



Title: Making Maths Graduates More Employable: an enhanced role for tutors.

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Abstract:

Mathematics graduates are viewed by employers as typically well-equipped with technical skills but weaker on communication and teamwork, and tutors can lack the necessary workplace experience to help with this.

The Greenwich mathematics degree addresses these skills but students, particularly, but not only, those from BME communities or non-traditional backgrounds, often have low expectations, low aspirations and lack self-confidence; and they do not always make effective applications when they are job-hunting. This project, delivered with the Adab Trust (an organization dedicated to increasing graduate level employment outcomes for students from Black, Asian and Minority Ethnic (BAME) communities) has addressed these issues through masterclasses and workshops for current students and recent graduates which has enhanced their awareness of their employability, built confidence, and improved their career opportunities.

The project has also focused on developing the skills, knowledge and confidence of teaching staff so that we can continue to deliver such support after the project finishes, creating a sustainable improvement in graduate prospects. In particular the Adab Trust provided two staff development workshops to enable staff to better help students develop some of the employability skills that would be beneficial.

Background and Rationale:

The Department of Mathematical Sciences at the University of Greenwich has a large number of students from non-traditional backgrounds. There is plentiful evidence that such students have poorer employment rates and are placed in lower-quality jobs than traditional students. In addition a report, by Neil Challis et al, 2002, citing the findings of an employer survey, says 'Mathematics graduates tended to lack presentation and communication skills (including report writing and presentation to a non-technical audience)'

This project has worked with mathematics undergraduates and recent graduates to enhance their employability and to provide teaching staff with information about employers' needs along with ideas and exemplars which will help embed employability more strongly in our programmes.

The project has raised levels of motivation and aspiration amongst students and graduates thus helping to increase job prospects. They have been taught how to set attainable goals whilst aiming high. Students' and graduates' soft skills have been improved, helping them navigate the employment application process with greater confidence.

Tutors are now able to implement a programme of workshops and masterclasses in subsequent years, having taken confidence, ideas and inspiration from observation and participation in the events run by the Adab trust in this project.

Objectives:

The project has delivered:

- Six masterclasses / workshops for students and recent undergraduates aimed at increasing motivation and helping practically with CVs and job applications.
- Two skills training sessions for students with potential who are currently under achieving and promising graduates still seeking employment.
- Two training sessions for staff to inform academics on how to up-skill graduates, liaise with employers and explore opportunities to embed Employability Skills in the 2012/13 curriculum.

This project reflected the core values of the HE STEM programme whilst supporting and enhancing the short and medium term employability strategy in the Mathematics Department at Greenwich. Methods for developing long-term sustainability were also built in.

Staff who attended a masterclass delivered for undergraduates by the Adab Trust in May 2011 and saw its impact on students wanted to build on this good practice. A desire to model good practice and then share it with others is at the heart of this project.

There is a need to identify and respond to the differing and varied needs and circumstances of the whole range of employers from multinationals to small and medium sized enterprises, including being duly responsive to the demands of the sectors in which they customarily operate. The masterclasses run by the Adab Trust brought in employers from a wide variety of backgrounds and experiences to motivate and inspire students and recent graduates.

The alignment of this project with the University's Greenwich Graduate Initiative and the intention to present the outcomes through the University's Teaching Fellows Network mean that this project has the potential to contribute to institutional change.

It has added value to graduates' degrees by providing enhanced employability skills in addition to their technical abilities. This has been noted to be of great importance to employers (Lowndes and Berry, 2003).

Implementation:

The Adab Trust was approached to help put together a programme of activities that would meet the objectives for both educating staff and students. Below is a detailed resume of the various events with commentary on their reception and effectiveness. The presentations from the events can all be found on a website dedicated to maths employability at the University of Greenwich:

<http://www.cms.gre.ac.uk/empandpgstudies/events/adab.asp>

Programme of activities:

1/11/11 CV Introduction

This session was delivered by the Adab Trust's Head of Development, Mohsin Aboobaker. It was attended by 47 staff, students and recent graduates. Mohsin gave a short interactive talk about CVs and then then students had the opportunity to have their CVs checked by him.

'Thank you and the rest of the team for giving us this opportunity. I think it was a real wakeup call and it has shown how much more effort is needed not only within the university but outside of uni.'

8/11/11 Selling yourself – a talk for those final years under achieving

This session was delivered by the Adab Trust's head of Development, Mohsin Aboobaker. It was attended by 24 students and staff.

21/11/11 Enhancing Employability – Communicating and Presenting Effectively

This interactive workshop run by David Nevill Assistant VP at State Street Global Services was attended by 30 students and staff. It covered various practical ways that students could improve their employability, including 'How to Deliver Effective Presentations', 'How to Manage their Online Presence' and 'How to Communicate Effectively,' It gave students a chance to try out and improve their presentation skills in front of their classmates.

'The events have given me more knowledge about presentations skills and how to stand out and make your presentation high-quality. I have come to know that presentation should be short and effective, and how to interact with the audience. I think this worked well for me, because I have more insights information about presentation styles. I thought the David Nevill's presentation was brilliant. The way he presented and interacted was brilliant!'

22/11/11 Staff Awayday

This was the first of two awaydays led by Dermot O'Brien CEO of the Adab Trust. It was attended by 8 teaching staff from the maths department. Dermot shared his experience of what graduate employers seek in potential employees, how the graduate recruitment process works and how best to involve employers with academia. The aim was to uncover new opportunities for the department to enhance students' employability. Much of the session focused on activities that staff could do with students to give them experience of team work and improve their communication skills.

12/12/11 Masterclass on Success

The speaker at this masterclass was Adrian Wyatt OBE, Chief Executive of Quintain Estates and Development PLC. It was attended by 46 students and staff. The University's Vice Chancellor, David Mellor, met up with Adrian just before his talk which was mutually beneficial to them both.

Although not a mathematician, Adrian talked about how he had come up with an original financial innovation that made a lot of money for his company. He shared his story of starting with very little and getting to the place where he is today.

He also talked about urban regeneration and how he wanted maths graduates to get involved in this.

17/1/12 CV clinic

This was led by Michael Staunton, Head of Talent Management at State Street Global Services and Mohsin Aboobaker, Adab Trust. It was attended by 24 students and staff. Feedback from this session was amongst some of the most positive. Michael and Mohsin gave a short talk on CVs and interviews and then gave an opportunity to students to have their CVs checked. All of the students who attended took up this offer and some in particular benefitted greatly from the advice given.

'The session with Michael Staunton and Mohsin from the Adab Trust was helpful because I have learned that the way we write C.V. is very important to the future employer and it gave us tips on how to write a good C.V. I found that part of the presentation very interesting and effective and I think most people would agree with me.'

31/01/12 Workshop on Interview Skills

The second session for those final years under achieving. Sixteen staff and students attended this event. The session covered the various ways that students could enhance their performance during interviews, including how to communicate effectively, persuade interviewers and understand the importance of emotional intelligence. All those who attended gave positive feedback

24/02/12 Workshop on the Recruitment Process subtitled How to succeed with under 300 UCAS points

This was run by Dermot O'Brien and attended by 60 students and staff showing that the subject of this event appealed to a large number of students. Dermot covered the various stages of a typical recruitment process. He also highlighted the various hurdles job applicants are likely to encounter in their search for their dream job. Practical advice was then given on how best to overcome these hurdles.

29/2/12 Staff Awayday

This second awayday was led by Dermot O'Brien and was attended by the same eight staff as last time. As well as these staff 12 second year students were invited to attend the first hour to help with activities. The staff and students were put into two groups and carried out the same team building and communication skills that they had practiced at the last workshop. This was so staff could see firsthand how these activities would work and how they would benefit students.

26/03/12 Masterclass on Success

This last Adab Trust event was led by Richard Addy Audience Strategy Consultant, The Guardian. Richard gave a very powerful talk showing clearly how you could look at the same upbringing in two totally different ways. This was attended by 30 students and staff.

'This particular event has inspired me to try to live up to Mr. Addy's accomplishment. The presentation was very interesting and had given me more insight into the job market.'

Evaluation:

Evaluation of the project comprised a number of approaches:

- Qualitative feedback was obtained from students and staff after each event.
 - Email
 - Social networking sites
 - Reflective logbooks
 - Informal discussions
- A survey of second and final year students was conducted after the project was completed.
- Anecdotal information concerning numbers of students' job applications this year could be obtained but a thorough comparison with previous cohorts cannot be made until the end of this academic year at the earliest if not later when the DHLE results are made known.

The Adab Trust also carried out their own evaluation of the events based on gathering of data such as student and staff participation rates at masterclasses and workshops and obtaining feedback from students and staff at the time of the events.

A summary of the evaluation from the Adab Trust is as follows:

During the period, feedback was obtained from 168 students who attended 7 separate events. Their responses are summarised in the tables below. These events comprised Masterclasses, Employability Workshops and Awaydays with academics. 94% of students found the sessions helpful with 98% wanting to attend similar events in the future.

Masterclasses:

Feedback was obtained from 56 students, assessing their responses to ascertain the impact or influence that students felt they had received in relation to three topics.

	Impact / Influence	
	Moderate %	Greatly / considerable %
On career / job focus	20	59
On goal setting re career	12	67
Inspiration on achieving career ambition	20	74

Comments on Masterclasses:

'Excellent speaker. He has kept his talk very interesting, and inspiring for all. Love to hear from him again.'

'The main thing I got from this talk was researching jobs I'm interested in and how to improve myself so I'm a better candidate for that job.'

'The talk has shown me the effects goal setting can have and will try to incorporate it into my life.'

'Thinking about what I can offer and the problem which I can help resolve.....'

Workshops

Before the workshops, 32% of students felt that their skills levels in the topics studied were “Not Very” good, whereas afterwards only 3% felt that was still the case. Those who felt most competent increased from less than one quarter (23%) to over one half (53%).

Students’ responses were obtained to ascertain the skills levels that students already possessed, ie Before the workshop and the levels they felt they had achieved After the workshop. The findings are below.

	Skill Levels					
	Not very		Partial		Fully	
	Before	After	Before	After	Before	After
Confidence	40	3	44	53	16	44
Knowledge	27	2	45	28	28	70
Ability	30	4	46	50	24	46
Average	32	3	45	44	23	53

Comments on Workshops:

‘It was very helpful with loads of tips regarding “How to prepare” for the job interviews’

‘Good real life examples’

‘More to interviews than I thought!’

‘Just keep them coming – anything would helpful’

‘I have been to most of the workshops by The Adab Trust – all of them are enjoyable and helpful.’

Awaydays for staff

These were attended by 8 out of 11 teaching staff. Staff who attended are now better equipped to deliver competency based employability sessions than previously. Students were invited to the second awayday so that staff could see how these activities worked with students. Here are some of the students’ comments:

‘I would love to see more of these activities for us to find out and improve our week spots.’

‘Thank you for the privilege to work with you today and all the teaching staff. I personally feel that if at all possible you could arrange such events very often, it would help, to prepare us for the future challenges of employment.’

‘Just wanted to say thank you for today's workshop. I've learnt so much and can apply it without hesitation. If it's possible could you arrange more workshops similar as today.’

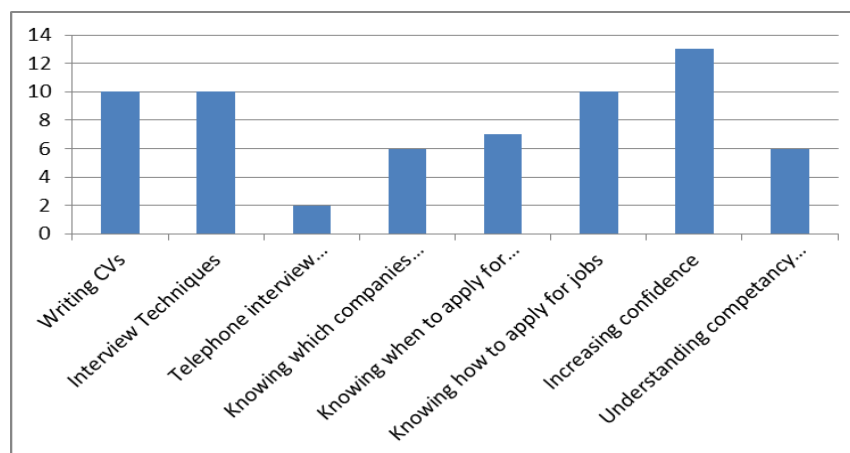
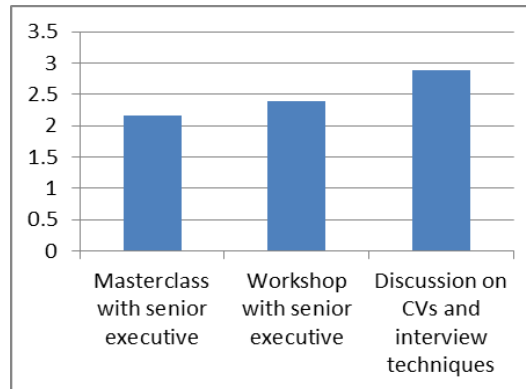
Feedback from staff was also obtained:

‘The workshop with students has given us a better understanding of students' need with regard to developing their employability skills. It has also given us some idea as to how to go about it.’

‘The workshops for staff were valuable in helping us think together about these issues and in suggesting ways in which we can work with students to give them confidence in their ability to find the jobs that their skills deserve.’

Department Survey

Subsequent to this a survey was also conducted by the department with all maths students. As is usually the case with such surveys, the response rate was fairly small. 15% of final year students (who the project was aimed at) filled the survey in. We also opened events up to second years on request and 8% of them (not all second years chose to attend the events, so this is a higher proportion of those who engaged) have completed the survey. From this we found out that they rated discussions on CV more highly than any other activity and they felt the main benefit of these events was to increase their confidence – something that was one of our main objectives.



General Feedback from staff:

Staff who had attended the sessions and had played a major part in the project were asked for their feedback as to whether the project had been a success in terms of helping students, changing staff attitudes and informing teaching practice.

'The workshops with students were exceptionally useful. They have certainly improved my understanding of the obstacles faced by our graduates in finding jobs, and in particular of the difficulties faced by students from ethnic minorities who do not have the informed family support and knowledge of how UK companies recruit which white middle-class students have. I became aware of the lack of self-confidence which holds back many of our students and lowers their aspirations.'

'As a result of these workshops I feel that I have a greater idea of what we need to address to improve our graduates' employability, and I have more confidence in my ability to help deliver sessions which will boost students' confidence and raise their aspirations.'

'Overall I feel that the programme has left the department with a much better understanding of employability issues and has given us experiences and examples which we can use to deliver a similar programme ourselves in the future.'

'Many of our students have benefitted greatly from this project; some have obtained places on graduate schemes and training courses as a result of the advice offered. It has done wonders for the students' confidence and I am looking forward to rolling out similar sessions next year.'

Discussion, Learning and Impact (Success):

This project originally targeted final year students and recent graduates. At an early stage, to increase the impact, we opened it up to second year students as well. Although statistical evidence of its success in boosting student employment will not be available until the DHLE survey for 2013, the students' feedback gathered from the individual events above shows that this project had a positive impact on the students' self-confidence and knowledge of the employability agenda which were two of our main objectives.

Staff feedback shows that they now have a greater understanding of the needs of employers, and especially of employers' expectation of graduate applicants. They have the confidence to deliver workshops and their teaching of employability skills will be enhanced. This will have particular impact in the delivery of year 2 and year 3 PDP material. Once further evaluation has been completed this work will be disseminated through the University's Teaching Fellow Network which will have an impact on the institution as a whole. This September the work will be presented at the HE STEM conference to the mathematics community.

The students and indeed staff have access to all the presentations that were given during the project which provide clear guidance to all on all aspects of employability. Indeed, the last presenter, Richard Addy, from the Guardian Group, noted that nothing else was needed after he had read the notes and presentations from other sessions.

Once the next year's teaching timetable is known we will timetable tutor-led employability workshops.

This project has also been noted by the Guidance and Employability Team (GET) at the University. Staff have asked for reports on the events we carried out. As a result of the success of this project, the University is looking to undertake further work with the Adab Trust.

Barriers:

Restrictions on room availability meant that some events could not be timetabled at times most convenient for students which affected student numbers. Some events did not appeal to students despite heavy advertising. All students that attended events other than the first one said how useful they were and that other students should be encouraged to attend.

The first event put some students off when it was mentioned that many companies' graduate schemes would not employ graduates with under 300 UCAS points. This was addressed by a subsequent meeting in the second term entitled 'How to succeed with under 300 UCAS points'.

Enablers:

The events that worked best were the ones that addressed students' immediate concerns. The prospect of talking to someone successful was not something that many students took advantage of, although those that did gained enormous benefit.

There are students that now have graduate jobs lined up: in previous years similar students would have been unlikely to be in this position now.

Other Lessons learned:

It is not enough to advertise events like this by email. Not all students read emails and even if the email is well-worded most students do not take the message in. The best attended events were the ones where we had taken time and trouble to advertise on Facebook and to go in to students' classes in person to explain what the event would focus on and how it would benefit them.

Word of mouth is powerful. Having students go back to their peers and talk about how helpful an event was really helpful. Students discussed the events on Facebook helping us to see what had worked well and what had not been so helpful.

When we run similar sessions in the future they will all be advertised on Facebook with students encouraged to make comments concerning their effectiveness afterwards.

Further Development and Sustainability:

Sustainability was designed into all aspects of this project and as a result we will deliver greatly improved employability support in future:

Deliver internal expertise

At the start of this project the department's academic staff lacked the expertise to run the sort of sessions that the Adab Trust delivered for our students. As a result of this project, staff are now in a position to run CV clinics, train students to prepare for competency based interviews, and provide guidance on the application process. In addition, working with the Adab trust has enabled us to make relationships with several key local employers. These employers have all offered to work with us in the future. Building relationship with such employers is useful for the department as it keeps us in touch with the workplace and with changing practices that will affect our graduates.

Changing Staff Attitudes

Staff came to the sessions with different levels of knowledge concerning employability but all went away with a much better understanding about what potential employers expect from our students and what we need to do to help them get there. Staff have been challenged and excited at the prospect of enabling our students not only to become good mathematicians but also to be successful at obtaining that all-important first graduate job. Many staff now better understand the importance of the students' CVs and covering letters and have helped students to rewrite these using the advice obtained from these sessions. This expertise will be developed through further staff discussion.

Changing teaching practice

These sessions challenged and invigorated staff to think of new ways to enable students to understand what is expected on them when job hunting. Employability has always featured high on the list of priorities and has formed the basis of the Personal Development Planning (PDP) material for all year. Following this project, this material will be rewritten for second and final years in the light of the information obtained from these sessions. The support of the Adab Trust has enabled staff to think innovatively about the activities that could be attempted. Some members of staff have attended HEA workshops on employability specifically for maths and operational research graduates, and the possibility of starting an employer mentoring scheme is being pursued.

Informing programme review

Lessons learned from this project are influencing the curriculum design in our current review and redesign of undergraduate maths programmes due for completion by January 2013. The aim is to embed employability into all of our courses so that students are more aware of what skills each course gives them and what they are able to offer to prospective employers. This will both deliver improved employability skills and help students present these skills, supported by evidence, when they apply for jobs.

Dissemination across the University and beyond Staff expertise will be used to help the School of Computing and Mathematical Sciences focus on what skills students need to gain before leaving university and how we can best enable them to achieve this.

Staff from the department are working with GET to arrange a University-wide staff development workshop on how to include material on employability into academic courses.

The results of this project will be disseminated through the University's teaching and Learning conference in July 2013 and through a presentation at the HE STEM conference in September 2012.

Outputs:

1. A website containing material which was presented at the workshops and masterclasses for students and staff: <http://www.cms.gre.ac.uk/empandpgstudies/events/adab.asp>
2. A case study on the team-building workshop for students and staff will be published in.....
3. A presentation on this project will be made by one of the project leaders at the HE STEM conference in September 2012
4. A presentation will be made on this project at the University's teaching and Learning conference in 2013 following further evaluation.

References:

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