

Learning to Work Two Consultation

An Institute of Physics response to the
SFC consultation on developing the
Council's employability strategy

A full list of the Institute's responses and
submissions to consultations can be found
at <http://www.iop.org>

7 August 2009

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Nicola Lynch
Policy Officer
Strategy
Scottish Funding Council
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In Scotland

Dear Ms Lynch

Learning to Work Two consultation– Developing the Council’s employability strategy

The Institute welcomes the opportunity to respond to the SFC’s consultation document.

The Institute of Physics is a scientific charity devoted to increasing the practice, understanding and application of physics. It has a worldwide membership of over 36,000 (3,000 in Scotland) and is a leading communicator of physics-related science to all audiences, from specialists through to government and the general public. The Institute of Physics represents its members in Scotland through an active volunteer network and two members of staff based in Scotland.

The attached annex details our responses to the questions in the consultation document.

If you need any further information on the points raised, please do not hesitate to contact me.

Yours sincerely

Alison McLure
National Officer (Scotland)

Dr Robert Kirby-Harris CPhys FInstP
Chief Executive

Learning to Work Two

Building on existing employability consultation questions

Comment on ways of building on existing employability work and identify any major issues. We are particularly looking for views on how best to evaluate progress and highlight good practice.

The Institute of Physics agrees with the broad principles for future developments on employability building on the initiatives described in paragraphs 8 to 14. The major issue from employers is the cost – both direct and indirect – supervision, etc. Not all employers can justify that work experience has a net benefit to their business. Consideration is required to find funding mechanisms to produce a net benefit.

Whilst there have been pockets of good practice many degree courses only have token employability features and tend to reflect a fairly narrow view of the job opportunities arising from a particular academic subject. This point is illustrated below.

One major issue which has been overlooked is the type of subjects students should be encouraged to enter. The Institute would argue that, in terms of developing employability, science, technology, engineering and mathematical (STEM) subjects are best placed to develop the workforce of the future. One important method of improving the quantity and quality of entrants into STEM subjects is to understand and publicise the quantity and quality of the jobs held by STEM students.

There are currently no reliable data on the destinations of those who graduate from STEM degrees, or indeed any rigorous survey of the first degree subject by sector of the workforce. However, recent enquiries of the Institute's membership, the majority of whom hold an undergraduate physics degree, have suggested that physics graduates are employed in all sectors of the UK economy, in a diverse range of areas including law, healthcare services and the financial industry. They make a substantial contribution at a senior level in many organisations.

Within the wide range of occupations and roles in the UK economy, STEM graduates, are commanding salaries above the national average. The Institute together with the Royal Society of Chemistry published a report, *The economic benefits of higher education qualifications*¹, in January 2005, which revealed that physics and chemistry graduates in the UK earn more than graduates from most other disciplines.

As part of the Institute's 'Undergraduate Physics Inquiry' of 2001², a survey was undertaken of the views of employers of physicists. This pool of employers included those from finance and other service sector industries. The survey suggested that

¹ http://www.iop.org/activity/policy/Publications/file_4149.pdf

² http://www.iop.org/activity/policy/Projects/Archive/page_6337.html

there is strong demand for physics graduates and that employers believe that physics degrees give:

- flexibility and versatility to tackle a wide range of technical and non-technical subjects;
- good analytical and problem-solving skills;
- good mathematical and IT skills;
- a good breadth of technical interest and ability;
- a good understanding of fundamentals from which to approach new situations where traditional approaches do not work;
- analytical problem-solving capabilities (in some sectors, including the financial sector, emphasis is put on the advantages of a research training in enhancing these skills);
- an ability to grasp concepts quickly and in a quantitative way (more important than knowledge of a particular specialism); and
- an ability 'to argue on one's feet'.

It should be noted that it is essentially impossible to overproduce STEM graduates. Not only do such people provide the capacity for technological advances, they also can, and frequently do, apply their skills in the non-scientific arena. For example, the combination of mathematical, ICT and problem-solving skills acquired by a physics graduate is highly applicable across a range of businesses. While it is true that a STEM graduate costs the taxpayer more than a graduate in the arts and humanities, the return on the investment is actually higher. In economic terms, STEM graduates are actually the better investment. The numbers of STEM graduates could be a measure of success.

Students need to know that there are real jobs in STEM subjects which open doors to a wide variety of careers. In the light of the above arguments, consideration should be given to providing general careers advice and guidance at the sector level and not at the individual employer level. There is a need for careers days at colleges and universities where employers can have the opportunity to explain what skills they need in a general way not just a straight recruitment pitch. Information needs to be tailored to the specific point in a student's career and professional bodies, such as the Institute, could have an important role to play in helping to facilitate this.

Priority One consultation questions – work-related learning and work placements

What are your views on the proposals on work-related learning and work placements?

Many universities already offer work placements as part of their undergraduate degrees and the Institute would welcome government encouragement for such programmes. However, the major challenge actually lies with universities that are faced with trying to deliver graduates with both employability skills and subject specialism.

Should work-related learning be an expectation of every institution, or an area where we encourage a degree of specialism?

Support and incentives should be aimed at increasing provision across all universities, and should be integrated with incentives for university-to-business research collaborations. The specialism should be subject based rather than institutional, the idea of teacher training without a substantial work experience element is as unlikely as a philosophy degree with a mandatory year long industrial placement. Each institution should be encouraged to have an overall approach that would allow it to differentiate from another.

However, placements must not be made compulsory, and there would be a genuine concern if, for instance, only STEM subjects were to be encouraged to offer one-year placements, as the proposal could further drive away potential students, onto degree subjects that would be shorter in length. The placement should be valued academically at about the same level as course work and should be an integral part of the course and not just an add-on.

Perhaps, instead of one-year work placements, universities could emulate Brunel University which, amongst others, offers 'thin-sandwich' undergraduate programmes, enabling students to spend two periods on work placements^{3, 4}. This allows students to gain invaluable experience, suited to the knowledge that they have acquired during the academic year, whilst earning money. The influence of an expectation of funded placements and possible sponsorship leading to permanent employment should not be overlooked in attracting students onto a course especially if the parents of students are aware.

What is the capacity to extend the supply of work-related learning from core provision?

The two limiting factors are the availability of placements for the full range of student abilities (most are restricted to those of the highest calibre) and the lack of administrative staff to organise placements.

What are your views on the specific initiatives outlined above in paragraph 21 in terms of the feasibility, likely costs, benefits and implementation issues?

All four of the development areas have their merits. With regards to SMEs, work placements could be a drain on their limited resources, unless students are prepared to work without being paid an income. A more effective mechanism for establishing operational links for them (and perhaps even larger companies) is industry-related projects being part of the undergraduate curriculum. The projects, established jointly by the university and placement company, would be aimed at developing certain key skills and knowledge. A project with a local company undertaking an appropriate and scientifically acceptable topic would benefit students, universities and companies. However, such projects would need to be quality controlled by both the academics and the hosts – input from both is essential in evaluating the project and the student's performance.

³ <http://www.brunel.ac.uk/courses/ug/structure>

⁴ Formerly, Brunel University's thin-sandwich course would involve students spending 20 weeks (i.e. the summer months) at a work placement at the end of the first three-years of a four-year course.

An example of such a course is run as part of the University of the West of Scotland physics department's MSc in Sensor Design⁵. The programme was designed with specific input from industry and the research dissertation is undertaken in a relevant industrial setting or with an academic research group within the university.

Initiatives such as this could be an important aspect of getting businesses and universities over the first hurdle of making direct contact with each other. This is something that Scottish Enterprise and Highlands and Islands Enterprise could be tasked with implementing.

The final idea of a tailored third year focussed on business processes and a placement with an SME is flawed, this would split the cohort into two groups and would reduce the academic content for some. A successful model is to have the students seek external projects but have internal university based projects for those unable or uninterested in getting an industrial placement, we should not forget that about half of physics graduates remain in academia to pursue a higher degree so a project in a university research group is as appropriate to some as industrial placements.

Priority Two consultation questions – enterprise and entrepreneurship

How should we develop enterprise and entrepreneurship education in further and higher education?

Should enterprise and entrepreneurship education be an expectation of every college and HEI, or an area where we encourage a degree of specialism?

What are your views on the areas for potential specific initiatives outlined above, and on ways of taking these forward?

Rather than concentrating on developing specific enterprise and entrepreneurship education, new markets built on new technologies and innovations will require workers that are able to thrive in fast moving and technological environments and the findings of the Undergraduate Physics Inquiry⁶ suggest that physics graduates will fit this bill.

As an example, physics degrees provide graduates with a wide-ranging set of transferable skills as determined by the Quality Assurance Agency benchmark statements⁷, including the problem solving and critical reasoning ideal for innovative activities. However, the teaching of physics, along with the other experimental sciences, is expensive within universities both financially and in terms of teaching time and requires proper resourcing. This is an issue which needs to continue to be monitored. In other words, if you get the basics right, the required skills will follow.

Whilst enterprise and entrepreneurship are popular concepts it needs to be recognised that the majority of students need business and financial awareness rather than courses in how to be the next Bill Gates. The need for education around

⁵ <http://www.uws.ac.uk/courses/pg-courseinfo.asp?courseid=680>

⁶ http://www.iop.org/activity/policy/Projects/Archive/page_6337.html

⁷ <http://www.qaa.ac.uk/academicinfrastructure/benchmark/honours/physics.asp>

business start-ups is extremely limited; the emphasis should be on examples of success.

Priority Three consultation questions – workforce development

What are your views on the workforce development issues outlined?

The Institute has concerns that the focus is on specific skills for the workforce. The reason education at the higher education level is better than training is because the primary need is for flexible people with good skills in communication, mathematics, IT, problem solving, and teamwork. Every effort should be made to improve these already high standards. One should resist the temptation to concentrate higher education on training in current technology as opposed to more general skills. For instance a physics graduate can be easily trained-up to work on nanotechnology, biomedical areas, whereas a graduate in these areas will find it harder to diversify as the skills-set is too narrow and they don't have the broad background provided by a physics degree. There needs to be a balance between developing the individual learner and producing workers for the economy.

In the short- to medium-term there will be a decrease in workforce mobility due to the economic situation and decreasing pension benefits. This will result in an increase in the need for workforce development in general – both education and training.

How should progress be achieved?

Progress will be achieved through the provision of modular courses, ideally on a block basis, from a range of institutions providing a clear path from HNC/HND through degree level to doctoral-level qualifications with the ability to cherry pick elements as required.

What would be required?

How far should public funds for further and higher education be used to support this?

Public funds should fund a proportion of these activities but equally employers should be expected to contribute to the development of their staff.

Should workforce development be an expectation of every college and HEI, or an area where we encourage a degree of specialism?

Workforce development should be undertaken in further and higher education establishments where it is thought to be most appropriate; for instance, where the courses are more vocational. Thus a degree of specialism would be the Institute's preferred option.

It might be worth considering using resources already in place. For example, the Institute has a well developed programme of Continuous Professional Development for its members, as have many other professional bodies. Students could also be encouraged to work towards chartered status, if they are studying an appropriate subject.

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