

'Developing a student-led employability audit tool-kit' - Practice Transfer Adopter Evaluation by University of the West of England

i] Achievements to Date

The engineering degree employability audit was carried out by six students [two from electrical and four from mechanical engineering degrees] during 4 meetings between the 7th March and 4th April 2012. The students were recruited through our PAL [Peer Assisted Learning] scheme.

The project had four strands:

1] Employer consultation:

The students having identified the top five 'key' skills graduate employers require, surveyed engineering employers to determine how these skills and attributes can be successfully evidenced on application forms, at assessment centres and at interviews. They were able to identify a range of concrete examples.

Sources: Airbus, Delphi, Broadcom, Infineon, Aeopona, Hewlett Packard, Intel, Stirling Dynamics, Ultra Electronics, GE Aviation, Zircon

2] Module audit:

Using the knowledge gained from the employer consultation, students conducted a module by module employability audit of their electrical and mechanical engineering to identify 'evidence gathering' opportunities related to these five skill areas. They then made suggestions as to how these opportunities could be further developed.

3] Comparison of employability skills development opportunities in mechanical and electrical degrees:

The students asked if there were differences in opportunities to develop or enhance employability skills between awards. If so, what examples of good practice from one area could be suggested for adoption by the other?

4] Personal career goals:

What are their personal career goals? After reviewing occupational literature detailing the key skills required for that specific role, how well does their degree prepare them by offering opportunities to acquire these? What gaps if any are there? How can these be filled e.g. work experience, volunteering?

5] Recommendations:

Group Projects

- Detailed guidance and feedback for every individual group member. Give groups an opportunity to bond and assess themselves in a controlled environment (no risk), so performance can be improved upon in later stages leading up to the final presentation.
- Cross disciplinary group projects, involving members of different courses, e.g. business, economics, marketing, engineering and mathematics. Mirroring workplace practice, this should build commercial awareness as well.
- A second group project instead of the reflective essay in the 1st year Mechanical and Motorsport Applications module.
- Compulsory involvement in presentations, to ensure every team member gets an opportunity to present.
- In the mechanical engineering year 2 group project, more marks given overall to the management aspect and rotation of group roles to ensure more wide ranging experience.

Commercial Awareness

- Conform to a report format used in industry i.e. the module academic obtains the report format from a company.
- Logbook format taken from IET and IMechE for group project logbooks.
- Electrical and Electronic Engineering courses should make more use of commercially justified practises during circuit and Printed Circuit Board (PCB) design such as using ingenuity in designing PCBs over a smaller area should warrant a greater reward to impart pragmatic skills to students.
- In case of Electrical and Electronic Engineering degrees, the choice of components for a particular circuit design should be questioned, with possible justifications of going with one manufacturer over another. Stock price, likelihood of components reaching end of life (EOL) are just some of many justifications that could be used.
- Inclusion of an economic module to enhance students' business awareness, and understanding of profitability.

Case Studies and Application of Theory

- Group project lectures based on specific case studies such as company successes and failures, and supporting theory linked to the case studies. This way the theory is more readily absorbed because the students have anecdotes on which to base it.
- For mechanical engineering specifically, linking content covered in theoretical subjects to its application in the real world, for example linking study of flow in convergent-divergent nozzles to its real world application: rocket engine nozzles. Focus placed on understanding and relevance instead of passing exams. (Application of course theory is a key requirement for placements at GE aviation).

Individual presentations

- Each student presenting their own design work to a group at the end of an individual design project, to ensure they are able to communicate it effectively. This should greatly improve oral communication and confidence during presentations.

Improving group discussion during lab sessions

- Lecturers could facilitate much more technical discussion during the lab sessions, to broaden the group's understanding of the work. Lab sessions provide an excellent opportunity for technical discussion.
- This opportunity could be improved using a system similar to the current one in the *stress/dynamics labs* module in mechanical engineering, where a group leader is nominated and must ensure that their own team completes the lab work to a strict timescale. The workload can be spread amongst the team, and ensure all tasks are completed within the lab session.
- The lectures could be coordinated with the lab sessions, and links made to them. This would increase the proportion of students that understand what they are doing in the lab.
- In case of the Electrical and Electronic Engineering degrees, a short presentation/demo at the end of each lab class will ensure students not only demonstrate their understanding but also use succinct terminology.

Week-long Project

- Similar to the wings week for the aerospace students and the first-year trebuchet project for mechanical students, a week-long project gives an excellent source of evidence for a number of soft skills, problem solving and oral communication in particular. By having the deadline at the end of the week, effective self-management and team management would be required to meet the deadline.

Real-life Problems in Mathematic Modules

- Design questions embodying mathematical concepts gleaned from past lectures, applicable to real-life situations, especially for mathematics or subjects which are pre-dominantly mathematics based.

Modelling Techniques for Problem Solving

- Use a two-stage deadline in the first year engineering design trebuchet project, to make sure students have completed the theoretical calculations and have dimensions for their physical model before they build it.

Professional Practice Module

- Offer an optional distance learning module for students on placement to improve understanding of application of course material in the workplace, enhancing commercial awareness. This module could be linked to an independent professional organisation such as ILM.

ii] Project Outputs

Engineering Employability Project Blog on the main UWE website called 'Engineering Employability Project'. All contributed over the duration of the project charting their progress and writing reflectively about the challenges encountered.

Engineering Employability Audit Poster designed for UWE Teaching and Learning Conference poster session.

Engineering Employability Audit Report describing the project's rationale and findings including all the documents produced during the audit, the recommendations and blog posts.

Changes or additions that will be implemented as a result of the audit: it is too early to categorically state these but indications from dissemination events lead me to conclude the recommendations in the report will be considered by the department. Unlike other PTAs I am not based within the department that runs the awards we have audited nor deliver any of the audited curriculum so my influence over adoption of these recommendations may not be as strong as others'. However our reception at the Engineering, Design and Maths staff development day was positive and many questions were asked about the findings. We propose to meet the Head of Department shortly to present the report and discuss next steps.

iii] Issues

Loss of one electrical student immediately after the initial briefing session due to workload issues was unfortunate as she was the only third year electrical student we had recruited. Fortunately a replacement was found quickly but then he wondered whether he would have enough time to devote to the audit. He was kept on board by me pleading that we really needed him and proved to be a great asset.

The students were extremely reluctant to blog and wanted to be told exactly what to say, thereby defeating the object of having different voices and perspectives recorded. I refused to 'spoon feed' them content but did relent and offer guidance as to what they might like to comment on, such as the experience of the employers fair, designing the poster etc.

The timescale for the project was the most challenging aspect. As the initial briefing did not take place until mid February I then only had until the end of March to recruit the students and complete the audit before the students had to concentrate on exam revision. There was no scope to resume post exams as many were international students going home or commencing a placement.

iv] Materials

We did not use any Exeter materials as such but adapted the concept to include employer consultation, narrowing down the soft skills audited to 5 for ease of surveying, concentration on engineering degrees rather than maths, introducing a comparative element in regard to mechanical vs electrical and asking the students to reflect on their personal career goals and how well their degree has prepared them to achieve these.

I did receive some materials/ activity ideas related to identification of key skills graduate employers want but these arrived some time after the project had started and after we had identified these. It would have been useful to have received them at the start.

v] Dissemination

26/4/2012 - UWE's Teaching and Learning Conference – lunchtime poster session, much interest in the poster and project. Staff from life sciences took a particular interest and started speculating on the benefits of doing this in their faculty.

14/5/2012 - UWE's Department of Engineering, Design and Maths – session for 60 academics at their staff development day talking through the poster and project recommendations.

18/6/2012 - HE STEM Workforce Development and Employability Conference – presentation and Q&A – 40 attendees

21/6/2012 – UWE Employer and University Engagement to Support the Advanced Engineering Sector Conference – workshop session. 15 attended, a mix of engineering academics and employers. There was useful discussion about whether some of these aspects were already covered in the curriculum but not explicit enough for students to be aware of this.

vi] Evaluation

The impact on the students involved in this project is demonstrated by their blog posts describing their increased awareness of the key skills graduate engineering employers require and their raised confidence in speaking to these employers. Two of the students attended selection days/ interviews in connection with placement applications and their experiences on the project informed their preparation and performance.

I am the linked Careers Consultant for the Department of Engineering, Design and Maths and will informally evaluate the influence of this project by following curriculum changes coming into force over the next year and seeing how they link with the project's recommendations.

vii] Sustainability

I have shared the practice of conducting the audit and its outcomes with careers colleagues who have expressed interest in adopting this activity for their faculties.

viii] Support/Feedback to Exeter

The support available during the audit has been helpful and it was reassuring to know that Chloe/Barrie were available to advise should we have run into any difficulties. My initial expectation was that we would be provided with actual audit materials as a 'toolkit' was referred to in the project documentation. However the absence of these did not affect our ability to conduct the audit and successfully deliver the project.

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