

Case study: London South Bank University and EDF Energy (Networks Branch)

Paul Sandford and Ray Pettitt: Building collaboration for an engineering foundation degree in power distribution

This study details the development of employer engagement with a new foundation degree at London South Bank University (LSBU)'s Department of Electrical, Computing and Communications Engineering (ECCE). The degree has been developed in collaboration with EDF Energy and aims to address the shortage of technically trained engineers in infrastructure companies which provide electrical power distribution in London and beyond. The needs of the industrial partner have influenced the content and delivery of this full and part-time course in a challenging way. As these needs have evolved, so have the links between the university and EDF Energy with the assistance of the Energy and Utility Sector Skills Council (SSC). This has raised issues of sustainability which can only be solved through close cooperation of the stakeholders and understanding of their respective requirements.

Background

With increasing energy demands in the UK and elsewhere there is a shortage of skilled people in the electricity industry. This demand can only be met by reaching out to:

- new recruits for the industry, through widening participation in HE initiatives or, for the longer term through engineering careers education and aspirational work, to young women and certain ethnic minorities in schools via the RAEng backed London Engineering Project and its successor from summer 2009, the National Engineering Programme.
- existing employees in the industry, via upskilling programmes.

This collaboration is aimed at the second category: mature male and female students with some qualifications and work experience and with adequate maths and English attainment of GCSE grade C or above. The course offers both full time (two years) and part-time (two and a half years) progression with an industrial based project to round it off. The foundation degree pathway developed in this collaboration will enable students (on successful completion) to enter the second year of a BEng (Hons) degree course at LSBU with advanced standing. Through a work placement with EDF Energy there is an expectation that participating full-time students will go on to employment with the company, the largest electrical power distributor in the south east of England and employer of some 13,000 people in the UK.

Methodology

Resources were specifically earmarked in the service level agreement (SLA) between the Royal Academy of Engineering (via the London Engineering Project) and EDF Energy to design the curriculum for the degree. Planning for the degree started in mid autumn 2006. The main vehicle for the partnership was a group of staff from LSBU and EDF Energy. This included a senior technical manager and a senior training manager from EDF Energy and the HoD and Deputy HoD from the

department of Electrical, Computer and Communications Engineering (ECCE) where the course is based. Regular meetings were held at both LSBU and EDF Energy locations to maintain the momentum of employer engagement.

The degree has an initial core providing STEM underpinnings for engineering with the necessary common and engineering skills. Following these initial studies, the programme includes material specific to the structure and function of distribution engineering infrastructures and to the applied study of electrical power distribution (see map below). Work based learning occurs at all stages in the degree, designed in close co-operation with EDF Energy technical and training staff and in relation to existing training programmes.

The following is a map of study levels and competence areas for the course:

	STEM knowledge and skills		Transferable skills and professional requirements	Electrical power related knowledge and skills	
Level S	<div style="border: 1px solid black; padding: 5px;">Mathematics A ECM-S-745</div>		<div style="border: 1px solid black; padding: 5px;">Computer applications for engineers DCM-S-051</div>		
Level 4	<div style="border: 1px solid black; padding: 5px;">Physics foundations for engineers EEE-1-824</div>	<div style="border: 1px solid black; padding: 5px;">Mathematics B ECM-1-755</div>	<div style="border: 1px solid black; padding: 5px;">Industrial studies for IE EIS-1-721</div>	<div style="border: 1px solid black; padding: 5px;">Electrical plant EPR-1-717</div>	
	<div style="border: 1px solid black; padding: 5px;">Electrical principles (DC) EPR-1-821</div>	<div style="border: 1px solid black; padding: 5px;">Electrical principles (AC) EPR-1-822</div>	<div style="border: 1px solid black; padding: 5px;">Working in power distribution EIS-1-826</div>		
Level 5	<div style="border: 1px solid black; padding: 5px;">Control and instrumentation ECL-2-714</div>		<div style="border: 1px solid black; padding: 5px;">Work based project for foundation degree EIS-2-847</div>	<div style="border: 1px solid black; padding: 5px;">Distribution systems A EPR-2-843</div>	<div style="border: 1px solid black; padding: 5px;">Distribution systems B EPR-2-844</div>
			<div style="border: 1px solid black; padding: 5px;">Managing the engineering process EIS-2-203</div>	<div style="border: 1px solid black; padding: 5px;">Network information systems ECL-2-846</div>	<div style="border: 1px solid black; padding: 5px;">Network management EPR-2-845</div>

The levels shown reflect the new QAA descriptors, formerly levels 1 and 2.

The curriculum was jointly developed, as were the ways in which work based learning could be incorporated. A crucial objective of employer engagement is that studies be relevant in the context of work and the first drafts for the content of technically specialised units were based on input from technical designers at EDF Energy.

This foundation degree is designed to integrate work based learning into many units across the curriculum. This activity supplements and enhances the normal university

material and puts it into a practical context in the industry. Extensive discussions with EDF Energy training staff identified both the technical and contextual parts of the curriculum and a range of ways in which work based learning could be integrated. It was clear that integrating the reality of work into many units in a fine grained way was the best way to meet the employment requirements. In addition, in order to expose full-time students to the workings of the company in a wider and not exclusively technical sense over longer periods, there is a placement unit. The rationale for this is for students to learn how the company organises delivery of its product and to experience being a part of this. As well as the normal management and administration functions of any large company, the work of power distribution companies such as EDF Energy is characterised by design offices and by extensive network teams who operate in the field working on the actual distribution infrastructure – students will spend time in both these parts of the business.

Once the outline of the curriculum was confirmed, an initial publicity leaflet was prepared in spring 2007. This was incorporated into LEP outreach activities and disseminated via LSBU open days as well as internally at EDF Energy. Funding was also obtained via the RAEng to organise two two-day ‘master classes’ in engineering at LSBU during April and June 2007 with the objective of attracting students to the foundation course as well as more generally into engineering at LSBU.

Standard entry requirements have been set with the possibility of more flexible entry mirroring the widening access and diversity rationale of the LEP. This recognises the need for more open access to FD programmes, including school leavers, those having completed an advanced apprenticeship, returnees to work, career changers and those already working in the industry.

The foundation degree has a defined progression route onto the BEng (Hons) in Electrical and Electronic Engineering at LSBU after four semesters of extra study. Students study a prescribed set of level 2 and level 3 units, culminating in a double unit final project.

Issues

A number of issues emerged as this collaboration progressed. In summary they included:

- uncertainty as to whether EDF Energy would be able to supply an economic number of students to the programme.
- changes of training and staff development policy within EDF Energy and incentives for staff to attain higher qualifications. Early indications suggested that incentives were not clear enough to encourage EDF employees to commit to the HE course.
- variable mathematics ability of prospective students, requiring special provision of a tailored ‘fast track maths for engineers’ course.
- time and distance for some students travelling from EDF Energy locations in the east of England on day release.
- the potential to attract numbers of new recruits from local schools and colleges onto the course in order to meet the university’s commitment to widening participation.

On the issue of sustainability, some lessons may be learned from earlier collaborations in Europe (Lewinski, 1997).

Benefits

Specific areas where strategies have been successful and have delivered benefits are:

- sustained involvement of industry practitioners and formation of close working relationships. For example, the learning outcomes and unit content of technically specialised units have been mapped to the original technical topics specified by the company to produce a learning schedule and identify industrial input.
- increased scope and opportunity to incorporate industrial examples and practice into the academic curriculum, exposing students to skills, practices and the application of relevant knowledge in the direct context of work.
- the course aligns with the LSBU mission of employer engagement by developing academic provision which meets the diverse needs of London and the wider SE regional economy and its various employers and development agencies. Similarly the faculty's strategic plan has an aim to respond to likely changes in the student market and lists the development of foundation degrees as an objective.
- part of the additional development funding provided by EDF Energy via the LEP project has been used to fund a new academic staff member during the initial implementation phase of the programme.
- the concept of distributed work based learning has also been taken up by other foundation degrees under development and some of the units designed for this programme have found use on other courses in the faculty.
- the staff development experience gained by academic staff whilst designing the programme has been valuable in a wider context. Their expertise has been used to develop other foundation degrees at LSBU, chair review panels for FDs and act as external panel members on validating panels both inside and outside LSBU.
- the faculty is a registered supporter of the proposal for a national skills academy for the power sector being developed by the Energy and Utility Sector Skills Council.

Evidence of success

At the validation event the course was commended for its exciting and innovative programme which was seen as a model for future developments. The working relationship with the industrial partner was applauded.

EDF Energy have sustained their commitment to the programme by participating in many meetings and providing WBL aspects of the course using EDF Energy facilities. The course will be further underpinned by the company's recent introduction of their Engineering Development Programme (EDP) which aims to recruit additional staff from inside and outside the company into middle level engineering roles through the undertaking of a two and a half year training programme. Participants are required to undertake an academic qualification (minimum HNC, ideally foundation

degree in engineering power distribution (FdEng)) on a day release basis whilst working in a number of placement areas around Networks Branch and the other branches of the business. In addition to the academic qualification there are a number of objectives that trainees will be required to meet to demonstrate that they are able to put the academic theory they have learnt into practice. They will each be allocated a mentor from EDF Energy who will liaise with the course director at the university as specified in the foundation degree management scheme.

The EDP is designed to provide the necessary skills and competencies to support trainees taking up engineering roles at higher technician level within EDF Energy Networks Branch. Initially there were 20 places available, to start in September 2008.

In mid-July 2008 around 25 applications had been received, mostly from existing staff employed at engineering craft level in the company. Indications in early August 2008 were that EDF Energy would be sending 17 students from their EDP to LSBU to study on the FDEng in power distribution. After assessment and interview in early August the selected trainees had a one month induction period before starting their academic study and placements in September. Phase one of their training lasts a year and consists of stints in each of the company's divisions, both technical and commercial. This is followed by phases 2a and 2b, comprising more focussed placements in areas where the individuals will eventually be based.

To aid more open access to the FD programme, the ECCE department has decided to offer a 'pre-entry refresher in maths' (PERM) course tailored to students who are returning to study. It will run for four half-day sessions and will cover material such as fractions, decimals etc to refresh core skills for students starting the mathematics unit on ECCE diploma/certificate/foundation programmes. Attendance is voluntary but applicants offered course places will be advised whether or not it would benefit them, depending on their entry qualifications. Possible arrangements for this are:

- EDF students take the course at LSBU alongside other entrants
- EDF students take the course at LSBU separately (maybe at different times)
- the course is delivered to EDF students at EDF Energy premises at a mutually acceptable date/time.

In the latter two options there are cost implications which must be addressed.

The preferred arrangement will depend on numbers as well as accommodating EDP students' commitments and LSBU timings. Selection of students will be by EDF Energy/LSBU CD.

How can other academics reproduce this?

At LSBU, the formula adopted for this collaboration can be extended to other employers through the Employer Engagement Unit at the university. Most of its features would be transferable to other collaborative courses.

Reflections

The industrial partner was involved from the outset with initial meetings at director level with the RAEng/LEP, followed up by sustained commitment at senior

management level during the development phases. The company also committed significant development funding to the project over two years. The SSC was involved in the initial discussions where the basic course requirements were defined.

Regular contact has continued over the first year of the course between the technical and training arms of the company and the course management team at LSBU, with meetings minuted and actions specified.

Less successful has been the capacity to attract more diverse representation on the course, as proposed in the original rationale developed by the LEP and EDF Energy and encouraged by the Mayor's Office and other bodies. At this stage the main source of students is the existing workforce (i.e. upskilling within EDF Energy) and these students are largely white males. In due course, through role models in programmes such as the London Engineering Project, recruitment to the industry is expected to reflect the diverse nature of the population.

At an early stage in this collaboration, more use might have been made of experience elsewhere, via contacts in the Engineering Subject Centre-supported Foundation Year Network and published case studies of other collaborations. However, in many respects this collaboration has entered new territory not yet expounded by the literature.

References

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