Capturing work experience and enhancing employability for engineering students

Scarlett Xiao
School of Engineering and Technology
University of Hertfordshire

Abstract
This project aimed to improve engineering students' employability by enabling them to capture their work experience (including any non-discipline related work) and develop the skills needed by sector employers. During the capturing process, students are required to outline the activities they undertake and reflect on them.

Under the Work Experience and Employability Enhancement Model, students are expected to capture their work experience throughout levels 4 and 5 using the Employability Experience Record Cards and the Engineering and Technology Employability Skill Set. Based on the collected evidence, students produce an employability portfolio at the beginning of the final year to demonstrate their achievements.

The project team has successfully achieved the following outputs and outcomes:

- The production of the Engineering and Technology Employability Skill Set, guided by sector employer inputs
- The development of the Work Experience and Employability Enhancement Model which has been widely disseminated and made available to other institutions that may wish to introduce it into their engineering curriculum.

Keywords: employability, work experience, employability portfolio

Background
In support of the employability agenda of the University of Hertfordshire and the wider STEM sector, the project team has been developing an effective model for capturing engineering students’ work experience and supporting them to develop the skills needed by employers. The team won the university’s Prevailing Priority Award (£12,000) to pilot the model with level 4 students in the school in 2009/10. Feedback from students has been extremely positive. The university's Working Group for Placement and Work Experience is planning to promote this innovation across the university.

The project targeted the level 4, level 5 and final year students studying the Aerospace Engineering, Automotive Engineering, Electrical and Electronic Engineering and Mechanical Engineering programmes within the School of Engineering and Technology at the University of Hertfordshire (about 460 students in total). The employer partners involved in the project are from the aerospace, automotive, electronic and mechanical engineering industries.

Rationale
Work experience covers a wide range of activities that students undertake, including any short-term work, part-time work, voluntary work, acting as a student guide, student representation and student ambassadorship (Done and Mulvey, 2011). Students are often unaware how these activities can enhance their employability and this project has raised their awareness of gaining work experience and helped them to understand how this can contribute to their skills development.
The project team worked with the employer partners to develop an Employability Skill Set (the Skill Set). The Skill Set enabled students to construct skills development strategies for their chosen profession in a systematic way. In order to help students easily link their experience to the skills and identify which skill of the Skill Set they have developed through a particular experience, the project team developed a description and provided examples of evidence for each. Although much work has been undertaken to develop effective practice in work experience, there is little information about the Skill Set produced and how to chart it. The project team has developed the Work Experience and Employability Enhancement Model (the Model) to further the sector's understanding of the Skill Set and its implementation.

The approach
The project started with the development of the Skill Set. Based on the university’s Employability Skill Set, the project team worked with employer partners to obtain their input on sector employment requirements. The Skill Set for the proposed model consists of the following skills:

- Self-management and development
- Team working
- Communicating
- Specialist technologies
- Professional awareness
- Problem solving/creativity.

This has been used by students to identify which skill of the Skill Set they have developed through a particular experience when they evidenced their work experience.

Under the proposed Model, students are expected to capture/evidence their work experience from the beginning of level 4 by using the Employability Experience Record Card (EERC) (Figure 1). Detailed guidance notes on how to complete the EERCs are provided (Figure 2). The work experience capturing process is supported by regular activities throughout levels 4 and 5. Students are required to maintain a repository of their electronic EERCs, together with collected evidence. This mechanism enables them to collate as much evidence as possible for their employability portfolio during levels 4 and 5, without disturbing their final year studies.

Students are required to submit their employability portfolio at the beginning of the final year. The portfolio consists of:

- Evidence of individual work experience collected in the previous two years
- EERCs completed in the previous two years
- A self-evaluation of their achievements against the Skill Set
- A personal action plan on skills improvement based on the outcomes of their self-evaluation.
Figure 1. Employability Experience Record Card (EERC)

<table>
<thead>
<tr>
<th>Employability Experience Record Card</th>
<th>School of Engineering and Technology, University of Nottingham</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student No.</td>
<td>Fill in your student registration number in Section 1.</td>
</tr>
<tr>
<td>2. Student No.</td>
<td>Fill in your student registration number in Section 2.</td>
</tr>
<tr>
<td>3. Course</td>
<td>In Section 1, fill in the course you are studying, i.e. starting with ENE or MEng.</td>
</tr>
<tr>
<td>4. Date</td>
<td>Write the date on which your EERC is completed in Section 4.</td>
</tr>
<tr>
<td>5. Work Experience Record</td>
<td>Use this section to record your work experience. Each activity should be recorded using separate EEROS.</td>
</tr>
<tr>
<td>5.1. Company/Organization Name</td>
<td>Fill in the name of the company/organization to which you are employed.</td>
</tr>
<tr>
<td>5.2. Address</td>
<td>Write the address of the above company/organization in Section 5.2.</td>
</tr>
<tr>
<td>5.3. Dates</td>
<td>In Section 3, give the dates of your work experience.</td>
</tr>
<tr>
<td>5.4. Job Title</td>
<td>Write the title of the position you held.</td>
</tr>
<tr>
<td>5.6. Outline of Activities</td>
<td>One brief description of your work experience, responsibilities and achievements in Section 5.5.</td>
</tr>
<tr>
<td>5.6. Supporting Evidence</td>
<td>In Section 6, support your claim described in Section 5.5.</td>
</tr>
<tr>
<td>5.7. Skills Developed</td>
<td>One brief description of the skills you have developed through the experience described in Section 5.5.</td>
</tr>
</tbody>
</table>

Figure 2. Guidance notes for completing the EERC
The Model is embedded into all study programmes across the school through three careers modules:

1. **Level 4 Module – Career Skills Development**
   - Online workshop:
     - Raising students’ awareness of the Skill Set
     - Importance of work, employment and voluntary experience, including previous work experience
     - How to collect evidence through work experience by EERCs
     - How these evidence-collecting processes benefit students’ future careers
     - Researching work experience options
   - Assignment – submission of two or more EERCs

2. **Level 5 Module – Career Planning**
   - Online workshop:
     - How to organise the collected evidence and use it to produce a portfolio
     - Writing a CV
     - Preparing for professional summer schemes, internships and placements
     - Filling in online application forms in preparation for job-hunting
   - Assignment – submission of two or more EERCs

3. **Final Year Module – Career Portfolio**
   - Online workshop:
     - Employment trends in related subject areas
     - Writing a self-reflection on employability skills development for a portfolio
     - Matching personal profile/portfolio with job advertisements; linking skills to future plans
     - Constructing action plans on skills enhancement for a chosen profession/graduate jobs
     - Refining a CV
   - Assignment – submission of employability portfolio

**Assessment**

The three careers modules mentioned above are zero credit modules and are compulsory for all students within the school. The Career Portfolio module is compulsory for all final year students except returning placement students. Students are required to submit their EERCs and portfolio in order to pass these modules and are awarded a Pass or Fail grade on their transcript depending on whether or not they meet the submission requirements.

Peer review and feedback sessions are organised to encourage group discussions, sharing of experience, analysis of skills gaps and construction of skill development plans.

**Evaluation**

Evaluation was approached from three directions: the target students, the employer partners and the academic staff who facilitated the implementation of the proposed model. Employers’ feedback was obtained via email. Feedback from staff was collected during the school’s away-day in September 2011. Students’ feedback was gathered via an online survey from September 2011. Overall, the feedback was very positive and the proposed Model is welcomed by all stakeholders.

Employer partners’ feedback/quotes:

- ‘I think the Skill Set is extremely good and fits employment requirements well based on my experience in industry.’
- ‘The regular work experience capturing processes definitely make students think how they would shape themselves for their future employment.’
• ‘The resources are excellent tools that can be used by students for their career planning.’

Staff feedback/quotes:
• ‘The Model was more efficiently implemented through the careers modules than with the personal tutor system in the pilot project.’
• ‘The online resources are good for reaching such large cohorts, it makes my life a lot easier.’
• ‘The guidance notes were effective for me to answer students’ enquiries on how to complete the EERCs and portfolio creation.’
• ‘I can notice students’ change of attitude on getting work experience, and the need to prepare themselves for graduate jobs.’
• ‘The project is an effective way to enhance our practice and profile in the area of student employability.’

Students’ feedback:
87 students completed the survey.
• 89.4% of the respondents agree that the careers modules have raised their awareness of the Skill Set
• 90.6% of the respondents agree that the Model helps them to understand how non-discipline related work experience can contribute to their employability skills development
• 90.8% of the respondents agree that the Model effectively supports them in gathering employability skills evidence for job interviews
• 89.5% of the respondents agree that the Model helps them to identify the skill areas they may still need to develop.

Discussion, summary
The project has successfully achieved the following outcomes:
• Production of the Employability Skill Set, guided by sector employer inputs
• Development of the Work Experience and Employability Enhancement Model with associated forms and guidance notes.

The proposed Work Experience and Employability Enhancement Model was highly commended by the Engineering Accreditation Board during its accreditation visit in June 2011. The Model effectively supports students in developing the skills that sector employers require by regularly capturing their work experience (including any non-discipline related activities), evaluating their achievements against the Skill Set and constructing their personal action plans.

The three careers modules are the key to the Model being embedded and sustained within all study programmes across the school. The modules provide online workshops, hosted by the university’s VLE (StudyNet), to introduce the Model to students and show them how to use the associated forms. Running the workshops online makes it easier and more flexible for large cohorts to access the resources 24/7.

The Skill Set is generic to the engineering sector. This facilitates easy transfer of the Model to other institutions at different levels for their engineering students. Firstly, the online material (workshops, associated forms and guidance notes) is openly available and can be used in a stand-alone manner. Students can use them as and when they need to. Secondly, as it is applied through careers modules, universities can readily adopt the Model. Thirdly, institutions can adapt the model to their own needs, actively selecting relevant parts and modifying others and inserting their own examples or features. The project team is more than happy to assist with any of these levels of adoption upon request from the sector.

Further development
To ensure that the outcomes of the project are sustainable, employer input will be periodically obtained in order to review the employability portfolio contents. In this way, sector employability trends and developments can be embedded into the Model’s continuous development.
The project team will work with the university’s Working Group for Placement and Work Experience as well as The Royal Academy of Engineering to promote the project outcomes across the University of Hertfordshire and the STEM sector. The team will demonstrate the benefits and good practice emerging from the project in order to facilitate effective local adoption. The project team has been invited to present their work at the first HEA STEM conference on 12 April 2012 in London.

References

Bibliography

This work is licensed under a Creative Commons Attribution-NoDerivs 3.0 Unported License

Publication Date: 20/04/2012
Appendix A: Engineering and Technology Employability Skill Set

**SMD** – Self-management and development

This skill is concerned with knowing your aims and responsibilities and ability to successfully carry them out and recognise and evaluate your own development.

*Skills include:* self-motivation, time management, study skills, project planning, decision making, reliability, organisation, self-evaluation, accepting and providing constructive feedback.

*Possible evidence includes:* time sheets, action plans, attendance records, grades achieved, *curriculum vitae*, project plans, work schedules, self-assessment, and peer assessment.

**TW** – Team working

This skill is concerned with how effective you are at working with others and how you effectively work as a member of a team, your ability to develop good working relationships which requires respect for the views and opinions of others and appreciation that diversity produces better results.

*Skills include:* demonstrating an appreciation of cultural, social and other diversity as well as transition of roles to meet the needs of each situation.

*Possible evidence includes:* references from past employers; records of planning meetings; accounts of successful team enterprises; team-supervisor feedback; self or peer assessment of working relationships; reflection on contribution to a team (i.e. identifying roles within and between teams, identifying the student’s preferred role within teams).

**COM** – Communicating

This skill is about effective communication in all its forms: visual, written, oral and non-verbal.

*Skills include:* expressing oneself and responding to others in a wide range of settings and communicating with others from a range of social and cultural backgrounds.

*Possible evidence includes:* written reports with different writing styles (e.g. formal reports or magazine style); staff and peer assessments or oral presentation; posters; videos; reflection on oral communication with peers or in work placements (e.g. customer service, telephone communication with colleagues, training someone). This also includes electronic forms of communication.

**ST** – Specialist technologies

This skill is about the ability to use industry-standard applications within the subject area.

*Possible evidence includes:* application of specialist technologies within the subject area; understanding of current and future trends and developments in specialist technologies.

**PA** – Professional awareness

This skill is about awareness of professional standards, competencies and ethics.

*Possible evidence includes:* understanding of sector standards, employability trends and developments; critical analysis of a variety of referenced sources.

**PS** – Problem solving/creativity

This skill is concerned with identifying problems and coming up with different solutions by applying logical and methodical methods, appreciation of problem solving analytical tools and verification of achieving optimum solutions.

*Skills include:* applying current knowledge and skills to new situations which involve planning and testing different options and checking whether solutions have worked.

*Possible evidence includes:* retrospective account of a problem solved; implementation of successful ideas; project reports; design projects; accounts of resolution of logistic or time constraints.