

## *Alternating Work-based training at Higher Education Institutions*

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### **Abstract**

Alternating Work-based training is often considered as one of the best existing systems in terms of links between education and employment. It works at undergraduate and master's level and the purpose of this paper is to review its efficiency when higher education is concerned. Therefore a study is underway of the current status of the provision of work-study engineering degree programmes at Higher Education Institutions across the countries of England and Wales, Germany, Switzerland and Austria. This paper focusses on degrees at Bachelor, and Master level as identified by the Bologna process. For the purposes of this presentation we will concentrate on this provision in England and Wales.

**Key words:** alternating training, work-based learning, higher apprenticeship, engineering gateway degrees, applied professional study programmes

This paper is derived from a wider study of the current provision of engineering degrees by alternating training programmes at Higher Education Institutions across the countries of England, and Wales, Germany, Switzerland and Austria. The report focusses on degrees at Bachelor, and Master level as identified by the Bologna process.

For the purposes of this paper we will concentrate on this provision in England and Wales.

### **Definitions**

We will start by considering some definitions of alternating training and work-based learning. From this, we will go on to look at Higher Apprenticeships, Engineering Gateway Degrees and Centres of Work-based learning, and then reflect to consider whether they correspond with these definitions.

Alternating training programmes can be defined as:

“Alternating training employs specific pedagogy based on the complementarity between periods of acquiring practical knowledge with an employer and periods of theoretical training offered by a training provider”<sup>1\*</sup>

Another definition could be, alternating training finds itself “between work and training, [it] allows a person to train in an occupation and gives that person the possibility to integrate easily into the life and culture of a company”<sup>2</sup>

The French government employment service identifies three key actors in alternating training: the trainee, the employer and the training provider<sup>3</sup>

So we can discern that alternating training involves the combination of work-based training and, for our purposes, Higher Education Institution (HEI) degrees at bachelor, master or doctorate level.

Work-based learning can be defined thus:

1. “Work-based learning is the term being used to describe a class of university programmes that bring together universities and work organisations to create new learning opportunities in workplaces.”<sup>4</sup>. This definition includes meeting the requirements of learners and the contribution that this learning will have in the development of the organization in the long term<sup>5</sup>
2. “Where students are full-time employees, whose programme of study is embedded in the workplace and is designed to meet the learning needs of the employees and the aims of the organisation.”<sup>6</sup>

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<sup>1</sup> <http://travail-emploi.gouv.fr/informations-pratiques,89/fiches-pratiques,91/formation-professionnelle,118/les-contrats-de-formation-en,1077.html> [accessed : 29 October 2014]

<sup>2</sup> [https://www.alternance.emploi.gouv.fr/portail\\_alternance/jcms/tomcatleader\\_9294/navigation/entreprises/je-m-informe/pourquoi-choisir-l-alternance/l-alternance-en-quelques-mots](https://www.alternance.emploi.gouv.fr/portail_alternance/jcms/tomcatleader_9294/navigation/entreprises/je-m-informe/pourquoi-choisir-l-alternance/l-alternance-en-quelques-mots) [accessed : 29 October 2014]

<sup>3</sup> [https://www.alternance.emploi.gouv.fr/portail\\_alternance/jcms/tomcatleader\\_9634/l-alternance-en-2-minutes/quels-interlocuteurs](https://www.alternance.emploi.gouv.fr/portail_alternance/jcms/tomcatleader_9634/l-alternance-en-2-minutes/quels-interlocuteurs) [accessed : 29 October 2014]

<sup>4</sup> Boud, D. and Solomon, N. (2001) 'Work-Based Learning: A New Higher Education?', Taylor & Francis Inc. in The Higher Education Academy, UK Physical Sciences Centre, « An Introduction to Work-Based Learning, A Physical Sciences Practice Guide,” Lemanski Tom, Mewis Ruth, and Overton Tina, February 2011 p5

<sup>5</sup> The Higher Education Academy, UK Physical Sciences Centre, « An Introduction to Work-Based Learning, A Physical Sciences Practice Guide,” Lemanski Tom, Mewis Ruth, and Overton Tina, February 2011 p5

<sup>6</sup> Sodiechowska, P. and Maisch, M. (2006) *Educational Action Research*, **14**, 267-286.in above

## Higher Apprenticeships

Engineering degrees at bachelor level are accessible via Higher Apprenticeships, notwithstanding the current change from a system based on occupational frameworks towards a system based on employer-led standards. The apprenticeship framework entitled “Advanced Manufacturing Level 6 (Wales)<sup>7</sup> developed by Semta, the Sector Skills Council, provides a clear example of how an engineering degree can be obtained via alternating work-based and HEI based training. The engineering disciplines cover: Aerospace, Nuclear Related Technology, Mechanical, Electrical/Electronics, Maintenance, Automotive.<sup>8</sup>

Eligible applicants are required to follow a training programme combining on-the-job and off-the-job elements.<sup>9</sup>

- **Competence element (on-the-job training):**
  - This requires the candidate to achieve Incorporated Engineer Status by fulfilling the UK Standard of Professional Engineering Competences (UK-SPEC). The length of training depends upon the candidate’s skills, knowledge, aptitude and abilities, experience and previous learning. The competences contained in the UK-SPEC serve as an “Occupational Standard” for the main industries and services in which engineers work.
  
- **Knowledge element (off-the-job training):**
  - An Honours degree accredited by the relevant Professional Engineering Institution. The framework designates university degrees to fulfil the technical knowledge element.<sup>10</sup> The employers select the most appropriate degree course. Teaching methods may vary from taught courses to a blended learning approach including also work-based learning, and written and/or web-based distance learning. Since the degrees are followed on a part-time basis they can take up to 5 years. The duration will depend on the candidates entry qualifications.

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<sup>7</sup> <http://www.afo.sscalliance.org/frameworks-library/index.cfm?id=FR02280> [accessed 21 August 2014]

<sup>8</sup> SEMTA (2013). ‘Advanced Manufacturing Level 6 (Wales), Issue number 2; Framework ID FR02280’ p20. Available at <http://www.afo.sscalliance.org/frameworks-library/index.cfm?id=FR02280> [accessed: 21 August 2014]

<sup>9</sup> SEMTA (2013) ‘Advanced Manufacturing Level 6 (Wales) Issue number 2; Framework ID FR02280’ p110. Available at <http://www.afo.sscalliance.org/frameworks-library/index.cfm?id=FR02280> [accessed: 21 August 2014]

<sup>10</sup> SEMTA (2013) ‘Advanced Manufacturing Level 6 (Wales) Issue number 2; Framework ID FR02280’ p26/7. Available at <http://www.afo.sscalliance.org/frameworks-library/index.cfm?id=FR02280> [accessed: 21 August 2014]

## Off-the-job-training<sup>11</sup>

The acquisition of theoretical knowledge and practical skills need to be complementary so that all learning outcomes are fulfilled. Therefore, off-the-job training is planned, reviewed and assessed by:

- The apprentice;
- The employer training officer and company manager
- The Assessors
- University teachers
- The Professional Engineering Institution mentor

## Mentoring<sup>12</sup>

The on-the-job training is supported by a mentor. The mentor's role is to advise on the evidence to be produced to meet the Incorporated Engineer standard. This evidence is to be recorded in a portfolio and can include:

- ❖ Work-based assignments
- ❖ Practical tests
- ❖ Examinations
- ❖ Work based projects
- ❖ Dissertations

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<sup>11</sup> SEMTA (2013) 'Advanced Manufacturing Level 6 (Wales) Issue number 2; Framework ID FR02280' p111. Available at <http://www.afo.sscalliance.org/frameworks-library/index.cfm?id=FR02280> [accessed: 21 August 2014]

<sup>12</sup> SEMTA (2013) 'Advanced Manufacturing Level 6 (Wales) Issue number 2; Framework ID FR02280' p22/3. Available at <http://www.afo.sscalliance.org/frameworks-library/index.cfm?id=FR02280> [accessed: 21 August 2014]

## Engineering Gateway degrees<sup>13</sup>

Developed by the Engineering Council in conjunction with universities, Professional Engineering Institutions (PEI) and employer representatives, these degrees demonstrate another pathway combining work-based and university-based learning.

The pathway is designed for working engineers who:

- don't possess the required academic qualifications,
- intend to become an Incorporated Engineer (IEng) or a Chartered Engineer (CEng)
- are unable to commit to full-time study.

Engineers enroll with a participating university and will need to join an appropriate PEI.

The courses are flexible work-based degree courses to suit individual employer-employee needs. They are designed around the UK-SPEC competences and integrate workplace learning with academic supervision of professional development.<sup>14</sup>

The individual student is supported by an academic supervisor and a workplace mentor and may call on the PEI of which they are a member for advice and support.<sup>15</sup>

The Gateway principle is reflected in phases which are termed "entry and exit points".<sup>16</sup>

The entry point is delineated by a Professional Development Audit which the student undertakes with an academic supervisor and the employer. This takes account of the individual's qualifications, experience, competences and education to date. From this basis a Learning Contract can be agreed to set out how and by when the individual can achieve any outstanding standards of knowledge, understanding and competence in order the IEng or CEng standards contained in the UK-SPEC.

A copy of the Professional Development Audit and/or Learning Contract is sent to the appropriate PEI which then has an opportunity to suggest changes.

The individual, therefore, can be confident that the training plan contained in the Learning Contract is designed to meet UK-SPEC requirements.

<sup>13</sup> <http://www.engc.org.uk/engineering-gateways> [accessed: 25 August 2014]

<sup>14</sup> Engineering Council, (2014). 'Engineering Gateways degrees Bachelors and MSc Professional Engineering A guide for Higher Education Institutions', p3. Available at <http://www.engc.org.uk/engcdocuments/internet/Website/Guide%20to%20Bachelors%20and%20MSc%20in%20Professional%20Engineering.pdf> [accessed: 02 September 2014]

<sup>15</sup> Engineering Council, (2014). 'Engineering Gateways degrees Bachelors and MSc Professional Engineering A guide for Higher Education Institutions', p5. Available at <http://www.engc.org.uk/engcdocuments/internet/Website/Guide%20to%20Bachelors%20and%20MSc%20in%20Professional%20Engineering.pdf> [accessed: 02 September 2014]

<sup>16</sup> Engineering Council, (2014). 'Engineering Gateways degrees Bachelors and MSc Professional Engineering A guide for Higher Education Institutions' p6. Available at <http://www.engc.org.uk/engcdocuments/internet/Website/Guide%20to%20Bachelors%20and%20MSc%20in%20Professional%20Engineering.pdf> [accessed: 02 September 2014]

The Contract identifies work-based learning opportunities (activities, projects, in-house company training courses, validated professional courses) which allow the engineer to acquire sufficient learning benefits at the appropriate level to achieve the Bachelor/Master degree, whilst meeting the employer's objectives.<sup>17</sup>

Other key features of a work-based Learning Contract are:<sup>18</sup>

- Option to include university taught courses;
- Recognition and accreditation for previous learning whether formal or informal;
- Access to university learning resources;
- Academic supervision;
- Employer support in terms of opportunity to work at a level at which the engineer can acquire the knowledge and develop the competences required to satisfy professional engineering standards.

Assessment<sup>19</sup>

Work-based activities are performed under agreed supervision. All the evidence of learning is collated, a reflective summary of the work done is written and presented. The academic quality of the results is evaluated according to the university's regulations. External verification monitors decisions at Bachelor and Master levels.

The exist gateway consists of the completion of a Professional Engineering Bachelor or Master programme and an evaluation of whether the student has achieved the target learning outcomes including meeting the UK-SPEC competences. Successful candidates are registered at IEng and CEng status by their Professional Engineering Institution.

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<sup>17</sup> Engineering Council, (2014). 'Engineering Gateways degrees Bachelors and MSc Professional Engineering A guide for Higher Education Institutions' p9. Available at <http://www.engc.org.uk/engcdocuments/internet/Website/Guide%20to%20Bachelors%20and%20MSc%20in%20Professional%20Engineering.pdf> [accessed: 02 September 2014]

<sup>18</sup> Engineering Council, (2014). 'Engineering Gateways degrees Bachelors and MSc Professional Engineering A guide for Higher Education Institutions' pp5&10. Available at <http://www.engc.org.uk/engcdocuments/internet/Website/Guide%20to%20Bachelors%20and%20MSc%20in%20Professional%20Engineering.pdf> [accessed: 02 September 2014]

<sup>19</sup> Engineering Council, (2014). 'Engineering Gateways degrees Bachelors and MSc Professional Engineering A guide for Higher Education Institutions' p9/10. Available at <http://www.engc.org.uk/engcdocuments/internet/Website/Guide%20to%20Bachelors%20and%20MSc%20in%20Professional%20Engineering.pdf> [accessed: 02 September 2014]

## Centres for Work-Based Learning.

Examples exist at the Universities of Greenwich, Derby, Cardiff and Middlesex.

At Greenwich, the Applied Professional Studies programmes provide a structure to negotiate learning where knowledge is created and acquired in the workplace and to attribute credit values to learning outcomes.<sup>20</sup>

The curriculum framework allows the learner to negotiate and create a bespoke bachelor or master programme under academic supervision. The content of which is derived from professional practice and tailored to individual development requirements and employer needs.<sup>21</sup> Accreditation can be given to prior learning including both formal and informal learning, and students can negotiate to follow university taught courses. The programme is drawn up into a Learning Contract to which the student, the employer and the university are all parties.<sup>22</sup>

Programmes are available in a range of engineering disciplines<sup>23</sup>.

The programmes aim to apply academic concepts, derived from a variety of backgrounds, in order to improve professional practice. This application takes the form of project-work and work-based learning. The undergraduate programmes are divided into separate, yet incremental qualifications at Foundation degree and Bachelor level. These can allow convenient entry and exit points to and from the programme. This flexibility allows students to adapt their learning to their particular circumstances.<sup>24</sup>

The following schemas give an impression of the elements which may be integrated to make up a qualification at undergraduate and postgraduate level:

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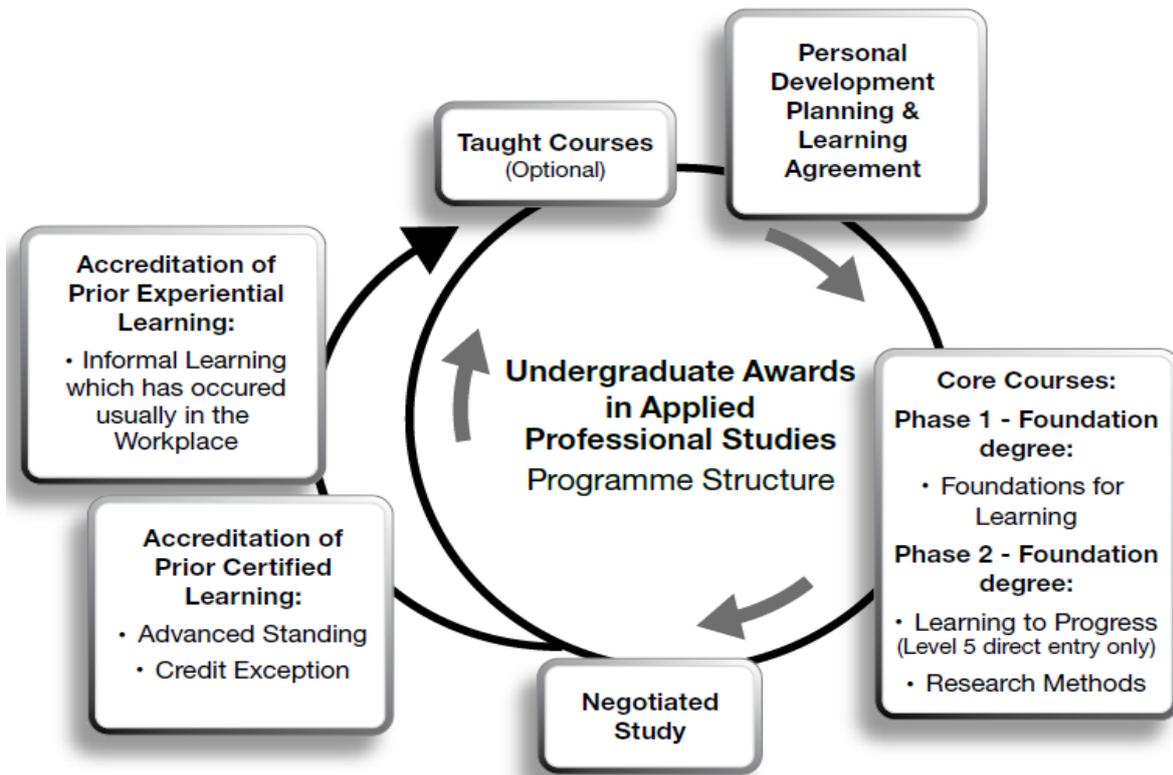
<sup>20</sup> University of Greenwich, (2011/12). 'Applied Professional Studies Undergraduate Programme incorporation awards in: Foundation Degree (Fd), Bachelor of Arts (BA) or Bachelor of Science (BSc), Programme Guide 2011/12, Partnership Division Centre for Work Based Learning', p4. Available at: [http://www2.gre.ac.uk/\\_data/assets/pdf\\_file/0010/559666/GU-D4595\\_11-W.PDF](http://www2.gre.ac.uk/_data/assets/pdf_file/0010/559666/GU-D4595_11-W.PDF) [accessed: 1 September 2014]

<sup>21</sup> Idem p5

<sup>22</sup> Idem p10

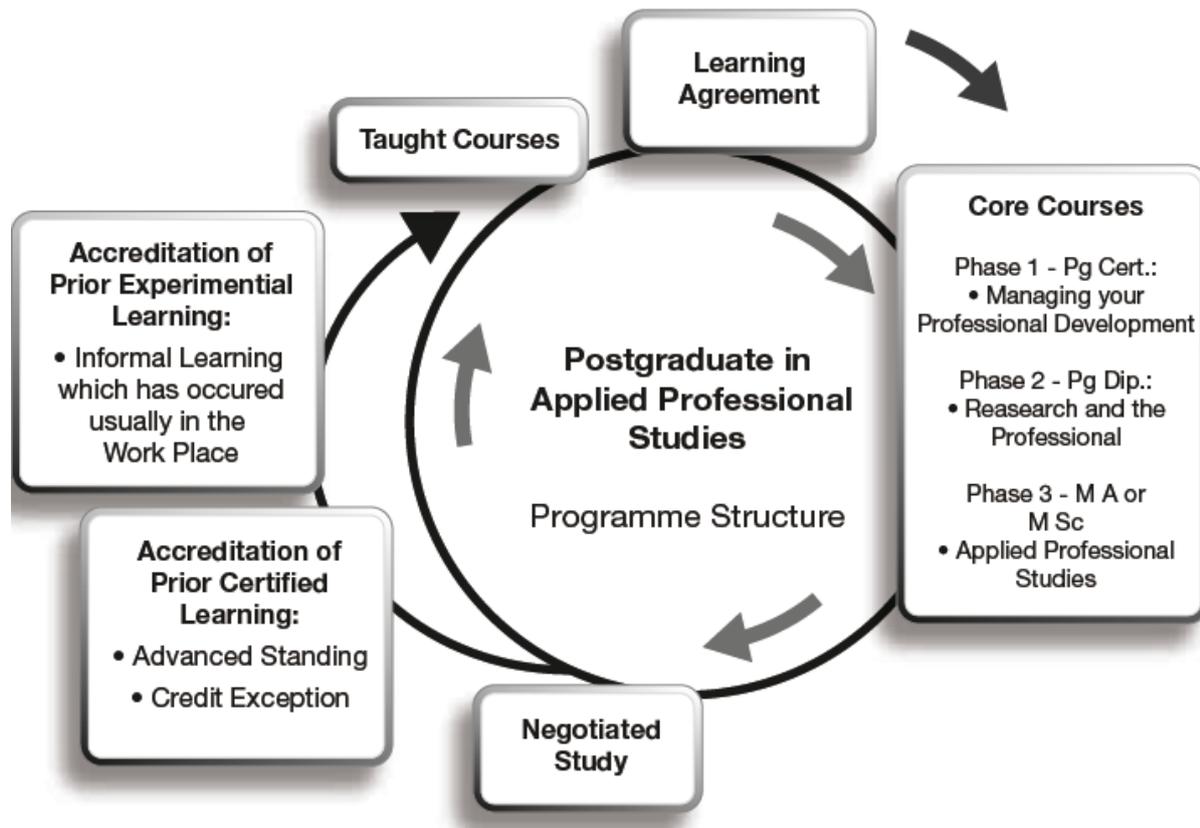
<sup>23</sup> <http://www2.gre.ac.uk/study/courses/aps/programme> [accessed: 1 September 2014]

<sup>24</sup> University of Greenwich, (2011/12). 'Applied Professional Studies Undergraduate Programme incorporation awards in: Foundation Degree (Fd), Bachelor of Arts (BA) or Bachelor of Science (BSc), Programme Guide 2011/12, Partnership Division Centre for Work Based Learning', p5. Available at: [http://www2.gre.ac.uk/\\_data/assets/pdf\\_file/0010/559666/GU-D4595\\_11-W.PDF](http://www2.gre.ac.uk/_data/assets/pdf_file/0010/559666/GU-D4595_11-W.PDF) [accessed: 1 September 2014]



Undergraduate programme structure<sup>25</sup>

<sup>25</sup> University of Greenwich, (2011/12). 'Applied Professional Studies Undergraduate Programme incorporation awards in: Foundation Degree (Fd), Bachelor of Arts (BA) or Bachelor of Science (BSc), Programme Guide 2011/12, Partnership Division Centre for Work Based Learning', p10. Available at: [http://www2.gre.ac.uk/\\_data/assets/pdf\\_file/0010/559666/GU-D4595\\_11-W.PDF](http://www2.gre.ac.uk/_data/assets/pdf_file/0010/559666/GU-D4595_11-W.PDF) [accessed: 1 September 2014]



Postgraduate programme structure<sup>26</sup>

<sup>26</sup> University of Greenwich, (2011/12). 'Applied Professional Studies Postgraduate Programme incorporation awards in: Postgraduate Certificate (PGCert), Postgraduate Diploma (PGDip), Master of Arts (MA) or Master of Science (MSc), Programme Guide 2011/12, Partnership Division Centre for Work Based Learning', p9. Available at [http://www2.gre.ac.uk/\\_data/assets/pdf\\_file/0011/559829/D4596\\_10-APS-POSTGRAD2.pdf](http://www2.gre.ac.uk/_data/assets/pdf_file/0011/559829/D4596_10-APS-POSTGRAD2.pdf) [accessed: 1 September 2014]

## Conclusion

The three training systems we have considered depend upon an apprenticeship training programme or a learning contract. These accords seek to ensure that the training serves both the needs of the student and the employer. All three systems are based around the application and creation of knowledge in the workplace in which academic supervision has a role to fulfil. This indicates that work-based learning, as defined above, is a central element in these systems.

Furthermore, the evidence seems to suggest that the form of Higher Apprenticeship examined here complies with both definitions of alternating training. The apprenticeship framework provides for distinct alternating periods of 'on-the-job' competence training with the employer, and 'off-the-job' knowledge training. The latter involves completing one of a number of part-time bachelor degrees at selected universities. Moreover, if we look at a current definition of an apprenticeship "[It] is a way for young people and adult learners to earn while they learn in a real job, gaining a real qualification and a real future", this indicates a correlation with our understanding of alternating training.

In a similar vein, both Engineering Gateway degrees and engineering degrees provided through the University of Greenwich's Applied Professional Studies programmes allow students to complete taught university courses as an integral part of fulfilling professional engineering standards. In the circumstances where students elect to do this, one might conclude that this training, in combination with all the other elements of work-based learning, constitutes alternating training.

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