Periodic Review of the School of Systems Engineering

Introduction

1 An internal review of programmes in the School of Systems Engineering was held on 5 and 6 December. The members of the Panel were:
   - Dr Alan Howard, Associate Professor of Computational Geography, School of Archaeology, Geography, and Environmental Science (chair)
   - Professor Phil Mars, Emeritus Professor of Engineering, University of Durham (external member, subject specialist)
   - Professor Chris Price, Department of Computer Science, University of Aberystwyth (external member, subject specialist)
   - Dr Emma Mayhew, School Senior Tutor/Dept Director of Teaching and Learning, School of Politics, Economics and International Relations (internal member)
   - Mr Stuart Morris, School Senior Tutor, Henley Centre for Entrepreneurship, Henley Business School (internal member)
   - Mr Tim Seeborne, Part 2 MPharm student, University of Reading
   - Mrs Breanna Edwards, Centre for Quality Support and Development (secretary)

2 The Panel met the following:
   - Dr Ben Cosh, Head of School
   - Professor Virginie Ruiz, School Director of Teaching and Learning
   - Professor Simon Sherratt, previous School Director of Teaching and Learning
   - Dr Hong Wei, Programme Director
   - Dr John Bowen, Programme Director
   - Professor Chris Guy, Director of Postgraduate Taught
   - Dr Giuseppe di Fatta, Programme Director
   - Professor Victor Becerra, Programme Director
   - Professor Shirley Williams, Director of Recruitment
   - Mrs Julie Rees, Placement and Employability Manager
   - Dr Richard Mitchell, Senior Tutor
   - Dr Ian Bland, Technical Support Manager
   - Mr Steve Gould, Technical Support
   - Mrs Sally Woodley, Student Information Centre Administrator
   - Mrs Helen Marley, Student Information Centre Administrator
   - Miss Helen Fisher, Teaching Administrator
• Miss Elaine Jones, Teaching Administrator
• Professor Paul Sharkey, Examination Officer
• Professor Rachel McCrindle, Director of Enterprise
• Dr Karsten Lundqvist, International Recruitment
• Dr Frederic Stahl, Study Abroad Co-ordinator, New lecturer
• Dr Evangelos Delivopoulos, New lecturer
• Dr Jian Qi, New lecturer
• Professor William Harwin, Director of Research

The Panel met students who represented the following degree programmes:
• MEng Artificial Intelligence and Cybernetics
• BEng in Electronic Engineering with Industrial Year
• BEng in Applied Electronic Engineering and Computer Science
• BSc in Computer Science
• BSc in Artificial Intelligence
• BSc Computer Science with Industrial Year
• BSc in Cybernetics with Industrial Year
• MSc in Cybernetics
• MSc in Digital Signal Processing and Communications
• MSc in Advanced Computer Science

A sub-section of the Panel met with industry professional:
• Andrew Collins, Senior Manager at Sony Europe

General observations

The Panel was welcomed and given access to a range of teaching and learning and assessment materials. The panel met with a wide range of staff and wished to express its gratitude to all those who participated in the review process.

It was thankful for the provision of extensive documentation on the Blackboard Organisation, the immediate response to requests for further information and the quality and openness of the discussions throughout the visit.

The Panel met with a large and representative body of students and wished to thank them for their input. These students were a credit to the School, were confident, articulate and fully supportive of the programmes under review.

The Panel recognised the particular context within which this review took place, particularly the rationalisation of programmes in subject areas in Cybernetics, Computer Science, Electronic Engineering, and Information Technology. The Panel was particularly impressed by the sense of shared collective identity within the School’s community of staff, students and alumni. The School offers programmes which allow for flexibility as well as specialisation, particularly at undergraduate level, and are able to attract high calibre students. Following on from the successful reorganisation of the undergraduate provision, the Panel and the School recognise
that further work needs to be undertaken in order to attract a larger cohort of students to postgraduate programmes.

The Panel was tasked by the University Board for Teaching and Learning to give full consideration to the School’s response to the National Student Survey results particularly for assessment and feedback. The Panel has addressed issues relating to assessment and feedback throughout the report and paragraphs 11, 12, 14, 16 and 17 are most relevant.

Academic standards of the programmes

Educational aims of the provision and the learning outcomes

The Panel was provided with evidence in the form of programme specifications, module descriptions, programme handbooks, External Examiners’ reports and samples of students’ work including games produced for the Part 1 Module- SE1SE11 Software Engineering as well as examples of final year projects. These, along with meetings with key staff, students and one member of the Industry Advisory Board, enabled the Panel to confirm that the academic standards of programmes are being met.

The Panel reviewed the educational aims and learning outcomes of the programmes. The Panel confirmed that aims and outcomes on all programmes were clearly stated and that there is good articulation between programme and module learning outcomes and it was clear that learning outcomes are informed by QAA subject benchmarking statements and by the QAA Framework for Higher Education Qualifications. External Examiners’ reports verify that aims and outcomes are being obtained by students.

Curricula and assessment

The curricula demonstrated a good balance between theory and practice as evidenced in through programme specifications and module descriptions and meetings with current students and alumni.

Results of the National Student Survey (NSS) demonstrated low satisfaction particularly with assessment in relation to timing of feedback and the quality of the feedback. The School has implemented a 15 working day turnaround time for feedback ahead of the introduction of the policy by the University in 2014-15. Compliance is being monitored by the School Director of Teaching and Learning and staff are offered support if they are having any difficulty in meeting the new requirement. The School hopes that any issues will be resolved prior to the implementation of the policy University-wide. The Panel was content that the School is moving in a positive direction in relation to the timing of feedback and believed that the improvements would be evident in the NSS results in due course.

The Panel reviewed assessment criteria and concluded that the School relied heavily on generic assessment criteria provided by the University. Students in their second and third year recognised that assignment-specific assessment criteria had improved since their first year and students in their first year were generally happy with the provision of assessment criteria. One of the School’s External Examiners had
expressed concern in 2013 over a lack of specific assessment criteria as the University standard assessment criteria, as they stood, were not appropriate for the majority of assignments on modules within the School. The Panel concluded that the School was making improvements in assessment and feedback but further work was still needed.

13 The Panel was unable to find evidence that the School was moderating student work in line with University policy and procedures. The Panel recommends the School undertake a thorough review of the setting of assessment criteria taking into account student views on timing of feedback, and ensuring adherence to the University policy on moderation of coursework. The Panel further recommends that the School provide a clear response to all issues raised by External Examiners and student feedback should be gathered for inclusion in the response. All External Examiners’ reports should be tabled once per academic year at the Student-Staff Liaison Committee (SSLC) and all students should be provided with access to the reports so they have the opportunity to comment. Additionally, a report from the SSLC should be made available to all students [advisable recommendation a].

Use of student management information

14 The School operate SSLCs and Boards of Studies in accordance with University guidelines. The School convenes two meetings of the SSLCs which exceeds the University requirement of one meeting per term [good practice a]. Student course representatives were pleased with the speed at which the School responds to issues and felt that their views are given the appropriate level of consideration by the School. The School has secured a student Chair of the SSLC which is an accomplishment which many schools fail to achieve. However, the Chair of the SSLC found it challenging to service the committee as well as act as chair. The Panel recommends that the School provide SSLCs with appropriate administrative support in arranging meetings, minute-taking and dissemination of the minutes to the committee members and students [advisable recommendation b].

15 To ensure that NSS results is given due consideration annually, an action plan should be derived in order to develop a more transparent approach to improvement in areas of low performance. The action plan should be communicated to all staff in the School [desirable recommendation a].

Quality of learning opportunities offered by the programmes

Teaching and learning

16 The School’s reorganisation in 2010-11 resulted in a reduction of 42 undergraduate programmes to 16 and reduction in module delivery from 140 to 82. Additionally, in 2012-13 the School changed the teaching of its MSc/MEng Part 4 into one-week block teaching of 10 credit modules. The large-scale change might have negatively impacted on the teaching and learning of students but the School have successfully retained high standards in this area as evidenced in good NSS results for the overall satisfaction (85%) and teaching on my course (83%) categories.

17 The School is committed to providing a wide range of careers learning and other curricular or extra-curricular activities to its students. All students are provided with the opportunity for a one year placement in industry. First year students are
introduced to the Placement Team during Welcome Week and are provided with information on Careers/Placement support as well as information on the various placement opportunities offered. Additionally students are provided the opportunity to attend an Annual Graduate and Placement Fair every October and a number of company presentations are given throughout the year. A selection skills workshop is also held with employers as well as the Placement Team to improve students’ skills required to secure both placements and employment post-graduation.

18 The School has put in place a number of mechanisms to support students with disabilities which exceed standard University requirements. The University Disability Advisory Service appoints mentors to some students with disabilities and the School provides a mentoring room for mentors and mentees to meet. The School have previously organised lunchtime sessions for mentors with talks by specialists on supporting students with disabilities. The Panel was impressed by this scheme and encouraged the School to continue to run the lunchtime sessions.

19 The Panel was informed by staff of changes to the method of teaching on postgraduate taught and the final year of the MEng programmes. The School had decided to move to a block teaching format where students study a ten-credit module in an intensive one week schedule of lectures, practicals and tutorials. Assessment is undertaken outside of the intensive teaching week sometimes in the form of examinations during the University examination period. Current students and recent graduates identified a number of issues relating to this method of teaching most notably that there was not enough time for reflection on the information presented in lectures. Furthermore, some modules taught in the Autumn Term in an intensive block were assessed 100% by examination in the Summer Term. Some current postgraduate taught students were unsure how they would prepare for examinations so far removed from the teaching period without any feedback on additional assessments.

Current postgraduate taught students whom the panel met reported that they had not been aware of the block teaching method when they accepted their place on their respective programmes and that there was no mention of this in promotional materials. Furthermore they agreed that the delivery method was a significant factor in evaluating potential programmes and it should have been appropriately described in promotional material. The School should ensure that the block delivery teaching method on relevant programmes is made clear in marketing and promotional material [advisable recommendation c].

The School stated that the block method of teaching was developed to support potential Continuing Professional Development (CPD) schemes, however no such CPD schemes had been developed to date. The Panel remained unconvinced of the benefits of this teaching method in light of a lack of CPD uptake and therefore the School should conduct a thorough review of the block delivery method of the final year MEng programmes and the postgraduate taught programmes and must include student input in the review [necessary recommendation a].

Student admission and progression

20 The School’s Periodic Review conducted in 2008 highlighted a significant decline in progression rates up to 2006/07. The School had responded to this issue by implementing an engagement monitoring system which went beyond standard practice within the University [good practice b]. All Part 1 students are assessed as to the extent to which they are engaging with modules. Support staff collate all student results and this information is submitted to Personal Tutors. Tutors meet with students to discuss their results near week seven of the Autumn Term and, where
necessary, an action plan is developed with the student to promote engagement with their modules. Meetings are monitored for attendance using the RISIS Webportal and lack of attendance is followed up by Personal Tutors or the Senior Tutor if necessary.

The School exceeded their admission targets for undergraduate programmes and attracted more students in the ABB+ category than was expected. This is attributable to a number of changes including the redesign of the School’s Open and Visit day content, improved capture of participants’ information and School participation at overseas recruitment events. Current students stated that they chose Reading as a result of enthusiastic academics at the Open Day as well as the flexibility of the undergraduate programmes. The School is also capitalising on the success of its first MOOC (Massive Open Online Course) by encouraging potential applicants to sign up for the free course with Futurelearn.

Learning resources

The resources available to students fully support the learning experience of students and the space made available for lab work is good. The School has invested in their Wi-Fi provision for the building and also make all software packages available for students to access on their own computing equipment remotely. The computer labs are available twenty four hours but lab space is limited to office hours due to health and safety reasons. The students and graduates whom the Panel met were happy with the learning resources provided by the School, and the School’s commitment to providing cutting edge learning resources was identified as good practice [good practice b]. The Panel noted however that the School’s website did not make full use of the excellent facilities on offer to students. Therefore the Panel recommends that the School review their website in order to enhance recruitment at all levels through an accurate portrayal of the facilities and learning resources [desirable recommendation c].

The Panel recognised the key contribution of technical support staff to the teaching and learning of students in the School. Their contribution ensures that the resources available are used effectively by students in order to achieve the learning outcomes of their programmes [good practice c].

The lab spaces provided by the School also help to engender a sense of community amongst students and staff. Current students commented that the lab spaces create a social atmosphere which is enjoyable to work in and technical staff are readily available for assistance on assignments.

Employer engagement

The School has an active Industrial Advisory Board (IAB) which has superseded the former Industrial Advisory Committee (IAC). The IAB includes professional representatives from a number of relevant companies operating internationally and it operates on the following mission statement:

‘The School of Systems Engineering IAB is collaboration with international companies on strategic and operational issues, matching professional practice and academia, with the primary goal of improving the employment competencies and choices of Reading undergraduates.’

The Board meets on a monthly basis mainly via teleconference or webcast with physical meetings conducted twice per year.
The Board receives all new degree programme proposals and reviews the content of new programmes in detail in order to comment on their fit with employer needs and industry expectations of graduates [good practice d].

26 The School also use industry in the co-delivery of modules, e.g. the Part 3 Networking module is delivered in conjunction with CISCO Systems as well as soft/transferrable skills workshops led by companies such as IBM, Microsoft, Atos, E&Y, Atos, and Jaguar Land Rover. Students with special needs are supported by a mentorship and placement scheme with CISCO Systems.

27 The School offers industrial experience to staff through development of industrial research partners which allows staff to understand the applicability of their work in an industrial environment. Additionally, one meeting of the IAB is held on an industrial site to which all members of staff are invited. The site visit includes a tour of the facilities as well as presentations by both the company and School on selected research topics.

28 The School offers students on the undergraduate programmes industrial experience through one-year maxi placements. The School also supports students in obtaining work experience in the summer and might wish to enhance the student experience further by converting summer work experience to an optional mini-placement module.

29 As a result of the School’s efforts in the area of employer engagement, graduates of the School are highly employable as evidenced in the DLHE (Destination of Leavers from Higher Education) results.

Enhancement of quality and academic provision

30 The Panel was assured of the progress the School has made in relation to development of its undergraduate programmes. The School has successfully developed a suite of undergraduate programmes which offer both flexibility as well as opportunity for specialisation. The first year on all undergraduate programmes is sufficiently broad to allow students the opportunity to explore different disciplines within the School and potentially to change degree programme without repeating Part 1. However, programmes are also flexible enough to accommodate students who want to specialise as early as Part 1.

31 Some disciplines within the School are showing improvement in the NSS specifically in relation to the quality and timeliness of feedback where other areas of the School are falling further behind targets. It was noted that the School does not have a teaching and learning committee which reports to the Board of Studies. Therefore the Panel recommends that the School develops a teaching enhancement group with membership to include staff who teach on programmes. The terms of reference for the group should be to inform programme development, to identify good practice, to develop a mechanism to disseminate good teaching and learning practice (perhaps initially in the weekly staff meetings) and to report to the Boards of Studies [desirable recommendation b].

32 The School identified the current lack of recruitment to postgraduate programmes was in large part due to the closure of the associated ACET Centre. The ACET Centre ran two masters programmes, MSc in Network Centred Computing (supported by Erasmus Mundus funding) and MSc in Network and e-business Centred Computing which recruited well although interest in the latter programme declined to unsustainable numbers. The Erasmus Mundus programme was unsuccessful in
retaining funding beyond five years and was closed along with the ACET Centre. The School has developed further MSc provision in an MSc in Cybernetics, MSc in Digital Signal Processing and Communications, and a new programme running in 2012-13, MSc in Advanced Computer Science. The current postgraduate taught programmes provide a feed for the School to recruit PhD students but with current student numbers on these programmes, the have become unsustainable. The School are aware of the need to enhance recruitment to postgraduate programmes and therefore the School should conduct a thorough review of their postgraduate taught provision to ensure the programmes are commercially as well as academically viable [advisable recommendation d].

33 The Panel supported the School’s plans to explore joint Master’s programmes with the Henley Business School which would include a substantial management component and encourages the School to act quickly in this area. Evidence from the School’s External Examiners demonstrated that other institutions had seen a surge in recruitment to similar joint programmes. The Panel was concerned about the market potential of the proposed joint neuroscience degree with the School of Psychology and Clinical Language Sciences and therefore encourages the School to undertake careful market research on the viability of the proposed programme. Additionally, the Panel noted that the success of the first Massive Open Online Course (MOOC) and asks that the School consider how they were able to capture the interest of so many participants and how perhaps they could incorporate this success into their postgraduate programmes.

Main characteristics of the programmes under review

34 The School has successfully incorporated a number of structural changes to their School and their programme provision since 2010. The degree programmes offered by the School are highly regarded by students and employers. The School has made a number of improvements to the undergraduate portfolio of programmes and has created a united School in a relatively short period of time. The postgraduate taught programme portfolio is in development and the School has recognised the need to turn their strategic focus in this direction. Current postgraduate programmes provide students with a good educational experience but lack wider appeal and therefore have small cohorts. There is a strong sense of community amongst students and staff and the ample lab space provides a focal point for cohorts to work collaboratively and to socialise.

Conclusions on innovation and good practice

35 The Panel commends the following areas where the School has particular strengths:

a) the School convenes two meetings of the SSLCs which exceeds the University requirement of one meeting per term;

b) the School’s commitment to providing cutting edge learning resources including the investment in Wi-Fi for the building and making all software packages available to students remotely;

c) the key contribution of technical support staff to the teaching and learning of students in the School which ensures that the resources available are used effectively by students in order to achieve the learning outcomes of their programmes;
d) the School has an active Industrial Advisory Board (IAB) which includes professional representatives from a number of relevant companies operating internationally as well as senior Teaching and Learning staff from the School; and

e) the implementation of an engagement monitoring system at Part 1.

Conclusions on quality and standards

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 obtained by students, and that the programme specifications are appropriate.

Recommendations

The Panel recommends to the Joint Faculty Board for Teaching and Learning for Science and Life Sciences that the following degree programmes taught by the School of Systems Engineering should be re-approved to run for a further six years:

- BSc Artificial Intelligence
- BSc Artificial Intelligence with Industrial Year
- MEng Artificial Intelligence
- BSc Computer Science
- BSc Computer Science with Industrial Year
- BSc Cybernetics
- BSc Cybernetics with Industrial Year
- MEng Cybernetics
- BEng Electronic Engineering
- BEng Electronic Engineering with Industrial Year
- MEng Electronic Engineering
- BSc Information Technology
- BSc Information Technology with Industrial Year
- BSc Robotics
- BSc Robotics with Industrial Year
- MEng Robotics
- MSc Advanced Computer Science (currently in its first intake)
- MSc Cybernetics
- MSc Digital Signal Processing and Communications
- MRes Systems Engineering

The report will categorise any issues as follows, in order of priority:

- Those areas where the Review Team believes it is necessary for action to be taken urgently to safeguard the standard of provision;
• Those areas where it is **advisable** that the issues be addressed as soon as possible.
• Those areas where it is **desirable** that the issue be addressed over a longer time span.

39 The Panel does not consider that any recommendations must be addressed as a condition of re-approval. However, it would wish to see the necessary recommendation implemented immediately.

The Panel makes the following recommendations to the School:

**Necessary**

a) The School to conduct a review the block delivery method of the fourth year MEng programmes and the postgraduate taught programmes. The Panel remained unconvinced of the benefits of this teaching method in light of a lack of CPD uptake.

**Advisable**

a) The School should conduct a thorough review of their postgraduate taught provision to ensure the programmes are commercially and academically viable.

b) The School to undertake a thorough review of its assessment and feedback policies and procedures, including the setting of assessment criteria, provision of timely feedback and adherence to the University policy on moderation of coursework.

c) The School to ensure that External Examiner Reports are circulated in line with university policy, including tabling at the Student-Staff Liaison Committee to allow student views to help inform the School's formal response.

d) The School to provide the SSLC with appropriate administrative support in arranging meetings, minute-taking and dissemination of the minutes to the committee members and students.

e) The School should ensure that the current block delivery teaching method on relevant programmes is communicated clearly to prospective students in marketing and promotional material.

**Desirable**

a) To ensure that NSS results is given due consideration annually, an action plan should be derived in order to develop a more transparent approach to improvement in areas of low performance. The action plan should be communicated to all staff in the School.

b) Development of a teaching enhancement group with membership to include staff who teach on programmes. The terms of reference for the group should be to inform programme development, to identify good practice, to develop a mechanism to disseminate good teaching and learning practice (perhaps initially in the weekly staff meetings) and to report to the Boards of Studies.

c) The School to review their website in order to enhance recruitment at all levels through an accurate portrayal of the facilities and learning resources on offer to students.