

Quality Assurance / Quality Improvement
Programme for Academic Units
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Quality Improvement Plan

School of Physical Sciences

10 September 2002

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Quality Improvement Plan

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Dublin City University

September 2002

1. Introduction

The School of Physical Sciences at DCU has been one of the leading centres in Ireland for the education and training of undergraduate and postgraduate Physics students in the past ten years. In total, over 350 BSc, 50 MSc and 32 PhD graduates have been produced by the School since 1992. Students on degree programmes across all science and engineering disciplines take Physics course also, with the result that the School is centrally involved in a large fraction of technology-based programmes at DCU. At present, the School is providing courses to approximately 600 students from other degree programmes at the university. Within the Faculty of Science & Health, the School led the development of the BSc in Science Education, for which the first graduates will emerge in 2003, and of web-based continuing professional development courses for people in employment.

The School has played a major part in the creation of a strong research culture at DCU. This was achieved through strategic recruitment of staff with strong research records, through sustained success in national and international research funding schemes, and through participation in high profile conferences and publication in high impact journals. The quality of research in the school is indicated by the award of the annual President's Research award to members of the school on two occasions in the past five years, and by the leading role being played by School members in the National Centre for Sensor Research (NCSR), and the National Centre for Plasma Science and Technology (NCPST). The strength in depth of the School is evident from levels of research publications and citations which compare favourably to those for other Irish universities. The international standing of the School is exemplified very clearly by the participation of many staff members at international conferences and by the involvement of international speakers at School seminars. In this regard, the School is proud of having had four Nobel Prize winners for Physics on campus to date, the most recent in January 2002.

In this document we present a quality improvement plan based on a major review of all activities in the School. While it is evident from the findings reported below and in the Peer Review Group report that the School has achieved very high standards in all areas, there are some areas where improvements can be made. The implementation of this plan will require considerable support not only at School level, but also at university and indeed national level.

2 MAIN FINDINGS IN SELF ASSESSMENT AND PEER REVIEW PROCESSES

We present below the main findings of both the self-assessment review conducted by the School and of the Peer Review Group. These are presented in tabular fashion in order to facilitate a comparison of the views of the School and of the external panel. It is evident that in general, there is broad agreement between the two groups. The entries below have been extracted from the original reports.

2.1 Organisation and Management

Self Assessment Report	Peer Review Group Report
<p>School activities are managed by the Head of School in conjunction with the Chairpersons of the Degree Programme Boards and by means of a committee system. Standing committees exist for safety, staff/student liaison, research and computing. The programme boards meet together for dealing with learning/teaching issues. The School liases closely with other schools in the Faculty of Science and Health through the following Faculty Committees: (i) Teaching and Curriculum Review; (ii) Research; (iii) Safety; (iv) Marketing. Meetings of School staff take place at four-week intervals at which both routine and strategic issues are handled. Occasionally, off-campus meetings are held for dealing with major issues. Staff and students are generally satisfied with the manner in which School business is handled, and all sectors describe the School as having a strong work ethic, excellent community spirit and high morale.</p>	<p>The School is well organised with an effective committee structure. A team-based management approach ensures broad participation in management. The emergence of the large-scale interdisciplinary research centres (NCPST and NCSR) which are headed up by members of the School, and in which 75% of the School staff are involved, is the dominant dynamic at this time. The School is going through a period of rapid development with the emergence of these Centres and the related significant increase in funding. The relationship between the School and the Centres is ambiguous.</p>

2.2 Programmes and Instruction

Self Assessment Report	Peer Review Group Report
<p>The School is solely or jointly responsible for five programmes at undergraduate and postgraduate levels. The School also contributes to many undergraduate programmes across science and engineering mainly at first year level. Degree programmes in Computer Applications and Applied Languages also include Physics modules.</p> <p>Undergraduate students on full-time programmes show generally high levels of satisfaction with the quality of the lecture and laboratory courses provided by the School. Tutorial support and time-tabling are the only aspects which were rated overall as less than satisfactory.</p> <p>The major themes of the BSc in Applied Physics (electronics, optics, and computing) are seen as still valid themes. However, the detailed content of the specialist modules should be examined to ensure it is up-to-date, and the benefits of a pass degree exit should be examined</p> <p>Staff and students are generally satisfied with the balance between theory and practicals and with the variety of assessment methods used. The final year projects are generally very well received by the students. The small number of students on the Physics with French/German programme is a disappointment even though the additional resources they require are minimal (the students share both Physics/Mathematics and Language courses with other groups). This programme, with its counterpart Chemistry with French/German, is being relaunched as part of a wider Science International Programme, which will include English speaking countries for the period abroad.</p>	<p>The flagship BSc in Applied Physics is highly valued by former and current students, as well as by employers. The recent decline in enrolment is of concern, as is the ageing of laboratory equipment and the availability of industrial placements [for undergraduates]. The introduction of the peer-tutor system and general student-centred efforts towards improving first-year retention rates is to be welcomed. Teaching in other undergraduate programmes appears to be well received by students and their respective schools. Staff members are "very approachable" and the school is a student-centred unit.</p> <p>Postgraduate numbers (current and projected) warrant the provision of some formal coursework, with certification linked to progression from Masters to Doctoral registration. Web-based and other "off-campus" students present opportunities and challenges to both the School and the University.</p>

2.3 Scholarship and Research

Self Assessment Report	Peer Review Group Report
<p>The School has played a major part in the creation of a strong research culture at DCU. The quality of research in the school is indicated by the award of the annual President's Research award to members of the school on two occasions in the past five years, and by the leading role being played by School members in the National Centre for Sensor Research (NCSR), and the National Centre for Plasma Science and Technology (NCPST). The strength in depth of the School is evident from levels of research publications and citations, which compare favourably to those for other Irish universities.</p> <p>The community of researchers in the School report high levels of satisfaction with the overall research culture and research environment. The main areas of dissatisfaction are (i) the low levels of dedicated technical support for research, (ii) poor funding levels for equipment maintenance/replacement, and for research materials and travel, (iii) the absence of a career structure for researchers, and (iv) diminishing library funding for research periodicals.</p>	<p>A high proportion of academic staff in the School are 'research active'. There is a strong synergy between the research performed and instruction, in particular with the Applied Physics course. Research is strongly coupled to that performed in the NCPST and NCSR. That the School provides the leadership in the two centres is evidence of its research profile within the university.</p> <p>The School has benefited from major equipment donations and a good level of external research funding. However, there are deficiencies in the infrastructure, especially insufficient technical support and the absence of career paths for research-only staff.</p> <p>In terms of research output the School is competitive on an Irish level. Elements of the School are internationally competitive and the School as a whole has the potential to compete on an international level. The expansion of computational physics (numerical modelling and simulations) and growth in postgraduate student numbers would underpin the future development of research.</p>

2.4 Social and Community Services

Self Assessment Report	Peer Review Group Report
<p>Members of the school contribute widely at local, national and international levels in activities related to Physics other than formal education and research. Examples include:</p> <ul style="list-style-type: none"> • Access programmes for pupils from disadvantaged areas. • Student retention programme developed by the HEA. • Science outreach to the local schools and communities. • Provision of opportunities for second level pupils to access laboratory facilities. • National organiser for the Physics Olympiad. • Supported the Physics elements for the Pfizer Science Bus for primary schools. • Memberships in the Taskforce for the Physical Sciences <p>The Physics seminars are particularly well regarded both within and outside the university, as the speakers have included world-leading scientists.</p>	<p>There is strong involvement in outreach, access programmes and the promotion of physics in the local post-primary schools.</p>

2.5 Staffing, Accommodation and Resources

Self Assessment Report	Peer Review Group Report
<p>The main problem areas are in career progression/promotion for all staff categories. While the School welcomes the annual cycle of promotions for academic staff, there is a serious dissatisfaction with the continued use of quotas for Schools regarding promotion from lecturer to senior lecturer. The School view is that merit alone should be the criterion. There are inconsistencies across the university in the allocation of Professorship positions to Schools. The absence of a career path for researchers is also a problem and technical staff have no clear progression path either</p> <p>There is general dissatisfaction with the absence of a dedicated meeting/seminar room in the School. Also, the absence of a designated area for social interaction is viewed as a serious shortcoming, and there is strong desire for easier access to the School outside office hours</p> <p>The School has received only one capital budget allocation since 1993 (€63,500 in 1999-2000). This has resulted in a gradual and serious degradation in the quality of the undergraduate laboratory equipment.</p>	<p>The School has a well-motivated staff with a high proportion of researchers and good quality research equipment. The current senior/junior ratio inadequately reflects the age and experience of academic staff. The lack of promotional opportunity poses a serious threat to the research potential of the School. The fact that all 24 research-only staff members are on contracts of not more than one year is unhelpful.</p> <p>Office and laboratory space will improve when the nearly complete additional research centre facilities come on line. There is however a lack of a School “common space”. The undergraduate equipment is out of date and a cause for concern.</p>

2.6 Services delivered and received

Self Assessment Report	Peer Review Group Report
<p>The outcomes of surveys of stakeholders (other Schools/Units in DCU, external bodies, employers, second-level schools, graduates) show that the School is rated highly regarding the standards achieved in education, research, communications, reporting.</p> <p>The School finds a wide variation in the quality of the services received. The Library services are generally satisfactory. Procedures and services related to the Finance Office and the Personnel Office are found to cause the greatest levels of dissatisfaction in the School. For other sectors (Registry, Buildings Office, Education Services for example), the services are viewed as suffering mainly from poor internal (DCU) communications.</p>	<p><i>No direct reference was made by the Peer Review Group to this subject</i></p>

3. RECOMMENDATIONS FOR IMPROVEMENTS

3.1 Organisation & Management:

Given the outcomes reported above and the changing environment within which the School is operating, notably the creation of the NCSR and NCPST research centres, the new university management structures and new budget systems, the following are the recommendations for improving the organisation and management of School business:

1. A clear and well-defined vision around the respective roles of the School and the large research centres covering both teaching and research is required.
2. A new long-term Strategic Plan for the School to include clear prioritisation and costings over five years should be developed
3. A university-provided professional marketing approach supported by the School should be adopted to address declining student numbers

Actions already implemented:

1. Postgraduate and postdoctoral representatives attend School meetings
2. A School Resources and Finance Committee has been established

3.2 Programmes & Instruction:

1. For the main Applied Physics degree programme:
 - Identify market needs
 - Retain title and update contents
 - Examine feasibility of an exit after year 3 with a suitable qualification
2. In the context of the outcomes of a professional marketing analysis, examine the potential of an MSc in Science Education, a broadened BSc in Science Education, and multistrand physics degree exit options from a single common entry
3. Develop strategic alliances with key International institutes and in particular foster the relationship with ESPEO (Orleans)
4. Seek professional qualifications in EU scientific translation for the Physics/Language graduates
5. Review the balance of teaching methods used (lectures, labs, projects, team learning)

Actions already implemented:

1. A pilot problem-based learning programme has been put in place for several groups for 2002-03

3.3 Scholarship and Research:

1. Develop a recruitment strategy (linked to the School strategic plan) to entice high quality postgraduates to carry out research programmes in the School.
2. Appoint technical specialists to support advanced research equipment and facilities
3. Build on existing international links at research level

Actions already implemented:

1. A funding policy for supporting improved completion times of MSc and PhD degrees has been adopted by the School

3.4 Social and Community:

1. Evaluate and strengthen the DCU partnership with local schools to optimise the returns from the commitment involved.
2. Continue to participate fully in national and international organisations and professional bodies linked to Physics

3.5 Staffing, Accommodation and Resources:

The recommendations below are presented under three headings: budget, facilities and personnel. These impact on all aspects of the School and accordingly are significant for all the other recommendations in this plan.

Budgets:

1. Set the budget weighting for Physics to be the same as that for the other sciences.
2. Develop a capital funding programme to upgrade and modernize the undergraduate laboratories
3. Develop a budget system for the service, repair and replacement of research and workshop equipment, and for regular upgrades of staff computing/IT resources

4. Fund the tutoring and demonstrating services delivered by the School from central resources
5. The funding of library periodicals should be addressed by all Universities nationally.

Facilities:

1. A common informal meeting/assembly area for School personnel should be prepared
2. Access to buildings at night and weekends needs to be facilitated
3. The standard of office and desk space provided for research staff should be improved

Personnel:

1. Promotions of all categories of staff should be based on merit alone, and the use of quotas should be discontinued.
2. Anomalies in practices and salaries between DCU and other universities/ITs for all categories of staff should be examined and eliminated where appropriate.
3. Career structures should be developed for postdoctoral and contract researchers (referred to above under Research & Scholarship)
4. In the light of comments in the Peer Review Group report, the balance of senior:junior academic staff should be improved to reflect the standing and experience of School staff.
5. Strategic needs should override methods based purely on student numbers for allocating staff to Schools.

3.6 Services delivered and received:

1. The quality and timeliness of information from the central administration offices should be substantially improved, and an up-to-date Management Information System should be installed
2. The highly bureaucratic procedures used for staff recruitment, particularly for incidental and short-term work, should be eliminated
3. The procedures used by the Buildings Office for costing and carrying out laboratory refurbishments and minor works should be reviewed.

4. PRIORITISED RESOURCE REQUIREMENTS

This section contains a list of resource requirements necessary to implement the recommendations outlined in the Self Assessment and Peer Review Group reports. Estimates of the cost involved are included. Separate lists are shown for undergraduate, research and other needs.

	Recommendation	Estimated Cost
Undergraduate	Professional marketing programme to address issue of declining numbers on undergraduate programmes, to include the identification of possible new degrees	20,000
	Upgrading of undergraduate laboratory equipment and facilities	250,000 over five years
Research	Recruitment of two technical staff to support advanced research facilities and equipment	80,000 pa (possible cost sharing with Research Centres)
	Development of a scholarship programme for high quality postgraduate student recruitment	60,000 pa (to be funded in part by industrial sponsors)
	Research and workshop equipment maintenance and replacement programme	Based on % of value of equipment and as part of an agreed national budget process
Other	Provision of common social area in the School	5,000
	Personnel support to implement the quality improvement plan	10,000 pa for two years

5. SUMMARY OF THE ONE-YEAR PLAN

At School level:

- Preparation of a long-term strategic plan
- Implementation plan for upgrading of undergraduate laboratories
- Preparation of a student recruitment programme based on professional marketing
- Creation of a common assembly area for School personnel
- Appointment of technicians on permanent contracts for advanced research equipment support
- Identification of new partners for student exchange in Science International programme

At University level:

- Development of an attractive career structure for contract technical and research staff
- Budget weighting for Physics in line with that for the other sciences
- Inclusion of all research staff in calculation of research budgets for Schools
- Promotion policy based on merit alone, and not subject to quotas at School level
- Professional marketing support for the School
- Up-to-date Management Information System in operation
- Effective procedures for out-of hours access to research facilities

6. SUMMARY OF THE FIVE-YEAR PLAN

The long-term strategic plan to be developed in the coming year will provide the framework for the development of the School over the next five years. Accordingly, we cannot provide specific targets at this stage. However, we believe the following objectives will be among those aimed for in five years:

- A clear and well-defined vision around the respective roles of the School and the large research centres
- Expansion of continuing professional development activities beyond Plasma & Vacuum into optics/photonics and other technology sectors

- International recognition for high quality web-based programmes
- Expanded high-quality undergraduate programmes designed to match the interests of pupils and aligned to the current and anticipated needs of the country.

Appendix

School Quality Review Co-ordinating Committee

Ms Sarah Byrne, representative of Postgraduate Students
Dr Tony Cafolla, School Research Convenor
Prof. Martin Henry, Head of School
Mr Alan Hughes, Senior Technician and representative of Technical Staff
Dr Colette McDonagh, Chairperson of Applied Physics Programme Board
Dr Aisling McEvoy, Representative of Contract Research Staff
Dr Jean-Paul Mosnier, School Quality Review Coordinator
Ms Lisa Peyton, Secretary and representative of Administrative Staff

Peer Review Group

Mr. Frank Turpin, Education Manager, Intel Ireland (Chair)
Prof. Ignatius McGovern, Department of Physics, Trinity College Dublin
Prof. Dietrich Zahn, Institut für Physik, Technische Universität Chemnitz, Germany
Prof. Charles McCorkell, School of Electronic Engineering, DCU
Ms. Miriam Corcoran, The Library, DCU (Rapporteur)