Employability in Europe: enhancing post graduate complementary skills training

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Abstract

The gaining of complementary skills is one of the aims of the European Higher Education Area as it promotes training to ensure that all graduates have the skills necessary to enter the global job market. Whilst PhD training in the UK has seen the inclusion of transferable generic skills, in addition to subject-specific, such training is not common in all European universities. There often exists a lack of understanding amongst academics supervising PhD studies as to the importance of such skills to the future employability of their students. The Marie Curie Initial Training Network DITANET (Diagnostic Techniques in Particle Accelerators) aimed to improve the employability of researchers by providing both subject-specific and generic training from a variety of academic and industry trainers. In this contribution, the training concept is presented and student feedback summarised as a means of understanding the benefits, or otherwise, derived from such trainings.

Keywords
Researchers, employability, skills, post graduate, training, Europe

1. Postgraduate Transferable Skills Training for Research Students

Within higher education across Europe there has been a move to provide graduates with the skills and knowledge needed by society, equipping them for the world of work (Wall and Speake, 2012), often referred to as the 'skills agenda' (Warren, 2002:94). In the UK the development of transferable generic skills, in addition to the usual subject discipline teaching has now been included in PhD research training. However, such training is not formalised in all European universities. Cultural differences between countries with regard to their existing higher education systems, has made quality and comparability difficult (Kroo et al., 2008). As a result there is often a lack of understanding in those academics supervising PhD

studies as to the importance of such skills to the global job market. Additionally, in order to meet the expectations of the Bologna Process, in creating an international market for high quality research, emphasis is increasingly being placed on career development and employability amongst PhD students (Park, 2007).

Whilst the Leitch Review on skills stresses the importance of innovation, leadership and research and development in postgraduate study (Leitch 2006) it is not clear how much of their training is as a result of employer demand or how these qualifications are valued by businesses. There is, therefore, clearly a need for higher education institutes to work closely with employers in designing skills training to meet the needs of *real world* situations (Council for Industry and Higher Education - CIHE, 2010).

In particular employers cite graduates to be lacking in commercial awareness with a narrow focus due to over-specialisation in their subjects. They have unrealistic expectations of the work place which leads to problems in adapting to a non-academic environment (QAA Scotland, 2012). The European Universities Association (2007) believe that raising awareness of complementary skills amongst PhD students is important as a means of enhancing the skills gained through research**,** thereby improving employability prospects in the labour market.

The best way to acquire these skills was considered to be through dedicated training workshops (Marie Curie Fellows Association, 2003). The UK Research Councils, working in cooperation with charities funding PhD research, produced a Joint Skills Statement defining a common list of competencies which PhD students should ideally develop throughout their period of training, see Table 1. In higher education this statement has been recognised and adopted as a basis for skills development. Whilst for level one and two students undertaking taught courses, such skills can be embedded in their training, for PhD students the approach is different, as a result of the wide-ranging areas of research being carried out. A report produced by the Coimbra Group (2007), a network of long established universities, investigated the views of doctoral students and identified a list of generic skills which were considered to be important, Table 2.

Training Requirements for Postgraduate Students		
Research Skills and Techniques	Personal Effectiveness	Team Working
Research Environment	Communication Skills	Career Management
Research Management	Networking	

Table 1: Additional areas of training for postgraduate students
in addition to subject-specific topics (UK GRAD Programme, 2001)

Postgraduate Research - Important General Skills		
Personal Effectiveness	Assertiveness	Commercialization of Research
Time Management	Negotiation Skills	Information Retrieval
Team Work & Networking	Writing Skills	Thesis Writing
Professional Ethics	Media Communication	Career Planning
Communication/ Presentation	IP Management	

Table 2: Generic competences identified by the Coimbra Group (2007)

The skills outlined in Table 2 are, on the whole, unrelated to the field of research being

undertaken by individual postgraduate students and are, therefore, open to cross-disciplinary training. It is this style of training that the majority of universities opt for, combining students from both arts and sciences. Whilst it could be argued this leads to an understanding of interdisciplinarity, many students undertaking these courses feel there should be more focus on their particular field of study.

2. Marie Curie Initial Training Network: DITANET

Initial Training Networks (ITNs) sit within the European Union's 7th Framework Programme (FP7) People actions (FP7 People Network, 2012). Most of these networks consist of a consortium of universities, research centres and industry partners, aiming to train researchers starting out in their careers. The trainees are employed within partner institutions as researchers, and are provided with the opportunity to broaden their competences and acquire new skills through links with industry partners. DITANET was funded as an ITN in 2008, completing in May 2012. It was selected for funding amid high competition and achieved a budget of €4.16 million. The DITANET Consortium consisted of 10 beneficiary partners, all of whom employed researchers, and 12 associate partners who provided secondments and expertise within the Network. In addition, the Network was supported by 10 adjunct partners who joined and took part post-funding and throughout the lifetime of the project, adding an international element to the Network. DITANET has worked on developing diagnostics methods for a wide range of existing or future particle accelerators which was achieved through a cohesive approach including promoting knowledge exchange between partners.

In all 22 researchers were employed and provided with comprehensive training through their employers, secondments in industry and from eight Topical Workshops and four international Schools. Two of the Schools focused on the provision of complementary skills and were approached from a standpoint of providing transferable employability skills more focused within their subject areas, and therefore less generic than the standard university skills training, which is provided in the UK to postgraduate PhD students. This article outlines the first of these Schools, the success of which led to a further Advanced Complementary Skills School.

3. DITANET Complementary Skills Schools

A report by Vitae in 2010 outlined the results of a longitudinal study of 2,073 doctoral graduates in the years 2005-2008. The results highlighted that graduates in the fields of physical sciences and engineering were most likely to be employed in a variety of *other common doctoral occupations* compared to social science students who were employed mostly in HE occupations such as teaching and lecturing. Physical science and engineering students outlined that within their work they used subject specific knowledge 59.6%; research skills 27.3% and generic skills developed as a researcher 49.0% of their time (Vitae, 2010). Therefore, as most doctoral graduates are employed outside of research and higher education, it is increasingly important for higher education institutes to develop

programmes of skills training in line with the needs of employers (Vitae, 2010) to this end the Quality Assurance Agency (QAA) Scotland (2012) recommend increasing opportunities for internships to build the bridge between academia and industry.

Marie Curie Actions have acknowledged the need of industry to increase the number of new researchers taking up employment. To this end they have initiated the European Industrial Doctorate, with students spending 50% of their time working in industry. The benefits of this are two-fold, whilst enhancing research for European employers, and providing well equipped doctoral graduates, higher education and research institutes can work in tandem strengthening the commercial exploitation of research undertaken (Marie Curie Actions 2010). The European Commission's Principles of Innovative Doctoral Training, strives for research excellence by embedding an interdisciplinary approach to the training of PhD students, including exposure to relevant employment sectors. This can include placements, training with non-academics and mentoring schemes in order to create knowledge transfer and opportunities for employability skills training (European Commission, 2011).

In recognising that most PhD graduates will not pursue a career in academia the Engineering and Physical Sciences Research Council (EPSRC) reported the need for higher education institutes to include career advice and transferable skills within their PhD programmes (Frame and Allen, 2002). This was against the existing belief that laboratory work came above such training, and some PhD supervisors did not think it necessary to commit their students to this extra commitment (Frame and Allen, 2002). Traditionally, students undertaking post graduate research training at the University of Liverpool had been trained in large groups which mixed subject areas and topics, therefore, training needed to be somewhat generic in nature in order to encompass all student types. As a result student feedback within physics was mixed. Analysis of their feedback forms highlighted that many considered the training to be of little relevance to their PhD projects, too generic for their subject area, and the class numbers too high for worthwhile interactivity - to the extent that some reported they did not actively take part in discussions.

With this to the fore, the DITANET Consortium planned a five-day complementary skills training for all their Marie Curie Fellows. The training was hosted by the University of Liverpool in March 2010 and provided an opportunity to incorporate some of the skills that the current PhD supervisors, and industry partners, within the Network felt would benefit these students most. Professional trainers and experts in the field were asked to lead training sessions with the aim of including students' research interests as much as possible; being directly relevant to their study whilst providing employability skills. The sessions were designed specifically to combine generic skills with subject specific skills (Table 3). Training sessions were interspersed with talks and discussions and subject specific topics were covered by experts from industry, who were also available for further discussions during breaks. The biggest changes from the traditional method of research training were the small group size (16 students in all - allowing for interactive sessions and social networking), and

the focus on topics which would both help in their research study and transfer to a work related environment within their chosen field.

Overall student feedback was very positive, see Table 3. The sessions on Presentation Skills allowed each student to present their work to their peers and included a section on how to give and receive feedback. Each presentation was video recorded, played back and the audience asked to comment. Fellows considered this to be beneficial as it highlighted common presentation errors:

"Recording... was very useful to understand common mistakes. I appreciated it a lot."

Whilst all feedback results came back as good to average some topics were better received than others. The Project Management sessions were thought to be very useful as many had not considered themselves in this light despite undertaking their own projects in the form of PhDs:

"I hadn't really thought of myself as a project manager until today!"

Intellectual Property Rights and Patent Law were specific to the fields of study and feedback suggested a longer session would have been useful as it was so relevant. Scientific writing was extremely well received. Each trainee was asked in advance to bring an article from a journal they would aspire to publish in. Writing for journals was presented and culminated in each trainee forming the basis of their own research publication aimed at their preferred scientific journal:

"Very interesting approach...liked it a lot and hope to profit from it [sic]."

"Very helpful... impressed by the fact that dividing it into smaller tasks makes writing faster."

Sessions: Subject Specific Skills	Average Score	Sessions: Generic Skills	Average Score
Presentation Skills 1	1.52	Time Management	1.52
Presentation Skills 2	1.46	Problem Solving	1.46
Project Management 1	1.49	Work/Life Balance	1.49
Project Management 2	1.56		
Working within a Network	2.57		
Building a Bridge to Industry	2.90		
Intellectual Property Rights	1.77		
Scientific Writing	1.32		

Table 3: Average Scores of Training Sessions *n=16*
(Feedback responses were recorded using a differential scale where 1=excellent and 5=poor)

Conversely, there were lessons to learn from the topics Working within a Network and Building a Bridge to Industry. Both sessions, whilst useful to the trainees, needed more structure. For such open discussion trainees commented that the group was too big with little time to reach satisfactory conclusions. Also the generic session of Time Management, Problem Solving and Work/Life Balance had very mixed results with some considering them to be very useful, interactive and important "I really liked it – a lot of helpful examples and new ides to use in the project" whilst other said it was trivial and "...more like a group

therapy session". Overall the School was received well with the aim of including more scientific and project relevant areas appreciated by those attending.

> "Interactive sessions are helpful... Industry/self-management were perhaps too interactive [sic]."

This School led to a further Advanced Complementary Skills School being triggered by student feedback and trainer recommendations, and provided added value to the students' overall training in preparing them for their next career steps. Following the DITANET Complementary Skills School, student feedback was used to inform a two-day advanced school in year three of the trainees' studies covering CV writing, applications and interviews; advanced project management; the careers market and funding and grant applications.

Conclusion

Although employability skills are key elements to the success of the European Higher Education Area, and should be embedded in post graduate research training across Europe, this is not always the case. Despite the many positive comments received from students with regard to the DITANET training, it was clear from both discussions and feedback that some students, and their supervisors, still did not think complementary skills relevant. The concept of complementary skills training should therefore be introduced in relation to the challenges of the current job market, in order to raise awareness as to why these skills are important, so that PhD supervisors do not fall into the 'trap' of undermining this additional training being provided to their students.

The training methods used in the DITANET courses have since been adopted to incorporate research students across the School of Physical Sciences at the University of Liverpool, with initial feedback from those taking part being very positive. The course structure is also being considered by the University of Lancaster and will be used in two new European training initiatives; oPAC (http://www.liv.ac.uk/opac) and LA^{3}NET (http:// www. liv. ac.uk/la3net) projects.

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