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As part of the *Employability* & *Enterprise* module each author in this journal were asked to produce an accompanying poster presentation.

To view these presentations please visit;

[www.kcl.ac.uk/hernj/employability](www.kcl.ac.uk/hernj/employability)
Editor’s introduction

Dr Deesha Chadha & James Wilkinson

Welcome to this special issue of the HERN J on employability and enterprise in higher education. For the academic year 2015-16, employability has been chosen by the quality Assurance Agency for Higher Education (QAA) as one of two major themes deemed to be ‘particularly worthy of further analysis or enhancement’ (QAA, 2014:1). It is argued that prioritising employability together with enterprise education is needed because university students need to build confidence, knowledge and skills which will enable them to succeed in rapidly changing global employment markets and societies (Owen & Tibby, 2014). A further driver may be the presence of persistent challenges in creating and realising such education initiatives (QAA, 2012).

This issue includes selected essays from the module Employability & Enterprise undertaken by teaching staff enrolled on the Postgraduate Certificate in Academic Practice in Higher Education (PGCAPHE) programme. In this special issue, six authors have identified particular challenges related to employability and enterprise education in the context of their teaching and have undertaken empirical research. Their concerns have resonance with a familiar dilemma: our students are expected to find jobs or establish start-ups once they leave higher education, yet finding space in the curriculum to develop the necessary employability and entrepreneurial capability can seem elusive. The conclusions that our authors draw and the proposed interventions that they suggest offer ways of meeting this challenge in the context of their subject disciplines.

Enterprise education

Both Alexis and James look towards entrepreneurship and how enterprise education could be further developed in their subject disciplines. Alexis investigates curricula defined both at a theoretical level and with business management subjects in particular, employing a questionnaire aimed at founders and employees of early stage start-up businesses. Meanwhile James highlights challenges for forensic science graduates, exploring possible new enterprise opportunities through his review of the literature and via interview and questionnaire surveys conducted with both academic staff and students. He then discusses methods for implementing enterprise skill teaching within the existing King’s College London Forensic Science MSc programme framework. Employability is often marked as being about graduates contributing to ‘economic competitiveness in a global context’ (Cranmer, 2006). This very definition shows how employability has become interconnected with notions of enterprise. Entrepreneurship has become critical in a global economy and is increasingly portrayed as being at the heart of national economic growth. It is suggested that it is driven by policy and remains a mostly novel approach to graduate development and is therefore under researched (Henry, 2013). Both Alexis and James provide some original and significant insights into what is possible.
Employability-informed curricula

Arguments over embedded or ‘bolt-on’ approaches are reflected in our contributions relating to employability-informed curricula (for example Chadha and Nicholls, 2006). Evaluating an existing approach in the Maths curriculum, Niccolo’ analyses class presentations and the impact the model has on enhancing communication skills. Using empirical evidence, he compares his findings with new integrated approaches reported elsewhere for developing communication skills together with maths education. Such a view is supported by Blaxell and Moore (2012). In his essay, Sohail explores how best to enhance the employability for students who study history. He conducted a student survey with cohorts representing two arts and humanities departments: history and theology. As part of this discussion, he proposes a broader curriculum for history. Integration or infusion models are becoming increasingly apparent in higher education as more deliberate attempts are made to blend academic and employability learning (Speight et al., 2013). Both these essays argue for a curriculum shift from ‘knowing about’ to ‘experiencing and performing’ which encapsulates a changing discourse on employability in higher education.

Employability for employment

Francesca’s work focuses on the issues of developing employability for graduates in science, technology, engineering and maths (STEM) disciplines. In her conclusions she points to the development of an extra-curricular activity officially endorsed by King’s and that would represent at the same time a work-related experience easily recognisable by employers. Katja questioned PhD candidates at the Wolfson Centre for Age Related Diseases (Wolfson CARD), Institute of Psychology, Psychiatry & Neuroscience (IoPPN) about their employability skills development and how King’s supports this. The data obtained were analysed by drawing on the Dacre-Pool and Sewell model of 2007 to inform employability-skills development for doctoral candidates. Both authors argue for how the identity of the graduate (from their respective subject areas of STEM and IOPPN) is effectively shaped when different and varied opportunities for employability development are explored. King’s itself is conscious of the need to create such avenues of possibility. The approaches outlined here are not skills-led but career orientated and are designed to develop a broader range of graduate experience. The argument is made that this approach ultimately provides employers with a more useful tool through which they can assess the potential of graduates (Hinchliffe and Jolly, 2011).

Final thoughts

Even though the authors have considered different issues, their work ought to contribute to the on-going dialogue on creating a more joined-up, holistic approach by Higher Education Institutions (HEIs) that can better inform their employability strategies. Employers should be invited to review and develop curricula alongside educators and contribute more efforts to being part of the solution rather than the problem (Cai, 2013). Similarly, space must be created within the curriculum to innovate, and students must learn something of enterprise in addition to developing their academic capabilities.

We have enjoyed reading the authors’ contributions and hope you find them equally engaging.
References


Foreword

Isabel Frazer

*Deputy Head of Careers & Employability, King’s College London*

King’s College London is committed to enhancing the employability of its students and graduates. Employability is a fundamental element of the student experience, and King’s recognises that supporting a student’s personal and professional development in relation to employability is about far more than securing employment upon graduating. We work in partnership with our students, helping them to develop career management skills right from the start of their student journey at King’s, with the aim of maximising their career success as alumni. The term ‘career success’ is highly subjective; not only does King’s celebrate the variety of career aspirations held by our diverse student body, but actively helps students to achieve their aspirations – whether that be further study, starting a business, or working internationally.

The employability of our students is a university-wide responsibility, that is supported and underpinned by King’s Careers & Employability. The university has produced a Strategy for Student Employability which aligns closely to the Education Strategy, alongside overarching institutional strategic priorities. This strategy is reviewed and evaluated periodically, in partnership with senior management and faculty employability leads.

King’s Careers & Employability collaborates with all academic faculties and university departments to deliver quality career development learning to students that is embedded into the wider student experience. The appointment of Department/School Careers & Employability Liaisons, academic staff who help facilitate the enhancement of employability within their subject area, ensures that career development learning can be seen as an intrinsic part of every student’s learning experience. This collaboration at faculty and department or school level enables King’s Careers & Employability to deliver employability provision that is bespoke to specific disciplines and levels of study, from undergraduate to early career researchers.

King’s students also have access to a broad network of employers and alumni representing multiple sectors nationally and internationally – many who act as mentors to students and graduates. Indeed, the success of mentoring platform King’s Connect demonstrates the potential impact of these relationships on students’ career development. King’s hosts hundreds of employers on campus each year, providing students with the opportunity to expand their networks and access unadvertised work opportunities through a broad range of events, from employer presentations and skills sessions to informal alumni networking evenings. In addition, thousands of graduate vacancies, work experience opportunities and part-time jobs are promoted annually through the university’s jobs board, *JobOnline*.

Students are encouraged to undertake work-related learning opportunities throughout their time at King’s. Many take advantage of the exclusive paid opportunities with SMEs across...
the South East offered through the King’s Internships scheme, or the Global Internships Programme – which coordinates bespoke work-related learning in Washington DC, Shanghai and Mumbai. Where financial restrictions may present a barrier to access, students are supported through various funding streams – such as the Broadening Horizons Fund.

King’s is committed to understanding its students’ careers and employability needs through a data-driven and evidence-based approach. The careers enrolment data survey, launched in Autumn 2015 across all year groups, enables the university to analyse the career readiness, work experience history and sector interests of the vast majority of students upon enrolment and re-enrolment. This data, combined with the annual collection of graduate destinations data six months after graduation, empowers King’s Careers & Employability to make sound decisions around how best to support students’ enhancement of employability, and measure and evaluate impact in a meaningful way.
Can I better nurture entrepreneurialism in my business management students?

Alexis Dunstan
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Introduction
The ISBE Entrepreneur Poem
By Jonathan Hick

Am I an entrepreneur?
How can you tell?
There are some basic instincts
Which I know rather well …
For one thing Britain needs
Is more Entrepreneur Professeurs
(cited in Smith 2015, pp 459-460)

Jonathan Hick is an entrepreneur. Like poetry, entrepreneurialism can be difficult to define or categorise. Yet, poetic and entrepreneurial positions are of axiological and emotional significance – at least, for some – which may have the capacity to illuminate and disrupt normative conditions in business or art. Entrepreneur and poet may inhabit complex, unheeded and liminal worlds which strive to express novel, creative outcomes symbolised by success, failure, victory or tragedy.

Since 2000, around two million businesses have been created, an increase of 55 per cent from this baseline, the majority of which (76 per cent) employ no one except the founder (Department of Business, Innovation and Skills, October 2015). According to Rhodes (2015), the proportion of businesses that employ people has fallen since 2000 from around a third, to around a quarter. This decline in the number of employers as a proportion of all businesses is due to the growth in self-employment, particularly since 2010 when the number of sole proprietorships has increased by 568,000 or 21 per cent (Department of Business, Innovation and Skills, October 2015).

Business creation is an entrepreneurial act per se; an act of daring in the face of uncertainty and risk. Given UK business growth trends since the 2007 global financial crisis, which demonstrate an increasing proportion of sole traders, boundaries in policy and educational practice between concepts of entrepreneurialism, employability and enterprise have arguably become fuzzier and more notional (EC-Enterprise and Industry Directorate-General, 2009; Quality Assurance Agency for Higher Education, 2012; Department of Business, Enterprise & Regulatory Reform, 2008).

This essay sets out challenges and opportunities for higher educational approaches to
employability and enterprise by taking the concept of entrepreneurialism as an example. The scope of the work includes undergraduate degree programmes at Level 6, completed degree programmes and attendant curricula defined both at a high level and with business management subjects in particular which reflect the expertise and areas of practice of the author. A questionnaire designed to gather data and opinions about undergraduate degrees from founders and employees of early stage start up businesses is employed. Results of the questionnaire are presented. Implications and recommendations for student learning outcomes and possible curriculum developments are identified, discussed and analysed. Conclusions are then drawn.

The entrepreneurial UK small business landscape
According to Rhodes (2015), there are 5.4 million businesses in the UK, 99.87 per cent of which are small or medium sized and employ up to 250 people. These businesses represent 60 per cent of total employment and £1.75 trillion, or 47 per cent, of total private sector turnover in the UK. Of these, 95 per cent are micro-businesses, employing 0-9 people, and represent 33 per cent of total employment and £673 million, or 18 per cent, of total private sector turnover in the UK. By comparison there are only 7,000 large UK businesses, employing over 250 employees. Yet, these businesses represent 40 per cent of total employment and £1.95 trillion, or 53 per cent, of private sector turnover in the UK.

The purpose of this analysis is to suggest that for all the growth in numbers of businesses since 2000, particularly since 2010 which represents the beginning of sustained recovery from the deleterious commercial consequences of the financial crisis, the landscape of business will likely militate numerically and statistically against a graduate’s chances of gaining employment with a large business. The opposite is also plausible. It is probable that more graduates will manage the challenges of their employability by either founding their own micro-enterprises or working for them as they establish and expand beyond the start up phase. Indeed, the recent rise of the UK student-entrepreneur may already be apparent if media reportage is reasonably accurate that almost a quarter of students run or plan to run their own business while at university (Bearne, 2015).

Entrepreneurialism, enterprise or employability? Challenges and opportunities
What is to become of large numbers of UK graduates in an age of globalised, post-financial crisis? Government continues to worry about the country’s economic differentiation in a competitive global knowledge market (Chancellor of the Duchy of Lancaster, 1993; Johnson, 9 September 2015). It has tried to develop more policy to encourage and require the widening of different models of post-compulsory education (Department for Business, Enterprise & Regulatory Reform, 2008; Department of Business, Innovation & Skills, 2009). Yet for graduates, the threats of under-performance apparently abound whether at regional levels outside of London and the south-east (The Guardian, September 2014) or with graduate level, white collar jobs increasingly at risk of elimination by algorithms or computer-controlled equipment (Frey & Osborne, 2013).

Higher Education Institutions (HEIs) are under pressure to respond – just as they have always been – with bold and imaginative pedagogical developments that will nurture each generation
of students’ success in the job market. Yet, it is extremely challenging to produce a quality of graduate both fully fledged in the exigencies of a post-crisis job market and responsive to the socio-economic drivers that underpin the expectations of policy makers (Henry, 2013). HEIs may exhibit psychological and behavioural adaptations to political pressure that incentivises demonstrations of individual pedagogical credibility.

Attempts at replication of substantive entrepreneurial learning within a ‘real-world’ context may be preferable to transmission based pedagogical assumptions or habits for HE entrepreneurial education in HE (DeTienne & Chandler, 2004). Opportunities for realisation of this may present themselves abundantly within the entrepreneurial UK small business landscape discussed above. A micro-business is an incarnation of entrepreneurialism as well as a mainstay for major EU economies. Effective entrepreneurial learning in this context may require teachers within higher (and possibly further) education to adjust their assumptions, convictions or habits. It may be beneficial to develop pedagogy that favours opportunities for students to experience action learning whereby authentic SME business challenges are addressed in groups and, ideally, in context (Pittaway et al., 2009; Järvi, 2015). Where this is actionable, the learning would probably be characterised by development in student attitudes such as pragmatism, problem-solving, realistic situational assessment, decision making and greater toleration of risk, unpredictability, ambiguity and error. This will be challenging for some teachers because, in the entrepreneurial small business ‘space’, it is important for teachers to substitute generalised concepts or conclusions for a facilitative pedagogical style perhaps more akin to coaching. This might involve, for example, the facilitation of student learning that seeks to integrate the latter’s skills, attitudes and experience that are gained within the small business environment. The teacher could encourage evaluation of the varied and inevitable business challenges, testing the validity of proposed solutions to these problems. Conclusions can then be made through reflection by students, individually or in groups. In turn, teachers could observe and identify any differences (of degree or kind) between extant pedagogical theories and the realities in the entrepreneurial small business context (Pittaway et al., 2009; Järvi, 2015).

**Methods**

As stated above, it is difficult robustly to connect entrepreneurship, enterprise or employability pedagogies to the effectiveness of learnt student attributes such as self-efficacy, decision making, risk relationship and so on (Henry, 2013; Klapper et al., 2015). As a contribution to increase the longitudinal data to support pedagogical development in student entrepreneurship, the author developed and promulgated a brief questionnaire in response to this assignment. The questionnaire was designed using free, cloud-based software provided by SurveyMonkey. Eight questions were developed to collect high level business sector and employment data from micro- and small business founders. The survey also promulgated sixteen broad business and management subjects to be assessed by respondents in terms of their importance to the entrepreneurial context (for examples, marketing, project management, innovation). Respondents were also invited to identify and explain other business areas not previously listed. Finally, respondents were asked whether they have a bachelor’s degree and, if so, whether it is a business management degree (stand alone or with another subject such as information systems or accounting). The aims of the questionnaire
were to correlate entrepreneurs’ priorities for what is required to run their businesses, over time or since graduation, relative to what they may have been taught at undergraduate level, particularly if in a business management area.

Findings and analysis
The questionnaire was disseminated from 18 December 2015 to 6 January 2016 to two business incubation platforms, one located in the private sector and the other in the charity sector. It was also disseminated to a small number of micro-business owners known to the author. By the end of 6 January, nine responses had been received. The timing of the assignment deadline over the Christmas and new year period most probably accounts for the relatively low number of responses.

Respondent businesses operate in a variety of sectors from animal welfare, consumer electronics to film production. Business start up dates range from August 2002 to October 2015 with half founded approximately in the last eighteen months. Two thirds of respondents do not employ anyone, 22.22 per cent do and 11.11 per cent (one person) is an employee. Amongst the two employer businesses, one declined to indicate how many employees are involved and the other, as expected, employed in the range of 1-9 people. All respondents have a bachelor’s degree, of which 14.29% hold one in a business management subject.

Of the seven responses (two skipped the question) that rate on a five point scale the importance or otherwise of sixteen business and management subjects, it appears provisionally that a significant proportion of areas not generally taught under business management are considered either indispensible or important to the entrepreneurial small business context. The weighted averages for the sixteen areas cluster into two groups of eight above and below the mean average of 3.51 (standard deviation = 0.7036). Of the eight above the mean, subjects ranked in importance, first (project management), third (negotiation skills), fourth (product development) and fifth (innovation and risk) are not taught typically within business management programmes. The remainder are typically taught. Below the mean, there is also a 50:50 split between typical and atypical business management modules. The extent to which this applies to other degree subjects is unknown at this point. Two respondents also highlighted the additional importance of customer insight and service. Again, this is not typically part of business management programmes.

To date, the findings are small scale but do have implications for curriculum development if, after further responses, around a proportion of 50 per cent of established business management subjects/modules remain rated as below the mean importance for entrepreneurial graduate business owners. There may be a significant likelihood of outdated and irrelevant curriculum content and which fails to meet policy, funding and learning requirements of government and students. The corollary is also plausible where 50 per cent of areas defined from the judgment and experience gained from the author’s own entrepreneurial background (founder of two start ups) that are not typically taught on business management programmes are ranked highly above the mean importance. As discussed above, this may provide evidence for the homogeneity, sterility and antiquity of existing pedagogy - whether entrepreneurial in focus or not (Wankat et al, 2002; Pillay & James, 2013; Blenker et al, 2012).
Limitations
More work must be done better to underwrite these implications with more evidence given the numerically small number of responses to date. Clearly, more data is needed to elicit more robust and reliable conclusions. The challenges involved in mediating reliable proposals for entrepreneurial curriculum development in subjects other than business management cannot be underestimated, given that 85 per cent of respondents hold a degree in another subject.

Conclusion
This essay is essentially concerned with the currency and relevance of entrepreneurial pedagogy, particularly in business management subjects. The entrepreneur, perhaps like the poet, often inhabits a complex, allusive space not easily typecast or codified. There are more of them than ever before, as judged by levels of micro- and small business start up in the UK and EU since 2000 and particularly the post-financial crisis (Järvi, 2015; Rhodes, 2015; Department of Business, Innovation and Skills, October 2015). Policy expectations and educational practice have arguably elided the boundaries, such as may have existed, between concepts and pedagogies of enterprise, employability and entrepreneurialism (European Commission (EC) - Enterprise and Industry Directorate-General, 2009; Henry, 2013) in part because UK HEIs are required to articulate responses under pressure to labour market challenges to graduates whether real or imagined (Henry, 2013; Chancellor of the Duchy of Lancaster, 1993; Johnson, 9 September 2015; Frey & Osborne, 2013).

Sterile entrepreneurship pedagogy (Wankat et al, 2002; Pillay & James, 2013; Blenker et al., 2012), that is unable to evaluate its effectiveness for graduates (Jones, 2009; Council for Industry and Higher Education, 2010) and a lack of rigour, maturity and scholarship within the discipline (Klapper 2015; Jones et al., 2014) have arguably led to a lack of longitudinal data better to identify opportunities for innovation and rejuvenation of curricula content. This essay has contributed a modest, ongoing questionnaire that is small in scale but potentially significant in terms of implications for the currency and relevance of much business management degree pedagogy from the perspective of practising micro- and small business start ups in the UK.

References


Can Students Be Entrepreneurial Within the Forensic Science Sector?
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Introduction
Despite considerable expansion within the previous fifteen years, the UK forensic science industry still only consists of around 5000 total employees (Welsh & Hannis, 2011). It is also reported that less than 200 people per year find new employment with a UK forensic service provider (SEMTA, 2004). Despite this, more than 3000 students (both undergraduate and postgraduate) enroll on a forensic science higher education course within the UK every year (Mennell, 2006).

This disparity between the number of graduates and available jobs has been a major concern of the forensic community in recent years. A number of authors have attempted to explain this phenomenon as part of the ‘CSI Effect’, in which students are attracted to studying forensics as a result of watching glamorous criminal investigation TV shows (Schweitzer & Saks, 2007). A report published in 2004 by the Sector Skills Council for Science, Engineering and Manufacturing Technologies concluded that forensic higher education courses should now focus on teaching more ‘scientifically generic’ skills in order to prepare students for alternative careers within the chemical or pharmaceutical industry (SEMTA, 2004). However, the same report also found that 39 per cent of forensic graduates would not be likely to consider a career in a scientific discipline other than forensic science. With no sign of student intake rates slowing down, it is unrealistic for the forensic community to expect this relationship between supply and demand to change drastically in the near future.

A number of higher education initiatives (such as the Higher Education Innovation Fund) have recently been developed to encourage entrepreneurialism in highly competitive STEM subjects in the hope of improving student employment rates after graduation (Kirby, 2006). Rae (2007) further predicts that soon, all universities will be required to ‘offer students an enterprising approach to career development as an integral part of their provision’. However, heavy initial cost and industry regulation may render the process of initiating graduate-run startups and small businesses within the forensic science sector extremely problematic. This research attempts to examine the potential for students to be entrepreneurial within the forensic sector and identify challenges to their success. Both staff and student perspectives on enterprise within forensic science are explored through the use of face-to-face interviews and questionnaires respectively. Methods for implementing enterprise skill teaching within the existing King’s College London Forensic Science MSc programme framework are lastly discussed.

STEM Entrepreneurship in Higher Education
According to a report published by the Kauffman Foundation, nearly 50 per cent of all small business founders in 2008 possessed a STEM (Science, Technology, Engineering
or Mathematics) related degree (Wadhwa, Freeman & Rissing, 2000). Moreover, STEM students who undergo a facet of enterprise training whilst at university are still considered to have a higher employability than other graduates, even if they do not go on to become entrepreneurs (Rae, 2007). This is likely due to the fact that enterprise experience reportedly increases communication, problem-solving and self-management skills that are often deemed desirable to employers (Fallows and Stephen, 2000).

With the benefit of links between entrepreneurship and STEM subjects clearly established, a number of UK government and business leaders have recently called for enterprise education to be embedded within all higher education STEM curricula (Smith, Collins & Hannon, 2006). Several HEI’s, such as the universities of Portsmouth, Kingston and Surrey have taken some steps to fulfill these requests, but have only done so within a selection of programmes (NCEE, 2013). The way in which this education has been deployed is also varied, being offered all the way from single optional workshops and seminars to entire distinct modules. However, this lack of standardization across courses is to be expected, as the need for enterprise education is likely to be highly dependent upon the potential for entrepreneurialism within the market of each specific discipline (Sewell & Dacre Pool, 2010).

Of the 350 forensic-related undergraduate and postgraduate courses in the UK, not one includes an aspect of entrepreneurship teaching as part of the curriculum. The reasons for this are currently unclear. Before attempts are made to embed aspects of enterprise within the Forensic Science MSc at King’s College London, consideration should first be given to the feasibility of graduate-run startups within the forensic industry.

**Potential Forensic Challenges**

The closure of the government-owned Forensic Science Service (FSS) in 2012 resulted in 90 per cent of all forensic work conducted within the UK becoming available to private companies. Despite this, no new businesses were created to meet the demand in work. Instead, almost all FSS employees staying in the sector were integrated into one of the two largest private forensic science companies within the UK (LGC Forensics, Orchid Cellmark) or a local police force. With even highly experienced individuals unable to be entrepreneurial in times of such immense change, the complete lack of graduate-run startups in the forensic industry is not entirely surprising. Major challenges to such businesses largely arise from financial and regulatory implications.

The vast majority of forensic work within criminal investigation involves the testing of unknown biological and chemical samples found at crime scenes. This kind of analysis may be considered impossible without the requisite laboratory space, equipment and qualified personnel. The upfront cost of starting a business to handle traditional forensic casework would therefore be substantial and likely beyond the scope of any small business loan available to new graduates.

In response to issues of scientific quality in a number of high profile legal cases, the body of ‘UK Forensic Science Regulator’ was established in 2008. The job of the regulator is to oversee all forensic science activity in the UK by setting and enforcing a range of
administration and laboratory quality standards. The regulator itself recognizes that these standards may be more challenging and costly for small businesses to adhere to than larger ones and may therefore prevent companies from initially forming (Tully, 2015). However, processes are currently being put in place by the regulator to ensure that new and innovative ‘micro-businesses’ may be facilitated to comply with these standards, indicating the potential for graduate-run startup growth within the near future.

It may seem that the difficulties associated with traditional casework analysis render graduate entrepreneurialism within forensic science largely improbable. However, a number of authors have conversely reported that impending technological advances could result in a shift away from this kind of testing, allowing new and innovative areas to have an impact on the industry (Mennell & Shaw 2006).

**Methods**

With attempts needed to identify these areas and consequently those that graduate entrepreneurs may be successful in, two postdoctoral researchers currently working within the King’s College London Forensic Science Department were consulted in a 20 minute interview. Quotes from Staff Member A and Staff Member B are listed below along with the areas they believe may be compatible with graduate-run enterprises.

In order to evaluate student demand for entrepreneurialism training, a survey consisting of five questions regarding student entrepreneurialism was also prepared. The receiving population of this questionnaire was ten students currently enrolled on the King’s MSc Forensic Science programme. Questions 1 and 2 invited Likert scale responses where 1 represented ‘very unlikely’ and 5 ‘very likely’, whilst the other questions were either open ended or involved a yes/no answer.

**Staff Perspectives**

**Collaborating With Universities To Develop New Technology**

According to Staff Member B, graduates may be able to start small businesses involving the design, development and sale of analytical testing equipment. A number of such companies have formed within the last five years and do not have to adhere to the strict standardization of the forensic science regulator. These companies may also be easier to form by collaborating with universities in a Knowledge Transfer Partnership (KTP) of which ‘King’s relationship with SelectaMark is a good example’ (Staff Member B).

**Massive Growth In Digital Forensics**

During the interview both staff members were quick to mention the ‘massive growth’ (Staff Member B) in the field of digital forensics and cybercrime. This is consistent with predictions of digital forensics as the number one growth area for the industry (Mennell & Shaw 2006). The lack of physical equipment associated with computer forensics is also likely to benefit graduate startup companies by limiting initial costs.

**Education & Outreach: Widening Participation Grants**

Both staff members also discussed the author’s role previously working with a forensic science
education startup. The importance of forensic science education at an early age is reflected by the recent integration of GCSE forensic modules in UK science teaching. A number of ‘small grants available for widening participation activities’ (Staff Member A) from universities and the government may also make this a more attractive route for graduates.

**Student Perspectives**

Whilst staff may recognize the potential for graduate entrepreneurship within the forensic industry, student demand for enterprise education within the curriculum should first be considered before it is applied.

To the question ‘how likely would you be to start your own business in the future?’, 40 per cent of students claimed they would be likely or very likely. This figure reflects results reported by Hixon, Paretti and Lesko (2010) in a similar survey to postgraduate engineering students, indicating a potential consistency across STEM subjects. However, when asked the question ‘how likely are you to start your own forensic science-related business in the future?’ only 20 per cent responded in the affirmative. From these results it may be concluded that whilst students may feel confident in their ability to start a business, they may not have the necessary skills (or confidence in their skills) to do so within the forensic science sector.

Most students were unable to answer the question ‘can you name a startup or small business within the forensic science sector?’, with only one student naming the education company ‘Forensic Outreach’ and this may only be due to the author’s previous affiliation with the company. Shurry, Lomax and Vyarkarnam (2002) believe that this lack of market awareness may be a barrier to student entrepreneurialism, as most graduates gain business ideas from researching already successful companies.

Surprisingly, 80 per cent of students indicated that they would have liked to receive entrepreneurialism training in some form on their MSc programme. This may be construed as a positive sign for enterprise teaching use, as Jones and English (2004) argue that the acceptance of the learner largely shapes the success of entrepreneurship training delivery. Most students agreed they would be happy to receive between four to six hours of enterprise training.

**Limitations**

Whilst aiming to address the potential for entrepreneurialism within the forensic science sector via student and staff perspectives, findings from this study are limited by the relatively small survey sample size and number of interviewees. Extending surveys and interviews to students and staff members attached to other forensic courses within the UK may help to increase the reliability of the results.

**Implementing Enterprise Training**

With the demand for entrepreneurship training within the Forensic Science MSc evident, it may be considered beneficial to design a framework for its implementation. Rae (2007) successfully created an enterprise teaching structure for similar use with postgraduate business students using the ‘DOTS’ (decision making, opportunity awareness, transition
learning and self-awareness) model from the QAA code of practice. This model is particularly advantageous as all elements may be ingrained within a curriculum without affecting an already busy schedule. The five categories of Rae’s framework are outlined below along with potential methods for their coverage on the forensic science MSc:

**Personal Development Planning (PDP)** – Students should be given the time to reflect on the skills they have gained and utilised. This could be achieved via the use of an online skills portfolio, helping students to structure reflection on their development of skills, confidence and self-efficacy.

**Applied Learning** – A visit to a police force or research laboratory may give students the opportunity to observe theoretical knowledge being applied within a practical setting.

**Skill Development** – Generic enterprise skills could be developed by the replacement of MCQ assessments with an enterprise problem-based learning (PBL) activity. Students should design and present a business plan to target a problematic area of forensics.

**Work-based learning** – Preparation for the work environment is already covered within the three-month research project that students undertake at an external organization.

**Career Management** – Access and awareness of industry could be provided by the use of an ‘industry day’, in which guest speakers from large companies, small-businesses and startups are invited to talk formally or informally with students.

**Conclusion**
This research has shown that although fraught with challenges, graduate enterprise within forensic science should be seen as plausible and moreover a beneficial part of a developing industry. Face-to-face interviews with experienced staff members were used to identify a number of areas in which student-run small businesses may find success and were consistent with views published in recent literature. A small sample of students also reported enthusiasm for entrepreneurialism training, appearing to justify development of a framework for the integration of enterprise teaching (based on the established QAA ‘DOTS’ model) within the King’s Forensic Science MSc.

**References**


Enhancing communication skills in mathematics undergraduates at King’s College London

Niccolo Salvatori
Department of Mathematics

Introduction
The focus on equipping graduates adequately for the job market has become more and more central in higher education as rates of graduate unemployment have been high for long periods in recent years (Office for National Statistics, 2013). This has led to the need for universities, as recommended by the UK’s Labour Government of 2005-2010;

‘to demonstrate how their institution prepares its students for employment, including through training in modern workplace skills such as team working, business awareness, and communication skills’
(Department for Business, Innovation and Skills, 2010)

Consequently, universities and stakeholders have published statements regarding the set of abilities that students are supposed to develop during their undergraduate and postgraduate experience. For mathematics, these are described in the Quality Assurance Agency (QAA) Benchmark Statement for Mathematics, Statistics and Operational Research (MSOR) (QAA, 2007). There, along with the subject-specific skills, which are very much related to the problem-solving nature of those disciplines, general skills and attributes are listed, encompassing not only ‘numeracy and analytical approaches’ but also

‘general communication skills, typically including the ability to work in teams, to contribute to discussions, to write coherently and to communicate results clearly’

However, the extent of development of these attributes is difficult to assess and the National Student Survey seems to provide evidence that, at least from students’ point of view, communication skills are not adequately developed (Waldock 2011).

Mathematics undergraduates at King’s are no exception: they generally do not feel confident about speaking of mathematics with their tutors, let alone in front of an audience. The main activity designed to enhance students’ ability in communicating ideas involves a model of short, class presentations. In what follows, I will analyse the extent of the impact of this current model for the enhancement of communication skills in mathematics undergraduate students at King’s. My analysis will encompass the point of view of four tutors and six students, drawn from informal conversations, their opinions about improving the current method, and my personal experience as a tutor at King’s. I will compare these contributions with existing new approaches in other UK universities and respective case studies, thus
underlying the motivations for a change in the current presentation practice and the expected improvements for the learning outcomes.

**The current approach**

The Department of Mathematics at King’s College London believes that

‘the ability to express yourself clearly is highly valued by employers, and it is important to obtain some practice in the art of verbal communication before you graduate from King’s. Presentations [using a blackboard or a whiteboard] are a small step in helping you to develop your skills in this area’.

(King’s College London, 2014a)

Thus students are required to deliver five minute presentations during tutorials of a module of their choice. This should be fulfilled twice by first year students and just once for second and third years, for a total of four sessions and 20 minutes of practice. Presentations are supervised and assessed by tutors – generally Graduate Teaching Assistants or Teaching Assistants – who receive general guidelines by the undergraduate administrator and the lecturer of the module, the latter deciding what students should talk about. Usually, students can choose what they prefer from the list of assignments already discussed during lectures or tutorials. No new topics are thus involved and the mathematics delivered is not assessed.

Students are assigned one tutorial for their performance by the undergraduate administrator, who then forwards a list to the corresponding tutor, who in turn contacts the candidates and provides them with advice and instructions, by voice or email.

In accordance with the evaluation form, performance is assessed as ‘unsatisfactory’, ‘satisfactory’, ‘good’ or ‘excellent’ for each of the following categories:

- Presentation is audible (talking to board is relevant here)
- Candidate explains the material clearly
- Uses blackboards and/or other visual aids effectively
- Presentation is given in a stimulating manner
- Presentation is well organised
- Candidate has good rapport with audience.

Because of the College’s concern over presentation anxiety (King’s College London, 2014b), tutors are informally recommended not to interrupt the performance. On the form, further room is provided for general comments or in case the candidate was absent without prior notice. However tutors are told, still informally, never to tick the ‘absent’ box; it will be the administrator’s concern to schedule another presentation for that student.

To conclude, oral feedback should be immediately given to the student and the evaluation form, which the student is not allowed to see, is returned to the administration office.

**Tutors’ and students’ perspectives**

During informal conversations, I had the chance to share comments about this practice with
four other tutors in my department, who appeared very happy to share their opinions. All of us had completed postgraduate degrees abroad before holding a PhD position at King’s, although in different countries and areas of mathematics, and have been continuously tutoring at King’s in the last two or three years.

From the start, our personal opinions appeared to have many similarities. Firstly, we all agreed that if this is the system to be applied, it seems to include a very limited number of presentations for it to really help students to improve. Indeed, when tutors had the chance to observe the same student in different years\(^1\), little improvement could be discerned, whether in the student’s confidence or style.

Tutor A\(^2\) also pointed out that: ‘Students so often have a scared face during the presentation! You can tell that they would prefer to be anywhere else than there. Even students that are good at the stuff we do…they answer correctly in class, their assignments are good…when they stand in front of the class they do not perform as well as they could.’

A different point was raised by Tutor B\(^3\) : ‘There would be no need for presentations if they had to sit oral exams for every module’.

In fact, two tutors remarked that in their opinion these tasks are pointless and should be removed from the programme claiming instead that oral examinations would provide a good practice for improving communication skills, as they experienced first-hand with students. But others readily argued that this would be very difficult to apply, as it would raise quite a number of concerns from students, for instance about the fairness of the mark, and from staff, for example about the significant increase of workload.

When I raised the question on what is the strongest advice they usually give students before their presentation, the answer was, unanimously: ‘to remain within five minutes’. Indeed, presentations subtract precious time from the topic of the day and seem to raise little interest in the audience, as they regard topics already discussed in the course.

It was finally concluded, as Tutor C\(^4\) put it, that: ‘This practice, as it is now, lacks consistency and a clear purpose’. Hence it is perceived as a loss of time. The motivations discussed were the following: students are never really trained or prepared for the task, as they can just rely on other students’ performances or their teachers’ teaching style, which can be very personal and therefore diverse; the number of presentations and time involved is not enough; finally, learning outcomes are not clear for students.

In addition to tutors, I informally collected comments from a small number of students. It was

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1 It can happen if a tutor teaches in a first year module and then teaches a second year module the year after.
2 4th year PhD student in Applied Mathematics.
3 3rd year PhD student in Pure Mathematics
4 2nd year PhD student in Pure Mathematics
clear to them that having good communication skills is important and desirable, but confessed that the current practice does not appear to be helping them to achieve a better level. Also, they do not feel very motivated and put in little effort as the task seems to be carried out as a mere formality. Still, they remarked on the stressful aspect of the performance. When asked what they would prefer instead of class presentations, two students replied ‘no presentations at all’, but then admitted that they did not know how to gain experience in technical speech in front of others.

**A different approach**

As the previous paragraph suggests, the current system seems to fail in providing the desired outcomes. Indeed, a concern that ‘curriculum time is not “lost” when skills development is integrated in mathematical modules’ (Challis, Thomlinson & Robinson, 2002) is a common theme in a higher education system that tries to address generic attributes as well as subject-specific skills.

Challis et al. raise several interesting questions; for instance, whether it is ‘desirable to have a separate skills module, or to integrate skills development into other activities in the course, or some combination of these’ (2002).

As this is non-trivial, I asked tutors and students what they would change or integrate for improving the practice, and hence the outcomes. The picture which emerged is somehow in between a separated and an integrated approach.

Tutors’ suggestions were around developing the following attributes:
- **Quantity**: increase in number of sessions and time spent for them,
- **Quality**: topics chosen from complementary material, that could integrate but not repeat what had already been done in class,
- **Diversity**: presentations should vary in style: not just board, but also slide presentations, and in front of groups of different size and background,
- **Challenge**: add Q&A sessions, supervised and moderated by the tutor.

Hence, tutors’ advice focused on improving the current system, thus maintaining its link with the practice of tutorials.

Students’ contribution, on the other hand, was oriented in a slightly different direction, and can be summarised as:
- **Support**: provide preparatory sessions and more systematic advice, also online,
- **Example**: provide several examples of good and bad practice for different presentation styles,
- **Feedback**: provide oral and written feedback and a practice that allows to put feedback into practice,
- **Informality**: sessions should be more informal, in smaller groups and include discussions and feedback from all the participants.

In order to take all these eight features into consideration, it would be advisable to organise
it in parallel with the tutorial activity, albeit separately. In other words, a new ad hoc core module could be developed, divided in two parts. The first one should address first year students, regardless of their particular tutorials, and provide an adequate preparation in communication techniques and methods. In this way, students would have a clear framework to support them and learning outcomes would be made clear. Subsequently, students could be divided into small groups working on new mathematical problems, related to the modules they are attending in the same period. This group activity should allow discussions and include informal presentations each week, followed by teacher and peer feedback to improve the performance of the following week, and progress towards the solution of the problem assigned. In this way students would have time to collect a larger number and variety of performances, each of which would be improved by the previous week’s feedback. Finally, the module should be assessed with a final presentation, whose style can be chosen by the group, and the assessment should weigh as much as the other core modules.

This kind of approach is in the spirit of several innovative modules recently introduced in other UK universities such as the University of Nottingham, the University of the West of England, the University of Manchester (Hibberd & Grove, 2009) and Sheffield Hallam University (Waldock 2011). These institutions provide modules involving group-based projects, as these ones are believed to meet, by their very nature, the four categories of quantity, quality, diversity and challenge, are a good source of frequent feedback and examples, are mainly realised in an informal setting, and finally can be paired with preliminary support sessions. Group-based projects involve small groups working on topics that integrate other modules’ topics or are new, occupy whole terms, meet at regular timetabled sessions and involve frequent group discussions, which per se constitute a good practice for improving communication ability and confidence. For instance at Nottingham, 3rd year students engage in a module called ‘Vocational Mathematics’, which is based on interactive workshops that also provide support and examples of good practice. On the other hand, Manchester and Sheffield Hallam involve 1st year students with the help of final year ones, thus encouraging a sense of community. Assessment in all cases is divided into class presentations, like at West of England, and written reports, thus providing ground for written communication enhancement. Assessment can also involve PowerPoint presentations or poster presentations, like at Sheffield Hallam. This all suggests that it is possible to overcome common obstacles, such as lack of staff time, by developing modules that focus on both specific and general skills development.

The idea that support can be strengthened by a suitable skills module follows the approach of the University of Coventry, where two taught skills modules have been designed for 1st and 2nd year students, focusing on professional and academic skills, covering for instance study skills, motivation, time management, use of Microsoft Office or Maths-related software, and theory and practice of effective oral presentations.
Conclusions

As Challis et al. (2002) have remarked:

‘Employers have repeatedly said that they not only value our graduates’ specialist skills, but would also look for development of a range of generic skills, what might be called employability skills, including amongst others written and oral communication, team working, and IT skills’.

This view is supported by Hibberd et al. (2009) and Waldoek et al., (2011) who provide examples of recent innovative modules in UK universities: some are general skills oriented, like at Coventry, while others are more traditional but enriched with a wide range of integrative activities, like at Sheffield Hallam (Hibberd & Grove, 2009; Waldoek, 2011). In each case the underlying principles are:

• having a sense of purpose, including clear outcomes and how these complement the topics involved,
• frequent and structured group work.

These features also appear to be missing in the current approach to presentations at King’s. Interestingly, students and staff are aware of the weaknesses of the system but also appear to have the potential to start a new and fruitful conversation about it, which could be shaped on the innovations of other institutions. In this way, a new approach is suggested, with elements from both general skills oriented modules, like at Coventry, and group-based projects modules, like in the other universities named above.

Such a new approach would involve an initial uniform preparation to set a common framework and provide the tools that students can use in a subsequent stage, when working in groups. This latter activity would gradually strengthen students’ confidence about communicating mathematics in a technical way, as well as team work. Additionally, having to solve new problems would improve participation and could relate to other modules.

This would also fill a gap in what is the current provision of support for employability for mathematics students at King’s. In fact, sessions and workshops with employers are run by the Careers Service8 at King’s: in order for students to exploit all this potential, effective communication skills and self-confidence are indispensable features.

In the end, it is important to remark that, at the time of the publication of the above literature, these approaches were quite recent, but presented a high level in students’ satisfaction from a very early stage. It would be interesting to see how well these modules are performing after a longer time, but no more recent surveys seem to be available at the moment. This seems to be an area of research that needs further investigation, especially in terms of evaluating the impact of employability provision.

In conclusion, investing in generic skills along with subject-specific ones would benefit not
only students who will enter the job market, although they are the majority, but also those who will choose a career in academia. ‘In fact even for the minority of students who may become future researchers, they will have a thesis to write and papers to give, so the issue of skills is not irrelevant to them!’ (Challis et al., 2002).

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Enhancing employability for history students

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Introduction
This essay reflects a concern in how best to enhance the employability for students who study history. Graduates in humanities have to face tough competition. Data drawn from the Higher Education Statistics Agency (HESA) shows that in the years 2013-14 less than 44 per cent of language and history graduates secured a full-time job after six months of graduation compared to sociology and geography graduates who scored around 6 per cent higher; economics graduates were almost at 57 per cent; Civil engineering graduates, by contrast, scored highest at 70 per cent and a little higher were architecture and building graduates with 72 per cent (Prospects, 2015). Graduates in medicine and/or medicine-related subjects had particularly good job prospects with over 92 per cent securing employment (British Council, 2016). Given that students pay high tuition fees (with many students taking loans), 43.8 per cent full-time employment for history graduates is comparatively low compared to sociology, for example – a subject to which it closely aligns.

In this essay, I argue that a broader curriculum is required in order to enhance the employability of history graduates in a growingly competitive market, based on the hiring practices of a number of organisations and companies, including the UK civil service, the European Union, the German Foreign Office and private companies such as PricewaterhouseCoopers as well as some graduate public policy schools. Employers increasingly test a range of skills through in-house examinations. Apart from verbal reasoning and literacy (which historians are good at), tests also include numeracy (an area not included in the history curriculum). This gap is an important one to fill.

In this essay, I argue that a broader curriculum is required in order to enhance the employability of history graduates in a growingly competitive market, based on the hiring practices of a number of organisations and companies, including the UK civil service, the European Union, the German Foreign Office and private companies such as PricewaterhouseCoopers as well as some graduate public policy schools. Employers increasingly test a range of skills through in-house examinations. Apart from verbal reasoning and literacy (which historians are good at), tests also include numeracy (an area not included in the history curriculum). This gap is an important one to fill.

In the following section, recent developments in higher education are briefly discussed. This is followed by a presentation and analysis of the results from a survey conducted with students studying history. This will be followed by a proposal to offer a broader history curriculum by integrating a three-year foreign language module, a redesigned full-module in quantitative and qualitative methodology embedding basic statistics, a full-module in introductory economics (covering principles of micro- and macroeconomics as well as political economy), and a supervised internship module to be included into the history BA curriculum.

Overview: recent developments
Last year Hakubun Shimomura alarmed the public. The Japanese minister for education deemed subjects in the humanities and social sciences as worthless for the society. He encouraged Japanese universities to focus more on sciences (Time World, 2015). Twenty six out of sixty universities, which offer programmes in the humanities and social sciences, reacted to Shimomura’s proposal and announced cuts with some universities completely abolishing humanities (THES, 2015). This trend is not new and many national governments
have shifted their focus on the STEM courses (science, technology, engineering and maths), whereas humanities were seen as ‘economically less attractive’ (Die Ziet, 2012). Edelgard Buhlman’s initiative to create top universities in Germany in 2004 also raised alarm bells. Some observers feared that the German federal minister of education’s plans would marginalise the humanities (Ibid).

Questions of student employability are increasingly at the forefront of discussions in higher education institutions (HEIs). There is a greater awareness of enhancing student employability. Julia Goodfellow, president of Universities UK, emphasises the important contribution university graduates make to society, ‘Remember, our graduates are our teachers, our doctors, our engineers, innovators and wealth-creators’ (Universities, UK 2015). Some policy-makers, as the example of Buhlman and Shimomura show, shift their focus on the STEM programmes because they are seen to be economically more valuable than humanities. History departments need to respond to this development and offer a broader curriculum. Mason, Williams and Cranmer (2009) observe that there is a tendency among historians to believe that to make a ‘good historian’ out of a student (a historian should be good at information gathering and processing and developing logical and coherent arguments, for example) would suffice. These generic skills would be transferable to a diverse set of professions (Jones, 2009; Mason et al., 2009). The hiring process of the above-mentioned organisations, however, tells a different story. Their candidates must possess a broader set of skills.

What students think

As mentioned before, a survey has been conducted in order to embed students’ voices into the discussion. Twenty two students partook of this survey and were asked a total of eight questions. The participants were students of either World history or Islam’s Beginnings. A synopsis of the results and ensuing discussion is presented in this essay.

Figure 1 shows which career trajectory students themselves believe they will follow upon graduation. History degrees are aimed at preparing graduates to work as historians (Mason et al., 2009). However, it is interesting to note that a host of other career avenues are mentioned such as banking and law. Both areas require further training and qualification in order to secure a position. A popular career destination seems to be politics and diplomacy. This area stands out because students in the humanities do not bring in well-grounded training in statistics and numeracy for the jobs in the UK civil service, the EU and the German Foreign Office, for example. The selection process at all three organisations involves taking exams. The UK civil service and German Foreign Office make it an essential part of its application to ask potential candidates to sit a mathematically-based exam (www.gov.uk, 2015).
The fourth question was crucial to ask. I wanted to know from students if they believed their study in history would prepare them adequately for the job market. The overall picture was less optimistic. Students offered mixed feelings about employment with only nine students stating history prepares them well; there were at least five students who felt they did not know if they were satisfactorily prepared – indicating some uncertainty. Two students explain
this uncertainty by saying that, whereas history is important, for job readiness, the subject must be studied in conjunction with other subjects. Another student believes that history offers good methodological training, but concrete activities are required for work preparation. The results are reflected in figure 2.

The fifth question was on what students have learnt so far from their study of history (figure 3). Some aspects resembled the second question in terms of the benefits of studying history. Some of the skills students pointed to are indicative of the current curriculum for history. King’s College London and University College London, for example, advertise advanced writing skills and critical thinking on their respective webpages.

**Figure 3:** chart showing the skills that students feel they have learnt throughout their degree course

![Skills learnt during programme](chart)

Students fail to develop their numerical skills, although numerous private companies and organisations require them to have a reasonable grasp of maths. Numerical skills are tested especially if you want to apply for a job in the civil or diplomatic service, which are possible career avenues highlighted by the students. In relation to this, the next question specifically asks students whether history should include statistics and general training in numeracy. Thirteen students did say yes, even though some were a little cautious stating (‘it could put people off’ or ‘not so much though!’). Five students rejected the idea of embedding any statistics into the curriculum, whilst two believed an economics-related module would be more useful. Two students believed it was not necessary, but would enhance job prospects.

As for the seventh question, whether economics and law-related topics/courses should be embedded into the programme, students unanimously supported this. Economics was clearly
seen as indispensable, whereas there was some caution in regards to law.

All in all, areas highlighted in the survey and required by organisations/companies are missing in history curricula. Statistics, languages, economics, numeracy and internships do not always inform history programmes. As mentioned earlier, the civil service and foreign office require a wide range of skills – which are not fully covered by present history degree programmes. As a final question, students were asked to suggest any further training or core modules in order to increase their employability. Students mentioned internships, option modules in related disciplines, further training in law and economics as well as foreign language acquisition.

**Broadening the history curriculum**

‘The purpose of education is life-enhancing: it contributes to the whole quality of life’ states the Dearing report. The report findings resonate with the argument put forward by Toohey (1999) that a curriculum should enrich a student as a whole. In this essay, I suggest that a broad history curriculum should reflect key areas of skills’ development as highlighted by the Dearing report (1997). As a result, I propose that numeracy, economics, statistics, foreign languages and IT skills and a supervised internship ought to be added to the curriculum – all of these areas are presently insufficiently covered. However, the survey findings suggest they are important to students. I had the opportunity to meet career service consultants at King’s College London to discuss a supervised internship programme in cooperation with the History Department. I found out that the infrastructure is present, but this cooperation is not well-known and not promoted as the institutional webpage for history shows.

The internship scheme includes three participants: a student, an academic and a career consultant. Whereas the career consultants coordinate the internship, the academic staff member is responsible for supervising the progress of the student. This scheme should be made compulsory for second-year students to improve their job-readiness. The internship scheme should count towards their degree as a half-module. In addition to this, students could write a blog through which they reflect on their experience (as part of a formative assessment). This would further develop their IT skills and encourage responsible practice with social media. Platforms such as KEATS (King’s Virtual Learning Environment) and Wordpress can easily provide a secure service.

UCL and King’s allow students to study a foreign language, but only for one year. Having explored the UCL and King’s Modern Languages programme it is possible for students to study language for three years, which makes more sense (UCL CLE, 2016). Continuous engagement with a language is significant for progress. One year of language study is not enough to obtain the right level of competency of a foreign language, after all.

Introduction to Economics courses are offered in the Department of European and Department of International Studies at King’s, for example. This module gives a good understanding of microeconomics, macroeconomics and political economy. Cooperation with both departments would address this issue highlighted by a number of students in the survey. This module should ideally be studied as a full-module to allow all students to digest some complex concepts and economic terms. A better understanding of economics (GDP, inflation,
money supply) would greatly enhance their understanding of some of the literature of history too!

A modified version of the six-day course in basic statistics (as offered in Researcher Development Programme) could be offered to students. There are existing core modules, such as Historical Skills, Sources and Approaches in the King’s History Department, which could include aspects of basic statistics. Overall, the course could benefit from quantitative research methods which offers greater scope and skills training. A critical understanding of statistics could further support argument and analysis of historical research work (King’s College London Graduate School, 2015).

**Conclusion**

Changes at universities happen in a piece-meal process and I have, therefore, particularly highlighted those areas which I judge as best fit for successful implementation. The infrastructure is around, but not fully used. The Modern Languages Centre at King’s and UCL as well as introductory economics modules could be easily extended to history students. I understand that it would mean students study at least one history module less per year, but areas of work experience, foreign language skills, economics and statistics have a long-term impact, which is supported by the Dearing report and further evidenced by the survey and the hiring process of the organisations/companies.

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Employability has been at the centre of the Higher Education agenda for many years. From the Robbins report (1963) to the Dearing report (1997) and beyond, preparing students for their working life has been a crucial task. In 2010 David Willets, the UK Minister of State for Universities and Science at the time, stated that universities should ‘provide public statements on what they do to promote employability, to ... improve the job-readiness of their students and to do better at getting their students into internships, work experience and work’ (Willets). Often, however, employability data presented by universities is deemed superficial, only analysing ‘whether or not a graduate has managed to secure a job within six months of graduating’ (Dacre Pool & Sewell, 2007), without taking into account the students’ skills and knowledge and how these have been developed and applied.

In this essay, I have focused on the issues of developing employability for graduates in STEM (science, technology, engineering and maths) subjects. Even though the vast majority of final-year students would like to pursue a career related to their degree, there is a significant proportion of the student population which has no clear plans and a minority of about 10 per cent which will not look for employment related to their subject area (Mellors-Bourne, Connor, & Jackson, 2016). This fact, added to the increasing competition in the job market, means that graduates from scientific disciplines should be versatile and develop those transferable skills that would enable them to access a wider range of choices once they graduate and enter full time employment. These include team-working, leadership, communication, as well as time management, attention to detail and IT office skills.

A central issue to take into consideration when studying ways to implement these so-called soft-skills that are so central in terms of employability, is the employers’ perception. As pointed out in the literature, the majority of recruiters believe that ‘graduates who have had no previous work experience at all are unlikely to be successful during the selection process and have little or no chance of receiving a job offer for their organisations’ graduate programmes’ (Research, 2016). This is due to the fact that when academic modules are designed to include employability skills such as team-working or leadership, these skills are not easily identified and understood. It is not simple ‘to make the connection between the learning and the world of work (Trought, 2012), especially since the main focus of assessment at university is the academic knowledge related to one’s degree.

Further problems arise when one tries to embed some employability features within theoretical subjects such as those within STEM degrees. Academically speaking, disciplines such as physics, engineering or chemistry have very strict, established syllabuses that are mostly ill designed to accommodate anything other than academic content. This is due to the fact that each module is meant to cover subject-specific definitions and important concepts so that mechanisms and formulae, for use in successive modules, are understood.
From most employers’ perspectives, however, students are expected to develop a degree-related knowledge that is clearly identifiable and recognised not only within the university environment, but also in the job market.

For this reason, I realised that the best option available would be to develop an extra-curricular activity officially endorsed by King’s College London and that would represent at the same time a work-related experience easily recognisable by employers.

Initially my project was based on the idea that involving students in teaching activities would provide them with important employability skills such as public speaking, leadership, team-working and time management. However, reviewing the models present in the existing literature, I realised that the real development of employability is not limited to these single soft-skills but it is the outcome of a deeper reflection and evaluation on the student’s part. In particular, my work has been influenced by the so-called ‘CareerEDGE’ model, whose components are Emotional intelligence, Degree subject knowledge, understanding and skills, Generic skills (most commonly referred to as transferable skills), Experience (work and life) and Career development learning (Dacre Pool & Sewell, 2007).

Moreover, an activity that would focus exclusively on teaching would not be appealing to the undergraduate population at King’s College London. There is already an extensive range of opportunities for future teachers currently offered inside the university within the existing student societies. Teach First, Future Frontiers and Up Rising are some of the charities that provide volunteering teaching positions in secondary schools. For those students who are contemplating a career in teaching, being part of these societies represents a crucial experience in order to secure a job after graduation (maybe within the same organisation).

For those who do not have a clear career path, or those who do not wish to teach, however, work experiences in education limit their future career choices and hence are considered counterproductive for their employability. On the contrary, a wide range of experiences that would include teaching is seen as very beneficial.

Following these considerations, I decided to develop my initial idea further so that it could potentially offer an opportunity for students to have a hands-on experience centred on the different requirements for different jobs. In this way, one would then be able to understand the specific tasks involved and apply for a job based on one’s own abilities and preferences. This would reflect two of the constitutive elements of the CareerEDGE model, namely the ‘Career development learning’ and the ‘Experience’ components (Dacre Pool & Sewell, 2007).

The project would involve students currently enrolled in STEM related degrees at King’s College London managing a real company, namely a tuition centre: KCL Tutors.

KCL tutors would be a London-based company offering top tutoring services on a wide range of scientific subjects. It would start to operate with very low overheads, even though internal (from King’s College London) and external support should be considered at the beginning. This would be particularly useful in order to provide the students with the initial preparatory
training that is needed.

The centre would be managed almost entirely by second and third year students who would cover all the different aspects within the organisation: teaching, administration, finance and marketing. The administration department would be in charge of filling in registration forms, arranging the tutorials (time and place) and matching tutors with clients. The teaching department would be delivering the tutorials, but also developing age-appropriate programmes in each subject for the tutors. The financial aspect would be central and it would involve checking bank account details, requesting bank transfers for the registration and the tuition fees and keeping record of all the transactions by entering in data to simple spreadsheets. Finally, the marketing department would be in charge of online and offline publicity, building relationships with primary and secondary schools in the London area and seeking funding from external sponsors. After a fixed amount of time, students would be required to change their role within the organisation so that everyone would have a chance to develop the skills and competencies required by each department.

There are several market segments that would constitute the target of KCL Tutors. Since the tuition centre is initially planned to be managed by undergraduate students enrolled in STEM degrees, the services provided to external pupils would be tuitions on scientific disciplines. From 7+ entrance exams to A-levels, the focus would be on subjects such as mathematics, biology, physics, chemistry, economics, computer science/informatics and geography. Given the high percentage of international students at King’s College London, foreign languages such as French, Spanish and Russian could be considered as viable subjects to be offered as well. Another target could be represented by external companies who may wish to offer further training to their employees in IT or numeracy and problem-solving skills.

The participation in this activity should not hinder the students’ academic efforts or impact upon their academic success, and for this reason the amount of time that each person should be involved in any of these roles would be capped to five hours per week. This is due to the fact that managing an organisation would require a constant commitment on the students’ part, including the exam period.

I carried out a small piece of research, interviewing students of King’s College London from the Departments of Mathematics, Physics and Informatics in order to understand if they would be willing to participate in such an activity. The response was generally very positive, with undergraduates expressing their interest in taking an active part in this project. There was a very clear distinction between students who want to take on teaching as a future (even if only temporary) career and those who do not. The first expressed the wish to be in charge of the teaching aspect as their main focus, while the others demonstrated greater appreciation for the fact that they would have the possibility to change role inside the tuition centre after a fixed amount of time.

There are already other cases of extra-curricular activities endorsed by a Higher Education Institution that provides students with a job-related experience. For example, at the University of Glasgow the online journal eSharp run by postgraduates in the humanities department
has proved to be a successful experience. As detailed on the website (University of Glasgow, 2016), board members have the chance to experience a wide range of aspects of the journal’s work, such as publishing, web management, publicity and finance. Another very similar project has been developed at the University of Kent (University of Kent, 2016) through the interdisciplinary journal Litterae Mentis: A Journal of Literary Studies. KCL Tutors would then represent a continuation of these successful experiences, trying to widen the participation to undergraduate (not only postgraduate) students currently enrolled in STEM-related degrees.

References


How do doctorate candidates in a neuroscience department appraise their employability-related skills?

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Introduction
What is Employability? According to King’s College London’s Careers and Employability department it is the ability of a King’s graduate to be successful in entering their chosen career as well as the experiences, skills and attitudes gained during a degree that make a graduate more successful in the workplace (King’s College London Employability Strategy, 2016). Employability is also the recognition of skills, achievements and experiences that have been gained during education as well as the understanding of the chosen career environment and the present labour market. Furthermore, it implies the ability to present all these skills and capabilities to potential future employers and express confidence in applying the knowledge and skills.

Employability is often defined as the ability of a graduate to secure employment six months after graduating. More detailed surveys analyse this data according to the field of study, whether students are part-time or full-time and if graduates are satisfied with the jobs they are doing. Another relevant factor is whether the graduate actively uses knowledge and skills attained during a degree. It is also important to consider that some graduates may have entered careers on a lower level of their graduated degree, because of financial pressure and other circumstance (Dacre-Pool and Sewell 2007).

Employability is about the capability of attaining and keeping a fulfilling job as well as feeling able to move within the working environment (Hillage and Pollard, 1998). Furthermore, it is about realising potential for development and also depends on a person’s personal assets in contributing to the labour market. These assets include knowledge, understanding, attitude, management and job seeking skills as well as presentation and communication skills needed to get the job (Hillage and Pollard, 1998).

Developing employability skills as a doctoral student has also been a topic of much debate (Roberts, 2002; Schwabe, 2011). Along with challenges in doctoral education such as limitations to funding and the time it takes to complete a PhD, it has been noted that candidates do not get enough training in generic and transferable skills (for example Cryer, 1998). Most of the knowledge acquired and the skills gained are beneficial for an academic career but fail to focus graduates’ attention on careers in other sectors of the economy beyond Higher Education (HE) (Golovushkina & Milligan, 2013). This is of high importance as PhD candidates often follow a career path outside academia. A study by Markus Schwabe in 2010 showed that the potential of doctoral candidates in the labour market is not fully exploited and that although the majority are keen to work in research fields, they fail to gain adequate
employment and therefore end up working in other fields. Furthermore, a relatively high proportion of doctorate graduates end up working in jobs where their knowledge and skills are not directly applicable to their job or valued.

**A model of employability for PhD candidates**

For the purpose of this essay, PhD candidates at the Wolfson Centre for Age Related Diseases (Wolfson CARD), Institute of Psychiatry, Psychology & Neuroscience were questioned about their employability skills development progress and how King’s is supporting this development. The data obtained was analysed by drawing on the Dacre-Pool and Sewell model of 2007 and its application to doctorate candidates.

Arguably employability development should be an essential part of a PhD candidature. The higher education sector in the UK and other countries have taken on an approach to address these issues and attempted to improve the employability of doctorate candidates. Centres have been established to support employability such as career service centres, and employability is increasingly being integrated into the curriculum. Opportunities for work-based development such as laboratory experience and reflection on gained experience in the form of progress files and career management portfolios are also important (Harvey, 2003). The first point has been addressed by focussed career development departments within the university, such as the Careers and Employability department at King’s. Vitae is a national organisation that supports the development of researchers and offers information and training on professional development, career management and CV writing. The availability of formal training and development courses has also increased significantly and is now a mandatory part of a PhD programme.

Dacre-Pool and Sewell (2007) have developed a model which connects the components essential to employability. At the root of this model are career development and work experience, subject knowledge as well as generic skills and emotional intelligence. These feed into the important step of reflection and evaluation of everything that has been learnt. Finally the combination of self-efficacy, self-confidence and self-esteem are key factors in the employability of an individual. This model is a straightforward and practical approach to explain the essential concept of employability which can be used as a framework for development (Dacre-Pool and Sewell, 2007). Even though the model purports a strong relationship between academia and the world of work, care must be exercised to ensure that links between academic disciplinary departments are retained (O’Leary, 2016).

**Employability amongst PhD candidates – the student view**

Degree and subject knowledge are crucial to successfully complete a PhD. This has been recognised in the model as well as by all PhD candidates questioned. Career development learning is a process in which students should learn to actively identify interests and what type of tasks best suit their personalities. It should also include learning how to search the job market, be aware of job opportunities and how to present themselves at an interview. Work experience in higher education is also crucial for graduates to secure a job, inclusive of work placements or part-time jobs whilst studying (Dacre-Pool & Sewell, 2007). All PhD candidates questioned stated that they have done some type of career development, mainly in
the form of skills forge training courses and teaching. Whether the doctoral candidate remains in academia or not, the work undertaken by a PhD student ought to enhance employability prospects. As one student said:

‘Doing a PhD is what’s needed for a career in academia, so the “employability skills” are covered automatically. I also think it makes you employable outside of academia considering things we have to do outside of the lab – presentations, posters, meetings, working in a group, planning, being independent, able to think critically and analytically etc. However, I have done activities that will make me more employable specifically for teaching.’

According to Dacre-Pool and Sewell (2007) generic skills are skills that can support study in any field and are transferable to a range of contexts. These include team working abilities, communication and organisation skills, as well as creativity and entrepreneurship. Questioned on what King’s offers to enhance employability skills another student answered:

‘Various courses addressing important skills – teaching in higher education, writing and publishing academic papers etc., careers advisors who may be able to advise further in more specific fields.’

This shows that doing a PhD and being involved in activities set by the university will already enhance the employability of the candidate. These generic and transferable skills can be further enhanced during the numerous teaching opportunities PhD students are offered in this department. Namely, every student that has done some form of teaching named it as one of the most valuable activities for developing employability skills. Although teaching would still count as primarily advantageous for an academic career it can also open doors to jobs outside of higher education. Leading tutorials or small laboratory groups are seen as a highly valuable for developing transferable skills as this implies taking on different levels of responsibility, leading and managing small groups as well as developing presentation and communication skills.

All candidates questioned mentioned SkillsForge as the platform provided by King’s to develop new and existing employability skills. SkillsForge monitors transferable skills development of doctorate candidates and it is a formal requirement to complete at least ten days of transferable skills development per year, as was recommended by Roberts (2002) in his ‘SET for Success’ white paper. These can include courses taken at or outside of King’s in any discipline that develops skills and knowledge, however should not be directly related to the individual’s project. Via this method students are encouraged to seek outside project experiences and develop their existing or gain new generic skills.

**The importance of self-efficacy, reflection and self-confidence**

Emotional intelligence is another attribute mentioned by Dacre-Pool and Sewell (2007). It is the ability to understand and recognise your own feelings and the feelings of others. More importantly it enables us to motivate ourselves and others and therefore drive us towards successful completion of a working task. It cannot be measured quantitatively, but people
with high emotional intelligence are core members of teams and therefore highly employable. One candidate recognised that emotional intelligence and ‘getting along well’ with people was crucial to success in a research working environment and that she would value that as a major employability skill. It has not been recognised by others, probably because it is usually regarded as a ‘soft’ skill rather than as something that can be achieved via education.

Reflection and evaluation of the gained knowledge, experience and skills are important activities to enhance employability. Reflection enhances self-belief which is considered important for the continual development of employability-related skills (Turner, 2014). One opportunity for developing reflection in this way is through personal development planning (PDP), which is increasingly encouraged at university level. PDP can help students realise and reflect on the skills they learn and identify how these might be valuable to them once they enter the labour market. Additionally it provides the opportunity to manage career plans and future personal development towards successful employment-related outcomes (Dacre-Pool and Sewell, 2007). Finally, self-efficacy, self-confidence and self-esteem are key steps to employability, which are inculcated in the mastery of experiences. These qualities develop further in working environments or when students actively perform career developing tasks such as CV writing, mock interviews and applying for jobs. The successful completion of such tasks strengthens the self-efficacy belief and therefore increases employability. Additionally, peers that can demonstrate that they have achieved success can have a positive effect on the self-beliefs of other students. For example alumni presenting career success can affect current students and convince them that they are equipped with the necessary skills to be successful in finding a good career path (Bandura, 1995).

If believing in ones skills and capabilities is self-efficacy then being able to present these to others is self-confidence. Self-confidence is a difficult trait to learn and cannot usually be achieved just through educational activity. However, if self-efficacy can be improved by specific tasks and experiences then an increase in self-efficacy should be reflected in the way graduates present themselves (Dacre-Pool & Sewell 2007). Self-esteem has much to do with self-respect and feeling valued without being unrealistic. Still, seeing room for improvement is also a crucial factor to being open to lifelong learning, which on the other hand is another important step to increase ones employability. Summarising, self-esteem and consequently also self-confidence are major contributors in enhancing ones employability, as the belief in your own achievements makes it more likely that you succeed in them (Lawrence, 2006). 

PhD candidates felt that presenting their own data as well as teaching tutorial classes had a crucial impact on their self-belief and self-efficacy. These are probably also the most important experiences gained during a PhD, as the students gain confidence in their own abilities and knowledge.

Comparing PhD candidate perceptions of employability skills to those set in a well thought-through model showed that most candidates identified the ‘hard’ skills they have gained during their studies, for example knowledge, experience and subject understanding. However, barely anyone identified the ‘soft’ skills also required for a high level of employability. These are reflection and evaluation of learnt skills, experienced activities, active work on ones
own self-efficacy and self-belief. Also none of those interviewed had created a PDP or used comparable tools in order to enhance such ‘soft’ skills. Therefore, there is clearly a need for introducing such frameworks into doctorate candidature – as can be seen from previous research studies, it is essential to develop plans to significantly enhance employability skills and which are crucial for continuing or entering a fulfilling career.

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