



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

Report to Council on the Quality Review of the School of Computer Science & Statistics

15-17 February 2016

Reviewers:

Prof Susan Eisenbach, Head of the Department of Computing, Imperial College, London.

Prof David Madigan, Dean of the Faculty of Arts and Science, Columbia University, New York.

Prof David Wastell, Emeritus Professor (Operations Management and Information Systems), Nottingham University Business School.

Internal Facilitator:

Professor Sinéad Ryan, Trinity College Dublin

Table of Contents

1.	Reviewers' Report	1
2.	Response from the Head of School	8
3.	Response from the Dean of Engineering, Mathematics & Science	13

1. Review report for School of Computer Science and Statistics

1. Executive Summary

1.1 Key findings of the review including overall assessment of the School

The School is, in many ways, in good shape. The overwhelming majority of the faculty are research active, the School has had outstanding success competing for external research funding, the School's educational programs are attracting many applicants; the administrative and technical and systems support staff are also highly functional. The School has recently completed a strategic plan, and while we take issue with certain aspects of the plan, its existence is a huge step forward.

On the critical side, the School's undergraduate and postgraduate courses seem fragmented and more a product of happenstance than coherent strategic thinking. There is an action plan for the postgraduate offerings, and while we applaud the move towards fewer modules, we were not convinced of the strategic underpinnings of the specific moves being proposed. On the undergraduate side, we identified some concerns, and certainly the School should be looking to reduce the number of modules (and, we would argue, courses).

Two major concerns dominate our thinking and have relevance to all School activities. First, the School (and the strategic plan) lacks a clear intellectual vision. We strongly believe the School should identify areas within Computer Science and Statistics where it can excel and aspire to stake out an international leadership position. Future directions for faculty hiring and the design of the School's suite of educational programs should flow first and foremost from this vision. Second, the School operates in a financial haze with little clear sense of the financial implications of decisions, especially decisions concerning educational programs. The School has the will and the talent to be more entrepreneurial but is badly stymied by the financial opacity.

1.2 Recommendations for improvement

Our key recommendations include:

- The School should put the strategic plan on a sound intellectual footing and use this as a guide to key decisions with regard to faculty hiring and educational programming.
- The School needs to work with the College to develop a financial arrangement that affords the School some degree of visibility into, and control over, its financial future.
- The School should rationalize its undergraduate courses.
- The School's space is fragmented but dramatic progress seems unlikely in this regard. Thus, we think the School should focus on securing a lead role in the E3 project.

2. Strategic Direction and Planning

The School has many strengths and we believe it is in an excellent position to thrive in the coming years, having coped resourcefully through recent difficult times. We applaud the development of the strategic plan and believe this is a key step forward for the School. Below we provide suggestions that we hope might improve the plan, but wish to emphasize here that its existence, with strong School-wide support, represents an important step forward. We understand that the Plan has yet to receive College endorsement, but hope that this will be expeditiously granted so that progress can be made in urgent areas of future development.

Although the Plan provides a sound basis for immediate action, we do feel that a stronger medium- and long-term vision is required. The Plan would be enhanced by a strategic mapping of the field of Computer Science as a whole and how the discipline is likely to develop. The School should identify key sub-fields that are both important to the discipline and make sense for Trinity. Areas of current strength provide a natural starting point, but we are concerned that short-term funding might be overly constraining important areas of potential future growth. We would highlight bioinformatics, machine learning, and security as potentially exciting directions for the School, but this is not meant to be prescriptive in any way. A School-wide discussion and subsequent selection of key directions should now take place which will greatly strengthen the strategic plan.

The School has historical prowess in Statistics, and we were dismayed that the Chair in Statistics remains unfilled. The field of Statistics is undergoing a period of tremendous growth both in Europe and in the US. The co-location of Statistics with Computer Science is auspicious, reflecting a model that is now being pursued at a number of institutions (e.g., the University of California at Irvine and the University of Rhode Island). The strategic plan needs to provide a roadmap for statistics at Trinity taking advantage of the tight bonds with CS. The proposed master's degree in Data Science can perhaps provide a hub around which the two component parts of the School can coalesce.

3. Organisation and Management

We do have a number of concerns about the management of the School but several of these are already addressed in the self-assessment and the strategic plan. We believe it is important that, with the possible exception of Directors of Teaching and Learning, active researchers should occupy the key leadership positions in the School given its aspirations to world-class standing.

The Head of School is very engaged in routine operational issues and thus has little time for more strategically-oriented activities. We encourage the School to restructure the leadership team to address this issue.

We were unclear about the role of, and indeed the necessity for, the “disciplines.” We worry that the disciplines introduce unnecessary and unproductive silos and attendant turf battles. We did not fully understand the rationale behind the decision to shrink from five disciplines to four; no rationale was provided for the abolition of Information Systems as a separate entity, giving the sense that this has withered by neglect. If fewer disciplines are a good thing, why not do away with them entirely?

4. Teaching & Learning

Students, postdocs, and employers, while raising some specific criticisms, had very positive things to say about School. It is clear the School makes an important positive contribution to Irish society through its graduates.

On the postgraduate side, we welcomed the rationalization of the masters' offerings, particularly the reduction in the number of modules. We did feel though that more attention needs to be paid to the recruitment of non-EU students and how this expansion is to be achieved (we see an aspiration but no semblance of a credible action plan, other than the alliance with Thapar University). We also had some concerns over the closure of vocational programmes, the M.Sc. in Health Informatics, for instance. Whilst this is not an area where the School has a concentration of current research, the programme appears to be very successful and the social capital it has created could be a valuable strategic resource for the future; the synergy with genetics and neuroscience at Trinity is also obvious. On the other hand, we do support the general goal of aligning the School's educational offerings with areas of research strength. Such apparent incongruities, we believe, come back to what we perceive as the lack of intellectual focus in the strategic plan; it is true that the School does not have a critical mass of faculty in areas related to healthcare but this seems to be the result of happenstance (and funding) rather than any deliberate and considered plan. If the School ultimately identifies health-related CS and statistics as a key growth area for the future, the closure of the MSc will be seen to be unfortunate. We could make similar comments about the other programs slated for closure. No clear intellectual rationale seems to underlie the proposed re-organization of the postgraduate courses.

On the undergraduate side, we felt strongly that a similar rationalization is required, though there may be less scope for reducing the module count. Perhaps a common first year could be considered? Probably the easiest way of doing this is to decrease the 'and' degrees, possibly replacing them with 'with' degrees. The student representatives on the 'and' degrees expressed more dissatisfaction with their degrees (including high failure rates), whereas the single honours students were very positive. We also felt that modules with small student numbers should be suspended, and withdrawn if interest remained low. The dropout/failure rate in the CS+language course was of particular concern.

Teaching innovation was a worry; we did not see any examples of noteworthy practice, although we were informed that there was some innovation at the grassroots level. Flipping the classroom, for example, is something many institutions are experimenting with, as well as a host of strategies aimed at moving from a teaching to a learning culture; we saw little evidence of debate around this.

Student evaluation of teaching was also patchy, and appeared to be at odds with College policy. Currently some lecturers run formal module evaluations but some evaluations seem to be left to students telling their representatives, who then talk to the Course Directors. The School and/or the College needs to put in place a uniform student evaluation system where every student has the opportunity of commenting on every module, including individual teachers.

The Strategic Plan also lists some decisions on future teaching developments, without convincing business motivations. In particular, given the plan for an MSc in Data Science, we were concerned not to see a comparable investment in staff, with the vacant statistics Chair seeming particularly incongruent. In the same vein, given the limited number of Statistics staff, we did not understand why

the Statistics Certificate should be expanded into a Statistics Diploma (although we do understand that it may be possible to achieve this by reconsideration of ECTS associated with the modules). We also failed to understand the case for a new joint degree with Psychology. This did not appear to be based on any market research, and will require new bridging modules, working against the need for rationalization. Administrative complexity is also created, and, as noted above, there was a strong tendency for lower student satisfaction with joint programmes.

Some administration inefficiencies were noted, including bunching of the examination timetable and delays in communicating results. We anticipate that introducing exams at the end of the first semester should help alleviate these problems.

5. Research Activity

We have commented above on some of the limitations of the research strategy which seems overly driven by short-term funding opportunities and priorities set by external bodies. It does not refer to the College's Strategic Plan and Research Themes, as far as we could determine. We have also noted concerns about the narrowing of the School's research portfolio produced by a strategy of concentration rather than diversification. We understand the reasons for this and pay due regard to the impressive performance of the School in recent times in securing funding.

Regarding publications, it was difficult to assess performance. A full list of CVs was provided for individuals, but it was hard to gain an overall sense of how the School as a whole was performing from this. The website might have provided this, by listing publications under research groups, but the website was not consistently accessible during our visit; the lack of a common format also hindered easy comprehension of the levels and quality of publication performance. It is urgent that the website be redesigned to provide an effective showcase of the School's research, and welcome initiatives in this area. These need to make rapid progress.

The lack of a systematic process for assessing staff research performance (and development) was a major worry. In particular, mentoring of early career researchers is vital. The School should institute a formal mentoring programme. This programme should:

- provide support and advice on how to succeed at Trinity and in academia
- serve as a sounding board and as an advocate
- provide feedback on research
- help orient the junior faculty members within Trinity (e.g., on finding available resources for research and teaching)

Successful mentoring programmes sometimes involve two mentors, one from within the School and one from without. Mentoring programmes are not intended to provide a critical evaluation or an assessment of progress. The academic staff member is not obligated to follow any advice, nor does the advice constitute a roadmap for, or guarantee of, promotion or success. Nonetheless, an effective mentoring programme is a *sine qua non* for a leading 21st century School.

Although PhD students seemed broadly happy with current arrangements, we felt that a "two supervisor" system (already operating in some groups in the School) should be made the norm.

Some flexibility in the core requirements of research training would also be beneficial (e.g. no need for Statistics students to take a basic statistics module).

6. Resources

The current funding model was our largest overall concern, bringing responsibility without autonomy. The College financial model that the School sees is not transparent. Were the School to see in full detail the money it brings in and all its attendant costs (e.g. this overseas student brings in X, this college service costs Y), it would be able to plan changes that were both in its interest and in those of the College. At universities where this model exists, both the schools and the universities benefit; without it, decisions are made on guesswork, and can be driven by perverse incentives. As one specific example, consider the postgraduate certificate in Statistics. This has existed for decades and, as we understand it, largely but not entirely enrolls non tuition-paying students from non-SCSS programs. If the School is to consider shrinking or growing the program, the financial implications are completely opaque. Rational and effective planning in this environment is impossible.

The new research centres (viz. ADAPT, CONNECT) are College wide success stories and they come with substantial overheads. The College's current position is that they take 50%, and the School and Centre have to come up with an agreement for the remainder. Both the School and the Centre have legitimate claims on these overheads and it is unfair to expect the two entities to arrive at a solution themselves. We applaud the College's decision to come up with overarching principles of splitting overheads, and recommend this is implemented as a matter of urgency.

The scattering of the School over numerous sites is far from ideal, creating inefficiency, undermining collegiality, and detracting from the educational experience. We understand that the proposed E3 building may represent a long-term solution to these problems but forward progress cannot wait that long. We worry that E3 may cause "planning blight" and detract from creative efforts to find short- and medium-term solutions.

Recruitment and retention were particular concerns, especially for administrative staff, where the requirement to appoint at the bottom of the scale creates intractable problems. More flexibility is needed, although we appreciate that there are constraints beyond the control of the College. More flexibility is needed in terms of senior academic appointments if the School is to attract world-class scholars. There was also widespread dissatisfaction at the promotional blockage created by the need to conform to a fixed senior-junior staff ratio, created by the Employment Control Framework, which (although expiring in 2014) we appreciate remains in force *de facto*.

Several times, the development of a new system for workload assessment was mentioned, taking into account a fuller range of types of work undertaken by academic staff. This would appear to be a positive development if it leads to greater clarity of expectations, equity and recognition of contributions across the full gamut of academic work.

We also felt that there was a case for introducing teaching only positions. There is always a tension between time spent on teaching and that on research. Having teaching-only faculty ensures that the students get very well cared for, and provides a clear career path for relevant staff. We believe this is being discussed at College level and give this our full support. In addition to new PhD graduates deciding on a teaching only career, more senior staff who are not research active, and who provide

significant teaching leadership, could also decide to move onto (senior) teaching only positions.

6.1 Finance & Funding

As we discussed above, the School is operating in a financial haze where the consequences of significant decisions remain opaque. More than once we heard about strategic decisions that were “for the good of the College” or even “for the good of the nation,” which is all well and good but hardly a recipe for future success without a full understanding of the revenue and expense implications.

6.2 Staffing

The current composition of the academic faculty has a large majority of Trinity graduates. This is inconsistent with aiming for a high world ranking. If it is true that Trinity alumni really are better than all other applicants, then the advertising strategy for posts is not as effective as it could be. Retention does not appear to be a problem with academic staff, though this could be interpreted negatively. The plans for new academic posts are based on the College Usher competition and are tightly tied to those areas that attract large amounts of research funding. The School should be more proactive in trying to get the Chair in Statistics filled and should either search for first class Management Information Systems faculty to reinvigorate this historically important area, or consider whether they should retrench further in their teaching of MIS.

6.3 Infrastructure

It is not obvious that the space that exists within the School is being utilised to its best effect. Perhaps an external space audit would advise how to get better use of the existing space?

The labs we were shown looked well fitted for the education programme. The cellular offices for systems support staff should be re-considered as support staff can provide a more effective service in an open plan setting.

7. Administration

We thought some developments here could be usefully considered. The work of the technical and systems support staff, for example, is determined by a help/ticket system. But staff tend not to put in tickets for services they believe the technical and systems support staff would *not* be able to solve. In particular the technical and systems support team is not seen to have the skills to create and maintain a showcase website, so they are not asked. The technical and systems support staff, for their part, requested that they be given training courses.

Our suggestion is that 1) the technical and systems support staff are offered the opportunity to update and possibly reorient their skill set to provide the skills the School now needs; 2) a more strategic way of determining which tasks are undertaken should be devised to ensure that the support fulfils the changing needs of the School.

In addition, all modern IT support is co-located in large open plan offices and we were surprised to see that the School's IT support was scattered around in single offices. There are numerous reasons why the separate office model is less effective in the support it provides, than the open plan model.

8. Relationships and external engagements

The School has excellent relations with Industry, but we feel these could be better harnessed through the creation of an Industrial Advisory Board, covering both research and teaching. We note that in its strategic plan, the School is proposing to establish an Advisory Board but a separate Industrial Advisory Board may still be worthwhile.

9. Communication and Marketing

The web is the primary place all Computer Science schools communicate with the rest of the world. The School is aware that its web presence is weak and confirm that they are in the process of improving it. However, they have not committed to ensuring that they have sufficient resources (perhaps by retraining existing systems support staff members) to have a continuously current website.

One can see the evidence of previous attempts to update the website, which creates an uneven, improvised effect which should not be visible in the future.

School Response to the External Reviewers' Report

School of Computer Science and Statistics (SCSS)

1.1 Response to the Overall Assessment of the School

The School acknowledges the work of the reviewers and is pleased that the strengths of the School are highlighted in the review report. The current SCSS Strategic Plan 2014-19 follows the previous Strategic Plan 2009-14 which was successfully implemented.

The SCSS Strategic Plan recognises that the School's postgraduate courses are fragmented (although coherent when introduced) and sets out specifically to address this issue by terminating some MSc programmes and introducing a four-stranded single-entry MSc in Computer Science aligned with the research interests and strengths of the School. This will also lead to teaching and administrative efficiencies. At undergraduate level, the rationale is to continue to deliver our flagship Computer Science and MSISS programmes together with Computer "and" degree programmes (Computer Science and Language, Computer Science and Business and a proposal for Computer Science and Psychology). Many modules are shared between these programmes. The Computer Science "and" programmes attract a different type of student in to the School and mitigates risk as there is a finite supply of Irish school leavers wishing to take pure Computer Science programmes (for the last few years a constant 6.9% of CAO first preferences are for ICT courses). This approach is aligned with the aims of the Trinity Education Project which include a broadening of the curriculum and the support of interdisciplinary and multidisciplinary programmes. The Computer Science "and" programmes will also have a single Course Director leading to further administrative efficiencies. The School is, however, planning to terminate the Information Systems evening programme, with 2015-16 being the last intake. A combination of externally imposed resource limitations and competing priorities within the School itself, over many years, has resulted in the School becoming progressively more dependent on adjunct staff to deliver this programme. While the quality of these staff has been and continues to be excellent, SCSS has now reached the point where only 22% of the ECTS in the programme are delivered by full-time SCSS academic staff. This is far short of what the School regards as an adequate level of input from permanent staff for a Trinity honors degree. As the programme is delivered in the evenings, it is not possible to address this problem by sharing modules with day-time programmes.

The SCSS Strategic Plan does not explicitly describe the outcome of an internal review and prioritisation of areas of computer science that were part of the strategic planning process. The Reviewers' view that the intellectual vision is insufficiently articulated in the Strategic Plan does not equate to the lack of a School vision. We briefly summarise our analysis here, and in light of the reviewers comments, propose to amend the draft planning document accordingly. The School carried out a review of its current research activities in 2015. This review considered research quality and impact, scale/critical mass and potential for growth. Three existing areas of major strength were identified, namely Digital Content, Future Networks and Creative Technologies, each of which is also aligned with one of the College strategic research themes (indeed these groups within the School lead the relevant themes at College level). The review also identified five areas as targets for future investment and growth, namely Statistical Data Analytics, Future Cities, Internet of Things, Security

and Privacy, and Health. These areas were identified following the analysis of (i) their strategic importance to Ireland, which included consultation with local industry and government agencies, (ii) the strategic importance to the fields of Computer Science and Statistics and cognate areas, and (iii) the potential for success in building internationally competitive activity in each area.

The Strategic Plan incorporates this intellectual vision, even if, as already noted, this is not explicitly articulated in the staffing and teaching plans. The staffing plan includes appointments in Digital Content, Future Networks, Creative Technologies, Future Cities, Internet of Things, Statistics and Health. The development of Security and Privacy is planned to be a cross-cutting activity since it underpins so many of these areas. The postgraduate teaching plan includes the development within the MSc degree of strands in Digital Content, Creative Technologies and Data Science, and content in these areas is also part of the undergraduate programmes. The School is currently in the process of refreshing the undergraduate course content related to Future Networks and Statistical Data Analytics, and reviews of the undergraduate content in the other areas will be carried out over the lifetime of the Strategic Plan.

1.2 Response to key recommendations

- *The School should put the strategic plan on a sound intellectual footing and use this as a guide to key decisions with regard to faculty hiring and educational programming.*

The Strategic Plan is based on a sound intellectual footing as outlined in section 1.1 above.

- *The School needs to work with the College to develop a financial arrangement that affords the School some degree of visibility into, and control over, its financial future.*

A financial model of the School has been developed in conjunction with the Faculty Office and is now being used for planning purposes. The model has been used to predict the financial impact of the School Strategic Plan. The School's income over expenditure ratio is expected to rise from 1.32 to 1.49 over its lifetime. Given the financial challenges facing the College, however, the actual annual budget allocated to the School is not currently derived from the model.

- *The School should rationalize its undergraduate courses.*

As outlined in 1.1 above, the School is already rationalising its UG programmes by reducing the number of "year 5" modules and sharing them across its MCS, MAI and PGT programmes.

- *The School's space is fragmented but dramatic progress seems unlikely in this regard. Thus, we think the School should focus on securing a lead role in the E3 project.*

School space is fragmented. Fragmentation will increase in the short-term with Stack B and South Leinster Street until E3 is realised. The School is now included as one of the E3 Schools and is actively engaging with the planning of the E3 project.

2. School's Response to Strategic Direction and Planning

The Reviewers' state that '*Although the Plan provides a sound basis for immediate action, we do feel that a stronger medium- and long-term vision is required.*' The intellectual vision, as previously addressed in section 1.1, shows that the Strategic Plan is not driven by short-term funding. As

outlined in the Plan, the School is working actively to fill the Chair of Statistics, to strengthen the Statistics faculty by making new appointments and introducing a new MSc in Data Science to exploit the synergies that exist between Statistics and Computer Science.

3. School's Response to Organisation and Management

The Reviewers note that *'the Head of School is very engaged in routine operational issues and thus has little time for more strategically-oriented activities'* and they *'....encourage the School to restructure the leadership team to address this issue.'* Given the scale of the School, the Head of School and the three Directorships are very onerous positions. In spite of the high day-to-day workload, the Head of School and Directors have led many recent strategically oriented activities such as developing the Strategic Plan 2014-19, planning a new four-stranded MSc in Computer Science, introducing a pilot academic staff mentoring programme and working with Thapar University to provide a future steady stream of non-EU undergraduate students. The Strategic Plan recommends the appointment of a School Chief Operating Officer (COO), but such a radical idea would need support at College level.

The Reviewers were unclear about the role of and necessity for disciplines, and query the abolition of Information Systems as a separate entity. Disciplines are an integral part of School management and are organised around research areas. The Heads of Discipline sit on the School Executive and provide academic leadership, support staff development, work allocation and monitor discipline specific research metrics amongst other responsibilities. The reason for subsuming Information Systems into the other disciplines was a strategic one, reflecting the School's wish to focus on a number of key strategic areas.

4. School's Response to Teaching and Learning

The Reviewers report that students, postdocs, and employers had very positive things to say about School, and this feedback is appreciated.

With regard to the Reviewers' comments generally about postgraduate education, and specifically their statement that *'No clear intellectual rationale seems to underlie the proposed re-organization of the postgraduate courses'*, the intellectual rationale is articulated in section 1.1 above. There is a plan to improve non-EU intake in conjunction with Global Relations which includes Thapar, targeting the North American market and exploiting existing contacts in India, China and Vietnam. Re-organising the existing MSc offerings was the most challenging aspect of the Strategic Plan as there were many possible directions that the School could take, some of which are noted in the reviewers' comments. The ultimate decision was to create a state-of-the-art PGT programme aligned with the current and aspiring research strengths of the School. It is critical, for the future financial well-being of the School, that the restructured MSc attracts at least 100 students (financially it doesn't matter if they are EU and non-EU). The School is initiating a strong marketing campaign and will work closely with Global Relations in this regard. The School will bring forward the review of the MIS programme in light of the reviewers' comments made regarding Health Informatics.

In relation to its undergraduate provision, the School will continue to rationalise the number of UG modules taught. Given the Irish context, however, the School sees the Computer Science "and" or "with" programmes not only as having merit as interdisciplinary and multidisciplinary programmes in

their own right, but also as way of mitigating risk due to the finite numbers of Irish students who wish to study pure Computer Science [see section 1.1]. Feedback from course questionnaires and meetings with class representatives indicate that students on these programmes would like more Computer Science modules in the early years to strengthen their core Computer Science skills. The Trinity Education Project envisages Computer Science “with” programmes, with a 100% Computer Science first year, which the School will now investigate.

The Reviewers state that *‘the dropout/failure rate in the CS+ language course was of particular concern.’* An analysis of the progression rates for the CS+ Language (CSL) programme shows that the recent year 1 progression rates 62% - 79% are slightly lower than the sector norm of 85% (HEA report Jan-16). All other years have average progression rates greater than 85%. The year 1 progression rates will be monitored closely.

Concern was expressed by the Reviewers about the lack of teaching innovation. The School has many examples of teaching innovations such as (1) the CS year 2 year 3 group project where the year 2 students act as developers and the year 3 students act as project managers (2) the year 4 internship and (3) formative evaluation via substantial project based tutorial and laboratory exercises. Unfortunately the review schedule did not accommodate an opportunity for the reviewers to see, or review, existing teaching practice. It is agreed that the School should take a more systematic approach. The Trinity Education Project and the flexible teaching spaces envisaged in the E3 project gives the School opportunities to address this issue.

The Reviewers had concerns regarding module and programme evaluations. Recently, the School has used feedback from student representatives for programme and module evaluation; this is not actually at odds with College policy. In the Strategic Plan, however, it was decided that programme and module level questionnaires would be introduced at a School level. All programmes have now been surveyed using a Qualtrics based questionnaire. The results are very positive. Qualtrics module questionnaires, managed by the SCSS Teaching Unit, will be used for all modules from 2016/17 onwards.

With regard to future teaching developments, the Reviewers comment that the Strategic Plan outlines decisions around future teaching which are *‘without convincing business motivations.’* The business motivations, outlined in the Strategic Plan, are to deliver well regarded programmes more efficiently and to make sure that they continue to attract sufficient good students. The Strategic Plan includes the appointment of a Chair of Statistics and additional Statistics staff over the lifetime of the Plan. The academic staffing plan reflects the outcome of a comprehensive analysis and alignment of the expected teaching requirements in 2020 with staff expertise. The School sees Computer Science “and” and “with” programmes as a way of attracting more good students into the School and mitigating risk. This approach is in line with the Trinity Education Project which aims to introduce more breadth and choice into undergraduate programmes. A link with Psychology is underpinned by shared research interests and informal feedback from students at events such as Higher Options and Open Days. The cost of introducing a new “and” programme is relatively low as all modules are shared apart from the bridging modules which can be removed if needs must. Administrative complexity is also being reduced as there will be a single course director for all “and” programmes.

The Reviewers note some *“administrative inefficiencies”* around examination timetabling and communication of results. The School agrees with these observations, and hopes that these issues

will be addressed by the Trinity Education Project including full semesterisation, with first semester exams being held before Christmas.

5. School's response on Research Activity

A pilot academic staff mentoring programme which addresses the issues outlined by the Reviewers has already been introduced (16 academics are currently being mentored).

The School agrees with the recommendation that a *"two supervisor"* system be introduced for research students. This will be considered by the PGTL, Research and Executive committees. It also agrees that some flexibility in the core requirements of research training would also be beneficial, and this will be considered by the PGTL Committee.

6. School's response on Resources

The Reviewers reference to the *"financial haze"* has been addressed in section 1.2. The College financial position for 2016/17 still looks challenging with the likelihood that most School budgets will be reduced.

An improved workload model is being developed which will be operational in 2016/17 for the 2017/18 workload allocation, and should address the Reviewers' hopes for a system that *'leads to greater clarity of expectations, equity and recognition of contributions across the full gamut of academic work.'*

The School continues to increase the number of external academic appointments (non-Trinity graduates) by advertising extensively in accordance with College practice. The Strategic Plan outlines the future staffing needs of the School which not only includes a Chair of Statistics but also balances the College requirements for the Ussher posts with the strategic strengthening of research and teaching areas such as data science and statistics. The strategic direction is to position MIS as being more Data Science than Information Systems.

A space audit, initiated by the School, was carried out in 2014 by the College Planning Officer resulting in a number of initiatives to make better use of space. This is an on-going process.

7. School's response on Administration

The Reviewers comment on the remit and skills of the technical and systems support staff, particularly in relation to the creation and maintenance of a showcase website. The Technical and Systems Support staff provide the School with an advanced computing infrastructure by supporting wired and wireless networking, email, servers, virtual machines, virtual labs, cloud storage, backups, printing, selection and deployment of all UG and PG teaching equipment, the purchase and maintenance of all electronic equipment such as desktops and laptops, numerous AV systems, Linux, Windows, OS X, etc. The Systems Support staff are employed to provide back-end systems support rather than as artistic designers with the skills needed to create a showcase web site. The Reviewers' recommendation that the technical and systems support staff be offered the opportunity to update and possibly reorient their skill set, and that a more strategic way of determining how technical and systems support fulfils the changing needs of the School is accepted.

3. Faculty Dean's Response to the Review Report for Computer Science & Statistics

School of Computer Science and Statistics

On behalf of the Faculty I would like to thank the external reviewers for their report arising from their recent review of the School of Computer Science and Statistics. In doing so I would also like to acknowledge the enormous engagement of the School's staff over a period of some 18 months in developing the School's Self Evaluation Report and, more especially, the strategic plan that underpins it. The strategic planning process was detailed and painstaking, and considered the development of all aspects of the School's activities in context. While there are some inconsistencies in the reviewers' treatment of the plan, I note in particular their hope that *"College endorsement"* of the plan should *"be expeditiously granted so that progress can be made in urgent areas of future development"*.

Two overarching recommendations dominate the report: that the School should put its strategic plan *"on a sound intellectual footing and use this as a guide to key decisions"* and that *"a financial arrangement that affords the School some degree of visibility into, and control over, its financial future"* be put in place with the College.

It is unfortunate that the reviewers seem not to have understood the *"intellectual"* basis of the School's strategic plan. This may, in part, be a problem of lack of explicit articulation of the basis of the plan in the strategic planning document as suggested by the School's response. Nevertheless, it is clear that the School has a clear intellectual vision that underpins its strategic plan and that has guided the decisions that have been made including those related to research focus areas, staff planning, the set of disciplines that constitute the School, the alignment of course offerings, especially but not exclusively at postgraduate level, with the School's strengths, and the identification of areas for development. This is clearly articulated in the School's response. I note, in particular, that the recommendation that a *"School-wide discussion and subsequent selection of key directions should .. take place"* describes exactly the process that has taken place over the last 18 months.

On the other hand, the reviewers rightly point out as their *"largest overall concern"*, the *"current funding model"* with which Schools are forced to operate. They particularly note that the model is not transparent and refer to the School operating within a financial *"haze"*. They note that *"were the School to see in full detail the money it brings in and all its attendant costs (e.g. this overseas student brings in X, this college service costs Y), it would be able to plan changes that were both in its interest and in those of the College"*. Working with the School, my office has already drafted a financial model on the lines suggested by the reviewers that the School can use to inform planning and assess the potential feasibility of any planned course of action. However, I note that as per the School's response, the actual budget allocation to the School does not follow this model. The reviewers' comment that *"rational and effective planning in this environment is impossible"* is striking.

I look forward to working with the School to address the other recommendations made by the reviewers. Areas of particular focus will include:

1. planning to fill the Chair of Statistics, as foreseen in the School's strategic plan and highlighted by the reviewers, at the earliest possible opportunity;
2. facilitating the planned rationalisation of the School's programme offerings and their alignment with the School's strengths and with the expertise of the School's staff;
3. facilitating the provision of the space required to expand the School's activities including planning for E3;
4. working with the School to develop its international student recruitment strategy including assessing the potential for North American student recruitment as well as ensuring the appropriateness of the School's programme offerings for international students;
5. promoting continuous teaching innovation within the School's programmes.

In addition to these areas of focus I note the reviewers' comments about the need for the creation of a new workload allocation model, the hiring of teaching fellows, retention and promotion, hiring strategy and advertising of positions, and the School's web site.