (Learning and Teaching), College of Science and Engineering**
and **Director of the Learning and Teaching Centre**

Computer Laboratories

Recommendation 10

The Review Panel recommends that the Department liaises with the Mathematics Information Technology Committee, in a review of shared resources to maximise student access to the computer laboratories; this meets increasing demand, particularly for students undertaking research [*paragraph 4.8.12*].

For the attention of: **Head of Subject**

Appendix 1

Full List of Programmes and additional notes

The Department offers the following Honours degree programmes:

- M.Sci. in Statistics *^
- M.Sci. in Applied Mathematics and Statistics *^
- M.Sci. in Mathematics and Statistics *^
- M.Sci. in Pure Mathematics and Statistics^
- B.Sc. (Hons) in Statistics *^
- B.Sc. (Hons) in Accounting and Statistics [new for entrants in 2008-09]
- B.Sc. (Hons) in Applied Mathematics and Statistics *^
- B.Sc. (Hons) in Business & Management and Statistics
- B.Sc. (Hons) in Business Economics and Statistics
- B.Sc. (Hons) in Computing Science and Statistics
- B.Sc. (Hons) in Economics and Statistics
- B.Sc. (Hons) in Finance and Statistics [new for entrants in 2008-09]
- B.Sc. (Hons) in Geography and Statistics [new in 2008-09]
- B.Sc. (Hons) in Mathematical Sciences
- B.Sc./M.A. (Hons) in Mathematics and Statistics *^
- B.Sc. (Hons) in Psychology and Statistics
- B.Sc. (Hons) in Pure Mathematics and Statistics^ [new in 2008-09]

Those programmes marked * are currently accredited by the Royal Statistical Society (RSS), and are also the courses which are taken by the overwhelming majority of students. An informal approach to the RSS has indicated that all the remaining Honours degree programmes listed above could probably be accredited, and they will be considered when accreditation is next carried out (probably in 2011).

Those programmes marked ^ are available as faster route degrees; this means that students with appropriate qualifications (e.g. Advanced Higher in Scotland, A Level in England, Wales and Northern Ireland) may complete an M.Sci. programme in 4 years or a B.Sc. (Hons) programme in 3 years.

All the above B.Sc. (Hons) programmes, with the exception of the combined degrees with Accounting and Finance, are paralleled by three-year, B.Sc. Designated Degrees that are available as 'early exit' routes to Honours students who decide to leave at the end of their third year (or fail to reach the departmental requirements for progression to final year). The following three-year B.Sc. Designated Degrees are also available:

- B.Sc. in Mathematical and Statistical Studies
- B.Sc. in Psychological and Statistical Studies

In addition, the Department's Statistics 1C course is an integral part of all the Honours and Designated Degree programmes run by the Department of Psychology; a result of Grade D or better in Statistics 1C is a pre-requisite for entry to Level-3 Psychology. The Department also provides a Statistics course for Level-3 students in the Faculty of Biomedical and Life Sciences; this is a required component of several of their Honours and Designated Degree programmes.

The Department does not run a taught M.Sc. programme although it does have an M.Sc. by research.

The Department provides courses for the following postgraduate groups:

- M.Sc. in Financial Modelling [new for entrants in 2010-11]
- Master in Public Health (MPH)
- M.Sc. (MedSci) in Health Care
- M.Sc. and M.Res. students in the Faculty of Biomedical and Life Sciences
- Postgraduate students in the Faculty of Engineering

The Department also contributes to a programme of taught courses for all first-year postgraduate research students in the Mathematical Sciences in Scotland (Scottish Mathematical Sciences Training Consortium (SMSTC)).