Engineering Professors' Council

Newsletter March 2011

Funding Engineering Education

Professor Barry Clarke
President, EPC

The Browne Review, the Comprehensive Spending Review, *The Higher Education (Basic Amount) (England) Regulations 2010* and the forthcoming White Paper on Higher Education all point to a transformation of higher education in the UK.

Universities have for a number of years been faced with financial challenges, none more so than for engineering which, according to an EPC/ETB survey in 2008, is some 14% underfunded. Engineering schools have long been adept at using a mix of funding streams to offset this shortfall. The speed of transformation, however, has generated a great deal of uncertainty as we grapple with the implications of the changes not only to funding but to the world of higher education. The media has focused on the proposed fees as it is perceived that students will be paying these. In fact it is the graduates that will pay back the fees over a thirty year period provided they earn enough to do so. This means that the government will pay the universities to educate students with universities setting the fee level. The government based their calculations on a fee of £7500 but then permitted universities to charge up to £9000. Not

Included in this issue:

EPC Congress 2011

Keynote: *Professor Brian Collins, Chief Scientific Adviser to DfT & BIS*
Sessions on:

- **funding engineering education**
- **the international agenda**
- **graduate employability**

Distinguished Guest Lecture:
Mike Chrimes, ICE
Congress Dinner

London South Bank University
Tuesday 12th April

EPC Conference on the Future of Engineering Higher Education

with presentations and a range of speakers leading debate on key topics; followed by workshops on the challenges and how to take this agenda forward.

London South Bank University
Wednesday 13th April - see page 4

Book for both days at
www.lsbu.ac.uk/enterprise

surprisingly some universities have taken that opportunity and are declaring this will be the fee. This has raised real concerns within government, leading to a delay to the White Paper, as they reconsider their financial model.

The fees have to be fixed this autumn, given that the first students to be supported by this scheme will enter in 2012. It is the government that will provide the funds initially but it is not clear as yet how the government will decide on how many students they will support, the disciplines those students will be allowed to study and the how places will be allocated. This government wants to see a student-demand-led education that delivers graduates with the skills industry needs. Thus the government proposes that universities will be funded by students, industry and philanthropic contributions. However, some funds will be available to support vulnerable subjects and high cost subjects. How these will be chosen is not clear, nor is it clear how much funding will be available and how this will be used to support these subjects directly.

The government also want to see an improvement in higher level skills in the UK. A recent report by UKCES shows that the UK higher level skills are dropping relative to those of other major economies. The government propose that competition will raise standards. Competition for students at both undergraduate and postgraduate levels is already taking place across Europe as more programmes are being delivered in English. The government propose that degree-awarding powers could be given to industry and private training providers to increase that competition further.

Engineering programmes have been delivering value for money for a number of years and, through the accreditation process, are recognised internationally as meeting a minimum standard. Of course improvement is always possible, but our focus on higher education rather higher skills is critical given the grand challenges we face as we enter a low carbon future with depleting resources and changes in climate. Our graduates will have to cope with significant change. This will be reflected in changes to our programmes at a time when we are dealing with the transformation of higher education to deliver value for money, raise standards and diversify funding streams.

These are the issues that we shall be addressing in our Congress and Conference next month. I do hope that as many of you as possible will join me at London South Bank University as we try to chart our way ahead, drawing on the views and expertise of distinguished speakers both within and outside academia.

The International Agenda

Professor Clive Neal-Sturgess

Chair of the EPC International Working Group

The second session of the Congress will focus on international issues, under the theme of "competition and opportunity".

We are delighted that Julie Fionda, from the European Commission's Directorate General of Education and Culture, will bring us up-to-date on "What should the engineering academic know about the European agenda?". This follows on from the EPC Committee's Retreat in Brussels last September, reported on our last Newsletter, during which Julie gave us a particularly interesting presentation. The EPC's International Working Group has been active in the meantime, responding to formal consultation and directly to our interlocutors in the Commission, particularly regarding Engineering Doctorates and the involvement in industry in research. At the highest levels the Commission wish to ensure that research is industrially relevant, and that the outputs of research have ready mechanisms to be exploited and contribute to innovation – concerns set out in February in the Commission's Green Paper *From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation Funding.*

To help prepare for debate on European issues at the Congress, the International Working Group carried out a survey of members' views on student and staff mobility; and on their experiences of the Framework Programme. We had a good response, which will be summarized during this session.

Our other speakers on aspects of the International agenda will be Kevin Van-Cauter, Higher Education Adviser at The British Council, who will talk about the changing international context for student recruitment and the British Council's new Internationalising Higher Education Strategy; and Dominic Scott, the Chief Executive of the UK Council for International Student Affairs, who will give an up-to-the-minute briefing on the latest developments on Tier 4 student visas, and other issues of direct concern to our overseas students.

Also at this session, we will have a presentation from a current international student at a UK university, who has personal experience of studying both in the UK and elsewhere in Europe: how do we compare, in student eyes?

And there will of course be plenty of time for questions and debate.

Employment of Engineering Graduates

Professor Helen Atkinson
President-Elect, EPC

The final session of the Congress will look at the employment of engineering graduates. Our first speaker is Will Archer, who has agreed to speak on trends in engineering employability. Will is Chief Executive of i-graduate - the independent benchmarking, research and consultancy service, which produces for example the Student Barometer - and sits on the Council of the CIHE (Council for Industry and Higher Education). i-graduate is also carrying out the new International Student Tracking Study on behalf of BIS – see article on page 7 below. Next will be Chris Dowlen from LSBU who will talk about the employability experiences for our Congress hosts. This session will help to set the scene for a study the EPC is planning to carry out to understand why there is an apparent mismatch between graduate supply and demand: engineering employers say publicly at national level that they need more engineering graduates. Surveys by, for example, the Engineering Employers Federation, prove there is demand. So why is there a 13% unemployment rate for engineering (HESA data July 2010) with, in addition, a proportion of graduates employed in non-graduate level jobs? Employability has received a huge amount of attention but there is a distinct issue here about why certain students do not get graduate level work within a short time of graduation.

Our study, funded by the Midlands hub of the National HESTEM Project, will focus on these students. The Universities involved are Leicester, Loughborough, Aston, Birmingham and Coventry. The study would go beyond issues of employability (but include them); e.g. a graduate can be highly employable but want to live in a part of the country where few jobs are available. Each of the universities involved will identify the engineering students in the 2010 graduating cohort who are unemployed (or in non-graduate level jobs) at the 'First Destination' census date. These students will be offered an interview where the interviewer will build up a picture of the interviewee and identify the key issues that may be impeding employment at graduate level. Questions will range from whether the student decided to put off looking for a graduate level job

until after graduation (and therefore 'missed the boat' for 2010), through to academic and personal skills attributes and motivation. Issues such as regional location will be included. The findings will be set against national trends in the availability of jobs in the various engineering disciplines (e.g. civils versus mechanicals). In addition, employers will be interviewed to cross-validate the findings with graduates, along with some graduates who are in graduate level employment to elicit their views on their skills needs/gaps.

We hope the findings will be helpful to the members of EPC in due course and look forward to discussion and feedback.

The Future of Engineering Education

Professor Barry Clarke
President, EPC

Higher education is undergoing radical change: the funding regime; increasing focus on employers' needs and students' aspirations; increased international competition; and the grand challenges of climate change, poverty alleviation, health and well being and resource depletion. There is no greater time to test whether our engineering programmes are fit for purpose.

The EPC conference on the 13th April will create a forum to debate these changes.

Engineering programmes are designed to meet the learning outcomes developed by Engineering Council and modified to fit the needs of individual professional institutions licensed to accredit degrees. Thus graduates can, through a process of formal education and training in the workplace, demonstrate knowledge and understanding which integrated with skills and values enables them to become professional engineers.
An alternative approach to that specified by the Engineering Council are the National Occupational Standards, which describe the skills, knowledge and understanding needed to undertake a particular task to a nationally recognised level of competence. Many of these standards are developed by the Sector Skills Councils working with industry.

Thus we have two means of assessing and maintaining competency. This raises questions as to the role of higher education in supporting these qualifications and standards and whether these industry-driven requirements provide graduates with the knowledge needed to develop their careers in a rapidly changing world.

Three topics will be debated:
1. The relationship between learning outcomes, competency and National Occupational Standards;
2. The relevance of graduate knowledge to careers; and
3. The role of employers, professional institutions, Sector Skills Councils and other education influencers in building capability and capacity.

The conference will aim to develop a common vision for the future of engineering education; an education that delivers world class graduates that meet the needs of industry through appropriate education.

The conference will open with a debate on learning outcomes, competency and National Occupational Standards with speakers from Engineering Council, Institution of Civil Engineers and the Sector Skills Council. This will be followed by a number of short statements on current projects covering health and safety, risk, ethics and the challenges we face as engineers. The afternoon will be an opportunity to debate these issues and ensure that those who influence, inform and deliver engineering education have a common vision.

Designing The Future –

Engineering Education Colloquia

Professor Denise Bower

Chair of the EPC Designing The Future Project

In the changing financial, higher education and political landscape, there exists a real need to signpost relevant information in the quest to meet and exceed student and employer requirements in the creation of a sustainable STEM workforce. Programme learning outcomes, the UK-SPEC, accreditation requirements and White Papers like the RAEng Engineering Graduates for Industry Report all come together to create a substantial body of knowledge surrounding the current and recommended direction of UK Engineering Education.

The Designing the Future project seeks to synthesise this guidance from a holistic programme perspective, collectively seen through an employer, educator and student lens, in order to provide practical tools that are relevant and transferrable across all engineering subjects. A position paper, that draws together current thinking and key questions that must be answered to move the debate forward, is now available.

This collaborative approach is imperative for making certain that UK engineering education is addressing the requirements of the 21st Century in terms of attraction and employability, and to ensure it remains a world exemplar in a sustainable approach to engineering education. This requires constant reflection, consensus and support for action in order to maintain relevance and innovation in programme delivery. We currently have a wealth of information that needs to be synthesised and disseminated to highlight good practice and induce change where needed. The *Designing the Future Colloquia* series aims to enhance engineering capability in the UK by bringing together stakeholders with a vested interest in the direction of UK engineering education. Through meaningful discussion supported by the Royal Academy of Engineering, HE STEM funding and the project partners, this exciting and timely series will work towards the generation of a clear rationale for improvement. Four workshops will be held focusing on issues relating to the subject, staffing, students and learning spaces.

The project partners include *The Royal Academy of Engineering, Engineering Council, the Engineering Professors' Council, HEA Engineering Subject Centre and Engineering CETL, ICE, IMechE, IET, Sectors Skills Councils – Cogent and ConstructionSkills, University of Leeds, Loughborough University and London South Bank University.*

If you would like more information about this project, please contact me (d.a.bower@leeds.ac.uk). If you would like to book a place at any of the events then please contact Vicky Elston (v.elston@Surrey.ac.uk).

Colloquium 1 – March 16th 2011 – Royal Academy of Engineering
The Subject of Engineering – *Interpreting future engineering education requirements*

The first workshop targeted the development of a 'road map' to identify priority action areas for engineering education from now until 2050, and to inform future UK-SPEC benchmark statement revisions. Presentations and work groups focused on the articulation of future requirements, including pre-graduation experience, employer and employee needs and their impact on programme learning outcomes. Key issues such as the impact of higher education funding changes on university differentiation, the identification of core knowledge areas and attributes and the formation of strategic partnership clusters between universities and industry were identified and mapped.

The outcomes of this first colloquium will be discussed further on the 13 April at the EPC conference *Designing the Future – Preparing Engineers for the Grand Challenges.*

Colloquium 2 - June 8th 2011 - HEA Engineering Subject Centre
Staffing for Improving Engineering Education – *Developing a competency framework for academic staff*

The second workshop will form the initial development of a competency framework for the professional development of academic staff within engineering education. The framework will support and ensure the presence of the underpinning knowledge and behaviours needed to work across boundaries, attract and engage with industry and successfully guide the development of a sustainable workforce.

Colloquium 3
Synthesising the Student-Employer Perspective – *Articulating future graduate skills*

The third workshop in the series will help participants define future graduate soft-skills, including 'out-duction' requirements, to facilitate the transition into the workplace.

Colloquium 4
Engineering Space – *Managing learning space opportunities*

The final workshop will bring together academics and estates to discuss engineering education space requirements and opportunities and value for money in order to increase the effectiveness of future programmes.

Engineering Professors' Council Annual General Meeting Tuesday 12th April 2011, 17.30 at London South Bank University

The 2011 Annual General Meeting of the Engineering Professors' Council will take place at London South Bank University on 12th April at 17.30.

Helen Atkinson, elected at last year's AGM as President-elect, will take over as President from Barry Clarke, who remains on the Committee as Vice-President (Immediate Past President); a biography of Helen, who is Head of the Mechanics of Materials Group in the Department of Engineering at the University of Leicester, appeared in last June's EPC newsletter.

The posts of Honorary Secretary, Honorary Treasurer and four members of the Committee will become vacant, as detailed in the notice of the AGM that has been sent to all EPC members, which invited nominations to be sent to Barry Clarke, c/o the EPC Office, to arrive no later than 12 noon on 1st April.

International Student Tracking Study

Professor Barry Clarke
President, EPC

The government have commissioned a longitudinal survey to find out what happens to international students after they graduate. It is important that engineering departments contribute to this survey.

International students help create a rich, diverse learning experience that helps promote engineering education and research in the UK. International students also generate some £5B of fees for universities which, in engineering, is critical to the financial stability of schools, according to the survey undertaken by EPC in 2008. However, the recently introduced cap on immigration has already had an impact on recruitment, threatening the future of our world-class education and research.

EPC met officials from BIS in December 2010 to discuss this issue. We were asked to provide information on international engineering students including the numbers at all levels, the points of entry and their destinations on graduation. We provided limited information by the end of January due to the excellent responses from a number of universities. Clearly, with more time we would be able to demonstrate fully the importance of international students to engineering. Therefore the announcement that BIS have set up a project - the International Student Tracking Survey (ISTS) –to look at the geographical and occupational destinations of international students is most welcome – and we are delighted that Will Archer, whose organization i-graduate is carrying out the study, will be speaking at our Congress on 12th April.

The Study is surveying graduates who left six months and three years ago. It is important that engineering schools participate in this survey because it is seeking evidence of whether post-study work arrangements, for example, increase the attractiveness of the UK as a study destination.

The results will aim to improve the sector's knowledge of what international students do after they complete their studies; what affects their decision-making; what their future intentions are towards the UK; and what their experiences of studying in the UK were.

Further details can be found at http://www.i-graduate.org/services/register_trackingstudy.html

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The Value of Professional Accreditation

The following is the text of an EPC note sent to the Department for Business, Innovation and Skills in February 2011

An engineer who professionally qualifies as a Chartered or Incorporated Engineer through membership of one of the established engineering institutions has demonstrated professional competence and commitment at an appropriate level. To do this, they will normally have acquired the underpinning knowledge and understanding, an integral part of competence, through satisfactory completion of an accredited degree or a period of appropriate training in the workplace or a mixture of both. The majority of professional engineers have completed an accredited degree.

Outside Events

ICEE : An International Conference on Engineering Education : 21st-26th August 2011: Belfast: "Engineering Sustainability for a Global Economy". In her capacity as EPC president, Helen Atkinson will be giving one of the main keynote addresses. For details, see http://icee2011.ulster.ac.uk

The Institute of Mathematics and its Applications: Conference on Mathematical Education of Engineers (MEE – 2011): Loughborough University, Monday 11th April 2011. See http://mee2011.lboro.ac.uk

The professional engineering accreditation process ensures that graduates achieve the Engineering Council's general and specific learning outcomes at a threshold level and that the resources, teaching and learning processes and assessment are all appropriate for the level of entry to the programme. These learning outcomes have been set by professional engineers and have been adopted by the QAA as the subject benchmark statement for engineering at both Bachelor's and Master's levels. They mean for example that a MEng graduate will have the ability to integrate their knowledge and understanding of the underlying engineering and scientific principles to solve a range of complex engineering problems, using analytical and design skills placed in a social, economic and environmental context.

Accreditation has value for students in three ways: Firstly, the process of becoming professionally qualified is more straightforward for those with an accredited degree because they have clearly achieved the internationally recognised standards[1].
Secondly, the process of setting the standards and undertaking accreditation means that graduates of accredited engineering programmes meet the needs of industry, since it is the profession which includes practising engineers and academics that set the standards and carry out the accreditation process, i.e. engineering accreditation is self-regulatory. The internationally audited process leads to continuous improvement of engineering degrees though sharing best practice and engagement with industry. It is undertaken under licence by trained members of the professional institutions, providing tangible benefit for society, and meeting the institutions' charitable objectives.

Thirdly, the UK accreditation process is of international value, given that the professional institutions are regularly called upon to accredit degrees at overseas institutions and advise professional bodies overseas on their accreditation process.

In conclusion, engineering accreditation in the UK is an internationally recognised (through formal Accords), fully audited process that ensures that the learning outcomes of an accredited engineering degree meet the needs of industry. Lists of accredited degree programmes are published on the websites of the professional institutions and the Engineering Council.

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[1] The Engineering Council sets standards that are recognised by the International Engineering Alliance, thus enabling employment mobility throughout signatory countries.