Employer-endorsed employability assessment: an assignment delivered in an operational research course to second year mathematics students

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Abstract
This paper describes an employability assignment for second year mathematicians, embedded within a course on Operational Research at the University of Greenwich. The assignment, unlike other similar attempts before it, has been well-received by students and appears to be having an impact on student attitudes, which goes further than their simply wanting to obtain a good mark. The assignment involved a variety of tasks such as a CV, job application, covering letter, competency-based questions, a Linked-In profile and reflection. It has been endorsed by employers and could be adapted for use within any STEM discipline.

Keywords
employability, feedback, assessment

1. Background
There is strong and consistent evidence that maths graduates end up in a wide variety of careers, but that students taking degrees in Mathematics are largely unaware of the choice of careers open to them when they graduate (Hibberd & Grove 2006). There is also evidence to suggest that many academics do not want to give up valuable subject teaching time to devote to the development and practice of soft skills such as team-building, business awareness and report-writing (Challis et al. 2009). However employers consistently say that they need graduates equipped for the workplace, and a 1st class or 2:1 degree classification is no longer enough (Hibberd & Grove 2009).

2. Context
2.1 Past work
In the department of Mathematical Sciences at the University of Greenwich these employability skills have been taken seriously for many years and they have deliberately been incorporated into the academic syllabus. Academic staff have worked closely with the
University’s Guidance and Employability Team (GET), arranging for GET specialists to give regular input to maths students. In 2011/12 the department took part in an HESTEM-funded project designed to raise students’ confidence in their own ability, which had a focus on the graduate recruitment process (Bradshaw 2012a). In the same year staff organised an event based on Manchester’s Calculating Careers (Walker 2011) where some of our graduates were invited to come and speak to students about how they obtained their first graduate job (Bradshaw 2012b). This event was supported by a grant from the HESTEM Mathematics Curriculum Innovation Fund. Following the introduction of these initiatives, the National Student Survey (NSS) results for 2012 showed a rise from 53% of mathematics students who thought that their degree had increased their confidence to 96%, while the number saying their communication skills had been improved rose from 61% to 96%, and 91% thought they were good at tackling unfamiliar problems compared with 75% in the previous year. This helped the BSc Mathematics programme achieve overall 4th ranking sector-wide over all NSS questions. This improvement in the NSS results for these questions was maintained in the 2013 NSS.

Last year the department was awarded an HEA grant to enable us to arrange several special events such as a subject-focused Business Game co-run with the Institute of Mathematics and its Applications (IMA) (Bradshaw, 2013), and various masterclasses on specific technical skills for specialist graduate jobs which were too specialist to be taught within the curriculum. These activities have helped better equip our graduates for the job market (Ramesh 2013).

2.2 Previous assignment

Since 2010, based on the practice in Mathematics departments at other universities (Graham & Millar 2012), we have set an assignment in the 2nd year Operational Research course which required students to prepare their CV and make a mock job application, but many students still saw it as an optional extra which did not gain their full engagement. After the course coordinator attended an HEA workshop in 2012 to discuss what OR employers really want from graduates (Currie 2012) and took part in the HESTEM project mentioned above, a need to revamp this employability provision for second year students was identified, and this was agreed by the course team.

One of the main problems was that students left working on the assignment until the last minute, and then, having submitted the assignment, did not subsequently act on the feedback provided. They might be happy with an average mark for the assignment without realising that one or two weak parts of their CV or job application, in the competitive employment market graduates currently face, would mean that they were unlikely to be short-listed for a graduate position. Students also failed to realise that academics were well-placed to advise on employability issues, because they did not see them conversing with employers, conducting practice interviews or commenting face-to-face regarding their CVs. This led students to undervalue written feedback from academics, despite the extensive training for maths academics at Greenwich which was part of the HESTEM project, the considerable
efforts made by teaching staff to understand today’s employment market, and the many
discussions between academics and employers about recruitment issues.

3. New Assignment
The new assignment consists of the following components, some of which are discussed further below:
• Initial skills audit and research on maths careers;
• CV, job application and covering letter;
• Competency-based questionnaire;
• Linked-In profile;
• Reflection and plan for future.

3.1 Interim feedback on CV
Perhaps the most important change in practice was that students were asked to submit a
draft CV to obtain feedback before uploading the final version. This allowed students to take immediate advantage of feedback, improving their CV before final submission, whereas previously, since the feedback came after the assignment had been completed and when students’ focus had inevitably moved to other assessments, many students had not engaged with the feedback provided. The interim submission thus ensured that more students would have a CV that presented them to best advantage, ready for the beginning of their final year when they were starting to apply for graduate schemes.

Another change required students to make a mock application for one of three specific given jobs chosen by the course co-ordinator. Previously they had been asked to find a job for themselves, and prepare an application for it. This had resulted in some choosing unsuitable positions with inappropriate criteria, or finding ones whose specifications made the process less useful in terms of developing understanding of competence-based selection procedures. Also, some students applied for teaching jobs, for which the application process differs from other careers: consequently these students did not always appreciate what other doors a maths degree, which is exceptionally flexible in terms of preparation for a wide variety of graduate career options, could open. In addition to the CV and job application, the students were required to write a covering letter. The aim was that this assignment should cover all aspects of this part of the job application process.

3.2 Maths careers research
Other components were also added to the assignment. For example students were asked to research the variety of jobs available to them. The maths careers website (IMA 2013) was given as starting point, and students were tasked with identifying several places where they could find graduate jobs. They then were asked choose a company to research, saying what they liked about the company and what it could offer as a potential employee.
3.3 Competency based questionnaire
Most employers use competency-based questions extensively in the recruitment process and, if students are to successfully compete for the best graduate jobs, understanding and practice in answering these questions is vital (Thornburrow & Houston 2010). The students were asked to look at a series of questions on 15 competencies prepared by the University’s Guidance and Employability team. Students were asked to analyse three of these competencies, using STAR (Situation, Task, Action, Result) in order to describe how they met the competency. This is a method advocated by many employers to help graduates prepare for interview (Morgan McKinley 2012). It was hoped that after doing this, the students would subsequently have examples in their minds ready for a competency-based interview, and would understand how to answer other competency questions that might arise. In order to emphasise the link between these and the interview part of the recruitment process, several mock interviews were carried out in front of the class. Here student volunteers were asked competency-based questions used by a top graduate employer; during the exercise the interview was stopped at several points and the class were asked to comment on the questions and answers provided. This made sure that the session was interactive and gained full engagement from the class with everyone thinking in detail about this important aspect of the job search process.

3.4 Linked-In profile
The final aspect of the assignment was to create a LinkedIn profile. Employers advise that effective use of LinkedIn is an important professional activity and that they expect job applicants to have a strong LinkedIn profile (Whitmell 2011). It was acknowledged that some members of the class might, for various reasons, not want to provide personal information on this public platform, so the assignment allowed that the profile could be fictitious, with the strict condition that, in that circumstance, students must not link their profile to the University of Greenwich or any staff or students. Although it was important to offer this anonymity option, fewer than five students actually used this facility; almost the whole class understood the value of creating their own public profile. This has the added benefit of enabling us to keep in contact with them when they graduate.

3.5 Employer engagement
One important aspect of this assignment was the context in which it was placed. The lectures where the material was taught referred to employer and student feedback on the assignment, and employers were invited in to lectures and other events so that students could see that the activity was built on reality. As well as feedback being offered on early submission of CVs, the anonymised CVs of students applying for placements were (with permission) analysed in class in some detail. Again this helped gain credibility with students for the employability agenda behind this assignment.
4. Feedback

Feedback on the assignment has been obtained from a wide variety of sources: employers and recruiters, the University’s Guidance and Employability Team, fellow teaching staff, external examiners, graduates and current students. This has been exceptionally positive. In particular, employers and recruiters were very positive with one saying “I think you have an excellent model…I especially liked the Standard Application Form which should, if well thought through by the student, prepare them for almost any formal application”. Many students also said that without this assignment they did not feel that they would have obtained a placement after their second year or know what they needed to do regarding applying for graduate schemes at the start of their final year.

The feedback from employers has been particularly important in gaining student buy-in for the assignment. The positive feedback from previous cohorts of students has also been very valuable in this regard.

The only negative feedback came from one student who thought that the assignment was unnecessarily time-consuming and rather repetitive, in that some of the same information was required in the covering letter, CV, job application form and competency questionnaires. This feedback was discussed with several other students who all said that they felt the length of the assignment was justified as everything it covered was necessary if they were to be in a position to find a graduate job appropriate to their mathematical skills. Following this discussion it was agreed that the assignment should be unchanged for this current academic year.

This year students have been even more positive with one commenting: “I thought that being asked to make a CV and a covering letter as part of the coursework was excellent, as many people would already have a CV but just didn’t realize how much of an impact this has on being given the opportunity to have an interview with a company. After adjusting my CV I have now been motivated to go out and apply for more placements as well.” (Second year student, 2014)

5. Results

The success of this assignment will not be fully known in statistical terms until the Destination of Leavers of Higher Education (DLHE) survey results for the cohort graduating in 2014 are available (and indeed the DLHE survey results, for relatively small numbers of students, do not tell the whole story). However other signs are very positive. For example, we had four times as many students taking up sandwich placements in 2013/14, and all of these cited this assignment as helping them to achieve this.

Anecdotal evidence suggests that students currently in the final year are taking the job application process far more seriously this year, with more students applying for many more graduate schemes earlier than previous cohorts. We have little doubt that the assignment is having a significant effect in building student confidence in their ability to obtain graduate
jobs, and in encouraging them to focus on the search for employment earlier than was the case for previous cohorts.

6. Conclusion
This assignment, alongside other University and School-based employability initiatives, has met its objectives and left students better prepared for their search for graduate jobs on completion of their degrees. It has therefore enhanced Greenwich maths graduates’ career prospects.

7. References


