University College Dublin

Quality Improvement Plan

UCD School of Mechanical & Materials Engineering

November 2015

Introduction

The quality review process for UCD's School of Mechanical & Materials Engineering had four stages as follows.

- First, the School prepared a self-assessment report on quality.
- Second, a review group including UCD staff and external experts, national and international, spent a few days at the school, making its own assessment. This took place 2-5 December 2014.
- Third the review group prepared and submitted its report.
- Finally, the School prepared a *quality improvement plan* based on the review group's report, which is checked and monitored by the University.

The present document is this ***quality improvement plan***. It is mainly an outline of how the School proposes to implement the recommendations made in the review group's report. The structure of the report therefore follows closely the list of recommendations made by the review committee.

The plan was prepared by the School's quality improvement committee, made up as follows, with areas of responsibility indicated:

- Dr William O'Connor (Chair Committee) Convenor & report preparation
- Professor Michael Gilchrist (Head of School) Management & staff
- Mr Oran O'Rua Administration
- Dr Donal Finn Staff & facilities
- Dr William Smith Teaching, learning & assessment
- Dr David Timoney Curriculum development & review
- Professor Denis Dowling Research Activities
- Dr Vincent Hargaden Management of quality enhancement
- Dr Neal Murphy Support services
- Dr Eamonn Ambrose External relations
- Professor Alojz Ivankovic (Head of Mechanical Engineering discipline)
- Mr Paul Bright Technical staff
- Dr Kevin Roche Student/graduate representative

In what follows the Review Group recommendations are listed, with the paragraph reference from their report. Then there is a category number (1, 2 or 3), indicating the following:

1. Recommendations entirely under the control of the School
2. Recommendations outside the control of the School
3. Recommendations requiring recurrent or capital funding

Finally, there is an indication of implementation timescale envisaged, as follows

A. Recommendations already implemented
B. Recommendations to be implemented within one year
C. Recommendations to be implemented within five years
D. Recommendations which will not be implemented

Report	Review Group Recommendation	Cate-gory	Action taken / Planned / Reason for not implementing	Timescale
Organisation and Management				
A.6	The School should continue to develop the workload model and use it to reduce inequities in workload.	1	The need for, and usefulness of, a workload model is fully appreciated. Such a model already exists. It is not perfect. Indeed workload metrics frequently fail to provide consistent measures of the time and effort involved in a given activity. For the Head of School and for all involved in management, trying to match the work to be done with the people available and their various abilities, in a fair and reasonable way, is a continuous challenge and responsibility.	A/C
A.7	The School should consider student representation on the School Executive and Teaching & Learning committees.	1	The School is of the view that input from students to decision-making at the School Executive Level and in aspects of Teaching and Learning can best be obtained through other channels, including the (very active) Staff-Student Committee (at which aspects of Teaching and Learning are frequently addressed), through existing student feedback channels (formally organised for all taught modules), through mentoring, through informal feedback, and through constant dealing with student issues, which can take many forms. More formally, and at the programme level, the School is pleased that student representatives sit on Programme Boards and contribute directly to its decisions.	D
A.8	Given the importance attributed to non-EU student recruitment and philanthropy as potential solutions to the school's financial challenges, the School should consider tasking individuals with advancing these areas in conjunction with College and University-wide actions.	1	The School has actively augmented its engagement with the College International Marketing Manager. The Head of School and three additional staff members have travelled on multiple recruitment missions to the priority regions of India, China and North America. This Marketing Manager is also working on a College Development strategy to secure philanthropic donations and the School is engaging with this strategy. While the existence of a Marketing Manager at College level and of UCD Foundation are welcome, there are specific priorities that pertain solely to the School. In instances where possible philantropic or external opportunities can be identified, specific individuals do take responsibility to pursue these, for example externally funded posts. The greatest ongoing challenge, however, continues to be dealing with infrastructural deficits (laboratories, equipment) and acute staff	A/D

			shortages in certain subdisciplinary areas.	
Staff and Facilities				
B.7	The Review Group recommends that the schools that are sharing the administrative staff develop a plan to address the risk of this shared support becoming overburdened by development in either/both schools or by the absence of one of the members of administrative staff. This is particularly relevant with the increase in postgraduate student numbers.	1	Since the QA/QI Review, one new 5-year Executive Assistance has been appointed in the Schools' Office to complement the existing three administrative staff. Additionally, both Schools have recently appointed one full-time Post-Award Research Administrator, funded separately from research income and overheads.	A
B.8	When recruiting academic staff, the School should emphasise both active research engagement and strong teaching qualifications.	1	Since the creation of the new School of Mechanical & Materials Engineering four years ago a total of seven new College Lecturers and two Professors have been recruited to join the School. No appointments were made in the previous ten-year period. The School's recent Strategic Plan has identified up to eight additional posts, including two at Professorial level, which are intended to be made within the coming five-year period. In every single instance, it will be mandatory for each individual to be actively engaged in research and to have a clear research focus. As with all appointments to date in UCD, it will not be necessary for any future academic staff to have formal teaching qualifications, although all individuals will be required to have outstanding teaching abilities, appropriate for either cohorts of undergraduate or graduate students.	A/C/D
B.9	The Review Group recommends that the School try to reduce the administrative workload for early career academics to enable them to focus on developing a research base.	1/2	To the extent that this is possible, the School already does this. However, in four of the nine staff appointments mentioned in B.8 above, newly appointed staff were obliged to assume senior administrative roles as Programme Director (Masters in Engineering Management; Masters in Biomedical Engineering; Master of Engineering with Business; MEngSc in Engineering Management). This is solely a reflection of the acute pressure under which the School is operating and has had to develop new taught programmes in order to meet its budgetary targets. Growing staff numbers as agressively as possible will help with this objective, although in some specific instances where a single individual is associated with a particular programme, neither sabattical leave nor relief from such an onerous administrative responsibility is readily forseen.	C
B.10	The Review Group would strongly recommend that the School, when	1	While all core subdisciplinary areas of mechanical engineering will	A

	recruiting new academic staff, ensure that the qualified teaching of core mechanical engineering subjects is covered.		continue to be covered by existing and new academic staff, an alarming number of key areas are likely to remain vulnerable and served by single individuals (e.g., fluid mechanics, dynamics & control). Plans to increase staff numbers are intended to help address this challenge.	
B.11	When recruiting early-career academic staff, the School should allocate funding to facilitate attendance at international conferences and, where practicable, the purchase of some experimental equipment.	1/3	Agreed, within the restrictions imposed by budgetary limitations. In some instances these objectives will be achieved most readily by encouraging collaboration with senior, research active staff.	A/B/C
B.12	The School should formalise the peer mentoring supports provided for early career academic staff. Mentoring for postdocs should also be considered.	1	Agreed. In addition to the guidance and mentoring of new staff already happening, the School will assign a senior member of staff to act as a peer mentor for the first three years of the career of a new staff member. Postdocs are generally recruited and supervised by the academic leader of a research activity, who will naturally act as a mentor, although it would seem appropriate that this might usefully be formalised at a College Level by the College VPRII.	B/C
B.13	The Review Group would encourage the University to reconsider the current academic qualification requirements for technicians for enrollment and promotion. Such requirements are not common internationally.	2	The School welcomes the recommendation that the University and Unions should reconsider the requirement for Technical Officer and Senior/Chief Technical Officer staff to have relevant Level 8 or Level 7 qualifications instead of significant relevant industry experience in many areas of engineering. However, it is noted that the academic qualification for Chief Technical Officers was set out in a nationally agreed Expert Group report from 2006. UCD Human Resources are currently looking at whether flexibility exists to re-examine the qualification criteria. Subsequent to this QA/QI Review, the School has embarked on a process to recruit a Technical Officer for its Manufacturing Workshop. Of the 22 applicants, only two satisfied the mandatory requirement to have a Level 7 qualification and had relevant experience, although eleven other individuals had excellent relevant experience, typically 10-20 years in the manufacturing industry, but were without a Level 7 qualification. Neither of the two Level 7 qualified applicants were deemed appointable.	D
B.14	The School should develop a plan for future laboratory equipment upgrade requirements, including student setups and basic mechanical materials properties testing equipment.	3	Agreed, within the restrictions imposed by budget limitations. Since the QA/QI Review, the School has significantly upgraded its Design Office and the room used for the MEM Programme. Additionally, the School	A/C

			has invested in laboratory resources to develop portable data acquisition units which can be used across a multitude of modules including thise related to materials, and to implement a "Learning Factory" environment in our Manufacturing Workshop to support its teaching facilities for manufacturing.	
Teaching, Learning and Assessment				
C.3	The School should increase the amount of continuous assessment in modules. This could be in the form of exams during the semester or graded homework assignments. This would require additional resources such as postgraduate tutors.	3	The amount, and timing, of continuous assessment (CA) in SMME modules is under continuous review. The recommendations note that any increase in CA would require additional resources. Growing student numbers mean that additional resources are now required merely to maintain the current level of CA. Some students also complain of "assessment fatigue", and there is a notable drop in lecture attendance when a CA in any module is imminent. Currently, therefore, the School has neither the resources, nor a strong desire, to increase the quantity of CA. However, the School Head of Teaching & Learning plans to undertake a review of the timing, nature, and quality of the CA that is provided, and of the timeliness and quality of feedback delivered to students. This review will seek to structure the CA in each semester to deliver the maximum benefit to students, within the constraints imposed by heavily-stretched resources.	B/C
C.4	The Review Group recommends that the School increase the quality and quantity of lab equipment associated with teaching modules. This would be important in the context of recruiting international students.	3	c.f. B.14 above	A/C
C.5	Increase technical support staff for undergraduate modules, and undergrad/postgrad projects.	1/2/3	The School is very conscious that it is inadequately resourced in this area. Creative efforts are being made to increase technician resources – for instance by employing two apprentice toolmakers and obtaining non-core funding for one contract techician – but the funding available for this purpose is inadequate to provide a fully satisfactory level of support. A key ratio to be considered in supporting undergraduate and graduate students is the ratio of technical staff to the number of FTE students. Grave imbalances exist even within UCD's five engineering schools and no HR mechanism exists to permit a transfer of technician resources to satisfy acute demands. Frustratingly, many state funding agencies also refuse to permit technician costs to be charged to research grants. Nevertheless, the School is determined to increase its	A/C

			cohort of skilled technical staff. See also B.13 above.	
C.6	Change the current relationship between letter grades and numerical scores, especially in modules where assessments are based on questions or problems with well-defined answers or solutions. Since an A+ should indicate that the student answered nearly everything correctly, this should correspond to a numerical score in the 95-100% numerical range.	1	Defining the relationship between letter grades and numerical scores is the responsibility of individual module coordinators. The university regulations allow them to depart from the standard mapping. There have been discussions at School level about establishing an alternative mapping for the School. However, since students take modules from a variety of Schools (and Colleges), and since the standard UCD mapping works satisfactorily for some – though not all – School modules, no clear path forward has been identified. Some module coordinators already implement a more linear mapping, others are happy to stay with the university standard, perhaps adjusting their marking schemes to suit. Grade distributions across all School modules are reviewed each semester at the PERC and SMEC. In addition, The School Head of T&L, and the Head of School, carry out a detailed review of grade distributions and of student feedback for each module annually. Modules with highly-skewed grade distributions can therefore be identified, and further action taken as appropriate.	A/C
C.7	The Review Group recommends that the School consider carefully their international student recruitment policies and activities to include not only year-abroad study opportunities but students taking the three and four-year programmes.	2	The School has strategically focussed on the recruitment of full degree international students at bachelor and master level by engaging in direct recruitment missions in priority non-EU markets. In the academic year beginning September 2015 19 non-EU students entered the first year Engineering Omnibus and 19 non-EU students entered the School graduate-taught programmes. This represents a 46% increase on the 2014 intake. In addition, the School has signed a number of overseas partnership agreements to ensure a steady future supply of quality international applicants.	A/B/C
Curriculum Development and Review				
D.6	PWE should be optional rather than a mandatory for students. This could allow students who decide not to avail of PWE to study additional modules in their fourth year.	2	The School considers the professional work experience to be an integral and very important component of the relevant programmes. Since its introduction, the experience with PWE has been universally positive for students, industry and the university. Furthermore, degree accrediting bodies strongly encourage incorporating some engineering practice into the undergraduate programme. Students who do not satisfy the requirements for the placement, or	D

			who have difficulty obtaining a placement, or for other reasons, are already permitted to replace the full 30 credit PWE module with 4 additional taught modules (or 20 credits) together with a short 10-credit PWE option, which can also be taken in a suitable research group within or outwith UCD. The School believes that this approach already allows students to study additional modules in their final years and the School will not recommend to the Engineering Programme Board that it should facilitate students' deciding "not to avail themselves of" the PWE, by facilitating its total substitution with more modules.	
D.7	The Review Group recommends that the College, when reviewing the stage 1 curriculum, consider the following points. • Modules should be modified to take into account the new math curriculum in the Leaving Certificate. • A computer programming module, which includes MATLAB, should be added as a core module in Stage 1. The programme should be taught by a member of academic staff within the UCD College of Engineering and Architecture.	3	The Engineering Programme Board has established a subcommittee on Stage 1 design to address this issue. We understand that this subcommittee will study the Review Group's recommendation during the coming year.	A/B/C
D.8	The School should develop a mechanism to allow undergraduate students (especially BE students) to have some interaction with industry. While the Review Group acknowledges that internship as part of their programme is not really feasible, some possible approaches include field trips to 'plants' and/or visits by recent graduates and other more senior industry representatives.	1	The Programme Steering Committees of all relevant BE programmes will consider this matter during the coming academic year. Such interactions are afforded to BE students already through Guest Lectures, Adjunct Lecturers and Field Trips as part of some modules while the active student society, MechSoc, also provide such opportunities.	A/B
Research Activities				
E.4	Research interests and applications within the School should be broad enough to be able to adjust to changes in financing opportunities.	1	Agreed. To a large extent individual academic staff chose which research areas to pursue actively. In choosing areas they take many aspects into account: their expertise, their interests, the potential for collaboration, the needs of the School, and, not least, the availability of funding. So there is a natural mechanism by which, within limits, research proposals and projects are inherently guided by funding opportunities.	A/B/C
E.5	ME projects should to some extent be aligned with ongoing research activities at the School to financially benefit the laboratories in e.g.	1	Agreed. Academic staff tend to propose projects related to their research interests. When ME projects are directly related to specific	A/B/C

	sponsoring regular maintenance or purchase of materials.		industrial partners, often resulting from a student placement, the industry will be invited and encouraged to sponsor the work in some way, such as supply or maintenance of equipment and/or supply or purchase of materials.	
Management of Quality and Enhancement				
F.5	Additional technical staff should be made available to the School to reduce potential Health & Safety risks and to ensure that the learning outcomes for students are not negatively affected by a reduction in experimentation opportunities in laboratory settings.	3	Agreed – see also C.5 above. In making the case for staff positions these important aspects of the role of technical staff are emphasised.	A/B/C
Support Services				
G.4	Streamlining the processes for the recruitment and set up of post-doctoral research staff should be a priority for UCD Human Resources.	3	Detailed guidelines around recruitment of post docs exists on the University Human Resources website: http://www.ucd.ie/hr/recruitment/researchfundedrecruitment/. In addition, service level agreements are in place for the recruitment of research-funded staff: http://www.ucd.ie/hr/t4cms/Recruitment_SLAs_Research.pdf.	A/B/C
G.5	The University should consider developing an induction information sheet for new staff outlining key initial steps. This information could be supplemented at School-level by relevant local information.	1/2	The University Staff Orientation Policy can be found on the UCD Human Resources website http://www.ucd.ie/hr/t4cms/Orientation_Policy.pdf. The UCD Human Resources Learning and Development website has detailed information, including checklists, dedicated to new staff (http://www.ucd.ie/learninganddevelopment/newstaff/). Relevant local information is already covered in the post specification, the interview process, and, after the appointment, in conversations between the new staff member and Head of School and colleagues within the School. Major items will be covered automatically, and minor and changeable items listed on a sheet might quickly become dated.	D
G.6	The School should consider engaging in a strategic planning exercise,	1/2	The College Marketing Manager works closely with both the Head of	A/B/C

	with College international student recruitment inputs, to develop their thinking in respect of international student recruitment.		School and all Programme Directors to plan appropriately for the recruitment of international students. While the School is fortunate that there continues to be strong demand from students for places on the various programmes which it leads and from employers for graduates of these programmes, the School does need to consider the balance between EU and non-EU students on these programmes, since there are direct financial and resource implications for the School that will arise from these decisions.	
External Relations				
H.3	Develop a communications plan, with input from the College and the University Relations Office.	1,2	The School is feeding into the Engineering & Architecture College Public Relations strategy. The strategy includes: o Enhanced relations with education, technology and innovation correspondents in traditional and new media o Media monitoring o A Media Connect licence for press release dissemination o Media Training for high profile researchers o A full communications calendar o Alignment with a media partner o PR Company hire on a project basis	C
H.4	Consider setting up an Industry Advisory Board.	1	This has been considered frequently, but to date there have been good reasons for not proceeding to formally setting up such a board. To avoid potential frustration on both sides, the roles, responsibilities, constitution, method of appointment and the authority of such a board would need clear definition. The interface between the School and such a board would also require time and other resources. Some of the benefits of having such a board can be obtained informally, including feedback on programmes, sponsorship, provision of guest speakers, and advice on staff and research directions. Nevertheless the School continues to keep this suggestion actively in mind.	B/C
H.5	Consider dedicated administrative support for developing the Alumni relations activity. This could happen at College level.	3	The 2015 College strategic marketing plan has a detailed alumni engagement strategy with a recommendation for dedicated administrative support to emulate the best practice of the UCD Business School. This is under consideration by the College Principal.	C