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Are UK undergraduate Forensic Science degrees fit for purpose?

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ABSTRACT

In October 2009 Skills for Justice published the social research paper 'Fit for purpose?: Research into the provision of Forensic Science degree programmes in UK Higher Education Institutions.' The research engaged employers representing 95% of UK Forensic Science providers and 79% of UK universities offering Forensic Science or Crime Scene degree programmes. In addition to this, the research collected the views of 430 students studying these degrees. In 2008 there were approximately 9000 people working in the Forensic Science sector in the UK. The research found that the numbers of students studying Forensic Science or Crime Scene degrees in the UK have more than doubled since 2002–03, from 2191 in to 5664 in 2007–08. Over the same period there were twice as many females as males studying for these degrees. The research concluded that Forensic Science degree programmes offered by UK universities were of a good quality and they provided the student with a positive learning experience but the content was not relevant for Forensic Science employers. This echoed similar research by the former Government Department for Innovation, Universities and Skills on graduates from wider science, technology, engineering and mathematics degree programmes. The research also found that 75% of students studying Forensic Science or Crime Scene degrees expected to have a career in the Forensic Science sector, meaning that ensuring these courses are relevant for employers is a key challenge for universities. This paper reflects on the original research and discusses the implications in light of recent government policy.

1. Introduction

The overarching objective of the original social research was to understand better what impact the number of Forensic Science-related HE courses is having on producing employment-ready, quality graduates. This paper offers a review and discussion based upon the original research which can be found at www.skillsforjustice.com or from the authors.

2. Material and methods

In order to meet the objective of the study, the following social research methodologies were used:

- one-to-one semi-structured interviews with the leading Forensic Science employers in the UK, including interviews with representatives from 4 Police Forces' Scientific Support Units
- one-to-one semi-structured interviews with a selection of university course leaders and lecturers who deliver Forensic Science undergraduate programmes
- a one-to-one interview with then DCC Clive Wolfendale, North Wales Police and ACPO lead on training and standards in Forensic Science
- two online questionnaires
  - o one designed for Forensic Science course leaders/lecturers at Higher Education Institutions (HEIs)
  - o one for current Forensic Science undergraduates
- one-to-one semi-structured interviews with 8 university faculty heads
- 35 HEIs were invited to complete an online survey.

Faculty heads of Forensic Science departments at 43 universities were asked to invite their current students (across all years) to complete an online questionnaire. 430 individual responses were received from 12 different HEIs. In total, data was collected from 34 universities (a combination of students, course leaders/lecturers and faculty heads) scheduled to deliver Forensic Science-related learning in the academic year 2009–10.

We are mindful that for some of the results of the online questionnaires an institutional bias may prevail. We received responses from what we believe to be a fair representation of HEIs and students within HEIs. Along with the Skills for Justice Forensic Science Occupational Committee (the employer-led body concerned with skill issues that commissioned the report) we are content that the data is useful enough to be published. The findings cannot be generalised

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beyond the sample consulted as part of this research study to the wider population of Forensic Science students. Robust statistical conclusions cannot be drawn. However we use the data as the basis for a more general discussion of the issues that they raise.

We focussed the research on undergraduate degrees as this was the area which concerned employers the most. We did not control for degree courses that were either Skillsmark® endorsed or Forensic Science Society accredited.

3. Results

In the UK, the Forensic Science sector is complex. This is because in each of the jurisdictions within the UK there are different models and particularly because of the split between state provision of some aspects of forensic process and the commercialisation of others in England & Wales. In Scotland the Scottish Police Services Authority Forensic Services provide a holistic forensic service to the justice system. In Northern Ireland, Forensic Science Northern Ireland offer Forensic Science service to the Police Service Northern Ireland who maintains an internal scientific support capacity. In England and Wales it is more complex: most of the 43 Home Office Police Forces have their own crime scene and fingerprint capacity whilst others have a wider scientific support capability.

There are several commercial providers of Forensic Science services in England & Wales. These include Central Science Laboratory, First Forensic Ltd, Forensic Science Service Ltd, Key Forensic Services Ltd, LGC Forensics Ltd, Mass Spec Analytical Ltd, Napier Associates Forensic Ltd, Orchid Cellmark Ltd, Randox Laboratories Ltd, and Scientifics Ltd. In December 2010, the Home Office announced the winding down of Forensic Science Service Ltd. This could potentially leave a gap in provision of Forensic Science services in England & Wales. The relevant authorities and bodies are managing the process and associated risks carefully so that there will be a smooth transition. There is no reason to suspect that this decision will affect the quality of Forensic Science and Crime Scene undergraduate degree provision in the UK.

The Ministry of Defence – Defence Science and Technology Department; and other government agencies including the Serious Organised Crime Agency, HM Revenues & Custom and Royal Mail also maintain some Forensic Science capacity.

Our research has found that in 2008 there were around 9000[1] people employed in Forensic Science occupations across the UK. Around 5000 of these were employed by the 43 Police Forces in England & Wales.

4. Comparisons with other science students

In January 2009, the previous administration's Department for Innovation, Universities and Skills, DIUS, published *Demand for Science Technology, Engineering and Mathematics (STEM) Skills*. We have been able to draw some informal comparisons (as far as the differing datasets will allow) between students and graduates of Forensic Science degree programmes and students and graduates from other Higher Education based degree programmes across the UK. Although the fieldwork carried out by Skills for Justice looked at Forensic Science and Crime Scene degrees.

The DIUS data showed that across the UK there has been an overall growth of 4% in Higher Education student entrant numbers between 2002–03 and 2006–07. For the STEM subjects, however, the growth was at 2% across the 5-year period.

Biology numbers increased slightly from 6165 to 6485 (a 5% rise) and Chemistry decreased slightly from 4025 to 4020 (a 0.1% decrease). The largest area of decrease was in Computer Science, which experienced a 34% decrease in student entrants dropping from 30,205 students in 2002–03 to 19,885 student entrants in 2006–07.

Forensic Science learning is defying the trend of very small but steady increases in the STEM student population. There are no available studies in STEM that go in to the depth our research has into mismatches between graduate numbers and jobs available in the market.

The number of learners studying an undergraduate degree programme with 'Forensic Science' or 'Crime Scene' in the title between 2002–03 and 2006–07 grew from 2191 to 5514. This is a 151% rise. Of all the STEM subject areas, only Sports Science showed a large increase (65%) during the same period. These figures highlight the increased popularity and availability of Forensic Science-related degree programmes.

The content of Forensic Science and Crime Scene degrees depends very much on where the course is taught. It is difficult to generalise the content of a Forensic Science or Crime Scene degree for this reason.

5. Employer views of Forensic Science and Crime Scene degrees

Several of the employers interviewed in our study have employed Forensic Science BSC graduates in the past few years. The very best of these graduates are reported to be excellent, but a large number of graduates interviewed for posts are not of the quality employers are looking for.

Employers expressed little confidence in the knowledge and skills obtained by Forensic Science graduates and insist on putting new recruits through their own initial training programmes. This is costly and if the content and quality of Forensic Science and Crime Scene degrees could be assured this is a cost that would not have to be passed onto the consumers of these services: the police. One employer commented that they "don't take anything for granted" and go "back to basics". Often this training will cover fundamental principles they would expect graduates to have learnt and be comfortable with during their degree programme. This can often include learning around how a laboratory works, integrity of evidence and the professional standards expected of them. The most common skill deficits cited by employers were:

- The depth of basic scientific knowledge
- Basic Forensic Science theory
- Integrity and continuity of evidence
- Poor communication skills
- Poor attitudes towards workplace professionalism

When speaking to employers, it is evident that when advertising for posts, they can be overwhelmed with applicants. This issue of a large number of applicants for a small number of posts is not exclusive to Forensic Science, but is true of this sector nonetheless.

6. Student demand for Forensic Science degrees

Appetite and demand for Forensic Science learning appears to be as high as ever with 81% of HEIs reporting that their student numbers for 2008/09 were on target or above target. It is difficult to determine from the data collected if there is any correlation between aspects such as reputation, accreditation status, experience in delivering the course and student demand for courses in choices made about attending specific HEIs.

Location of the HEI was by far the most commonly cited factor influencing choice to apply to a specific HEI cited by 73% of respondents. Factors less likely to be cited as influencing HEI choice included the reputation of the university, course content and department facilities. In terms of learner choice, 71% of students cited a general interest in studying science at degree level as a factor that influenced their choice of degree programme. This suggests that

[1] Skills for Justice, LMI matrix, http://www.skillsforjustice-lmimatrix.com/ accessed 19 February 2010.

Forensic Science-related learning may be a popular vehicle for attracting people to study science at higher levels.

7. Student views of Forensic Science degrees

Overall, students were very pleased with the quality of the learning experience available to them. 96% of students indicated that the course content was good or very good. In the additional comments received by students there were some mixed opinions relating to the balance between practical and theoretical learning and the relevancy of some of the learning. Also, 96% of students felt that university facilities were good or very good. This result aligns with the findings of the HEI survey in which 89% of HEI faculty heads considered their facilities to be either good or very good. We did not define the parameters of what 'good' meant to the students. We relied on their own interpretation of what 'good' means for them.

Employer views on the effectiveness of Forensic Science-related degree programmes and their ability to produce employment-ready graduates were quite negative overall. Many employers felt that this could be improved through a number of measures that revolve around them linking in a much better way to local Higher Education Institutions.

Forensic Science continues to be a good vehicle for attracting students into Higher Education, and more particularly attracting female students and minority ethnic students into science-based HE. The number of students studying first degrees in the UK with 'Forensic Science' or 'Crime Scene' in the title has increased year-on-year over the 6-year period that data was available for. Gender representation has remained fairly steady over this period with females accounting for two-thirds of all students.

8. Quality of UK Forensic Science degrees

In the UK, the Quality Assurance Agency (QAA) safeguards the public interest in sound standards of Higher Education qualifications and to inform and encourage continuous improvement in the management of the quality of Higher Education. To this end, QAA carries out Institutional audits of Higher Education Institutions.

The QAA has 'broad confidence' in the soundness of all 43 of the universities' (that offer Forensic Science and Crime Scene degrees in the UK) current and likely future management of the quality of its academic programmes and the academic standards of its awards. Broad confidence is the highest confidence judgment the QAA can give. The other judgments are 'limited confidence' and 'no confidence'.

9. Discussion

There is an oversupply of Forensic Science graduates in the UK Forensic Science labour market. Every year hundreds of Forensic Science graduates compete for a small number of posts, with many unable to access employment in the Forensic Science sector. This is not an exclusive phenomenon to Forensic Science but remains true to this sector nonetheless.

A balance needs to be struck between giving students the best opportunity to compete for Forensic Science jobs and ensuring realistic expectations about this pathway; and providing a solid foundation of transferable skills and theory to facilitate entry to other science occupations. A further issue seems to be that of a perceived and/or actual mismatch between provision and sector needs. In the UK, it falls to Sector Skills Councils like Skills for Justice to co-ordinate such joint activity and help employers engage more effectively with universities with the support of relevant professional bodies such as the Forensic Science Society.

Views on the quality of Forensic Science undergraduate provision varied between employers and learners. As indicated above, employers acknowledged that these degree programmes did produce some excellent graduates, but often produced graduates that lack some of the fundamental skills associated with Forensic Science and its varying disciplines. As a result, employers were investing heavily in initial training programmes designed to cover many of the basic Forensic Science principles they would have expected these degrees to cover in detail.

In contrast, current students were very pleased with the quality of the learning experience available to them.

The research found that the quality of Forensic Science degrees was good but they were not as relevant as they could be to meet employers' needs. This is important because the research found that 75% of students study Forensic Science or Crime Scene degrees with the expectation of having a career in the Forensic Science sector.

The DIUS research found that employers' concerns about recruitment difficulties are much broader concerns about the lack of well-rounded candidates with technical skills, broader competencies, such as mathematical capability, and practical work experience. The evidence seems to suggest that there is a mismatch in skills that employers of science occupations are seeking and those that STEM graduates possess. These findings are in line with the views of Forensic Science employers, who also cited the lack of well-rounded candidates that are produced from Forensic Science degree programmes and the mismatch between the skills they seek when recruiting and the skills candidates possess.

We found that universities dedicate a lot of resource in developing the content of their Forensic Science degree programmes. Despite this effort Forensic Science employers claim that the graduates they see from these courses do not have the experience that they want, and in fact lack some of the fundamental skills they would expect to see. The DIUS report suggests that this issue is common across all science provision.

Universities have for some years now been feeding off the cash-cow that is the 'CSI effect', benefitting commercially from the widespread interest in this subject area. Converting existing but not so commercially lucrative traditional programmes such as Chemistry or Biology degrees to have a forensic context has proven to be a shrewd move, guaranteeing 'bums-on-seats' and securing the future prosperity of the science department.

But at what cost? The Quality Assurance Agency reports insist that the quality of the learning on offer is on the whole very good (hence the judgment of 'broad confidence'), but our research suggests that something fundamental is lacking: many of the courses on offer are not producing graduates with the skills employers require. As a result employers (both policing and commercial provider) are expending resource on teaching basic scientific principles to graduates that they would expect to come into the employment marketplace already equipped with.

What this CSI boom has created, employers said during fieldwork, is a level of misunderstanding and confusion in the HE system that undermines a lot of the good work and employable graduates that many universities produce. The sheer volume and diversity of Forensic Science-related degree programmes in the UK is a problem for the sector and students.

Employers are critical of the inconsistency and relevancy of the curriculum content of these programmes and are now looking outside the traditional approach of seeking graduates to fill vacancies. More and more often employers are now looking at pre-graduate level candidates (with good A level grades in Chemistry and Biology), who they can mould and develop into members of staff they can more usefully employ.

What about the students who undertake these courses of learning with expectations of a career in the Forensic Science arena? Surely students would expect the skills and experience they have developed during their Forensic Science degree to prepare them well for the practical assessment testing regularly used by employers during the interview process. At an even more fundamental level, are they even

aware of the immense competition for the lowest level jobs in the Forensic Science arena when they graduate? As students become ever more sophisticated customers of Higher Education and with funding being squeezed, university courses are going to have to be a worthwhile investment providing value for money for the public and student purse.

Our report highlights that in many cases graduates are ill-equipped for employment but have high expectations of securing employment in the Forensic Science sector.

What public service are universities then performing if the degree that graduates have spent 3 years working towards (and of course accumulating significant debt for) gives them no discernible competitive advantage when applying for jobs in the Forensic Science sector?

Perhaps pursuing their commercial interests has cost universities some valuable credibility. They have certainly suffered from a loss of faith from employers, who criticise both the course content and the product of the course – the graduates themselves. In these times of austerity, where value for money is more important than ever to consumers of Higher Education, degrees that don't serve the interests of students and employers are not viable and could ultimately be moribund.

Whilst there is a need for universities to ensure course content meets certain core needs and provides transparent information to employers (and indeed students), there is also the need for employers to recognise the opportunity they have to work with universities to ensure provision meets their core needs. Employers must take some responsibility to ensure that degree programmes equip students with the skills and experience they need to make them obvious candidates for employment.

The accreditation of university Forensic Science programmes either through Skillsmark® endorsement or Forensic Science Society Accreditation will be increasingly important. In the interviews we conducted with the university faculty heads who had achieved accreditation for their programmes, it was very clear that they viewed accreditation as a benchmark of quality and something that sets them apart from their competitors, giving them a market advantage. In one instance it was claimed that without accreditation or the intention to pursue accreditation, an institution "is simply not serious about Forensic Science."

Accreditation models based on National Occupational Standards (NOS) in particular will ensure a consistent approach to the content and relevancy of these programmes and ensure a degree of employer input into course design. The NOS, originally developed by a wide range of Forensic Science employers in 2008, will act as proxy for direct employer input if this can't be achieved in the traditional way.

The UK Forensic Science Regulator has recently published his draft Code of Practice stating that practitioners will have to comply with the requirement of the Forensic Science suite of NOS. Students graduating from a course that has been based upon these NOS will surely be at an advantage as they will possess the skills which employers have (stated by the NOS) that they want.

Employers continue to perceive the diversity of Forensic Science programmes available to learners as a weakness, but acknowledge that accreditation of programmes will aid their efforts in distinguishing between courses. The key recommendation from the report is to work with employers and universities to develop a QAA Subject Benchmark for Forensic Science which will help address many of these issues.

Despite the shortfalls outlined above, Forensic Science provision at universities has also delivered impressively on a number of different levels over the past 5 years, and it is these that we must now look to build on.

In the recent UK Government publication 'A Strategy for Sustainable Growth', Secretary of State for Business Innovation and Skills Vince Cable sets out his vision for a more balanced and sustainable model of growth to address the UK's long term challenges. He outlines how "we need to seize the opportunity to…build on our strengths" and cites Higher Education and science as crucial for our growth potential.

10. What therefore are the challenges and opportunities for Forensic Science?

Forensic Science and Crime Scene degree programmes attract large numbers of students at HE level, aided of course by the media coverage of the subject matter, commonly referred to as 'the CSI effect'.

Forensic Science and Crime Scene degrees continue to be a good vehicle for attracting black and minority ethnic students into science-based Higher Education (the minority ethnic student population on Forensic Science-related degree programmes increased year-on-year from 10% to 17.5% between 2002–03 and 2007–08).

Forensic Science and Crime Scene degrees are a good vehicle for attracting female students into science-based Higher Education (with females accounting for two-thirds of the Forensic Science student population).

How can these facts and the popularity of Forensic Science be built upon to take forward some of the UK's challenges around the need to expand engagement in the STEM subjects and the need for world class scientists? Can Forensic Science act as a catalyst to inspire a whole new generation of young, enthusiastic men to become scientists?

Can these things be achieved whilst ensuring at the same time that Forensic Science degree programmes are fit for purpose, meet employer needs and produce employment-ready graduates? Can the perceived 'savage waste of time and money' for students and parents who invest in such courses be avoided? Is it fair to ask more from Forensic Science provision at universities when there are already question marks over the relevancy of what they deliver currently? Is it realistic to suggest that it could be the saviour of science in the UK? These are the challenges we hope universities will embrace and champion and we stand ready to support them.

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