



Employer demand for intermediate technical education in higher education

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Glossary

AO	Awarding organisation
BIS	Department for Business, Innovation & Skills
BTEC	Business and Technology Education Council
CPD	Continuing professional development
CRM	Customer Relationship Management
DfES	Department for Education and Skills
DipHE	Diploma of Higher Education
EDT	Engineering Development Trust
EIF	Employer Investment Fund
ELQ	Equivalent or lower qualifications
EOP	Employer Ownership Pilot
EOS	Employer Ownership of Skills
Fd	Foundation degree
FDAP	Foundation Degree Awarding Powers
FE	Further education
FEC	Further education college
FHEQ	Framework for Higher Education Qualifications
FTE	Full-time equivalent
GIF	Growth and Innovation Fund
HA	Higher apprenticeship (not used in text)
HE	Higher education
HEI	Higher education institution
HEPI	Higher Education Policy Institute
HESA	Higher Education Statistics Agency
HNC	Higher National Certificate
HND	Higher National Diploma
LEP	Local Enterprise Partnership
LFS	Labour Force Survey
LSC	Learning and Skills Council
NESS	National Employer Skills Survey
NVQ	National Vocational Qualification

OUG	Other undergraduate
QAA	The Quality Assurance Agency for Higher Education
RDA	Regional Development Agency
SET	Science, Engineering and Technology
SME	Small or medium-sized enterprise
SOC	Standard Occupational Classification
SSA	Sector Skills Agreement
SSC	Sector Skills Council
STEM	Science, Technology, Engineering and Mathematics
UKCES	UK Commission for Employment and Skills
UTC	University Technical College

Executive summary

Introduction

1. The central aim of this research was: *“To test the hypothesis that there is, or will be, unmet demand for intermediate technical education in HE, and to identify the impact of previous Government initiatives in this area.”*¹
2. Intermediate higher education comprises qualifications at Levels 4 and 5 on the Framework for Higher Education Qualification (FHEQ) in England, Wales and Northern Ireland. These qualifications are also described as ‘other undergraduate’ (OUG) qualifications and are:
 - Higher National Certificates (HNCs);
 - Higher National Diplomas (HNDs);
 - Diplomas of Higher Education (DipHEs);
 - Foundation Degrees (FDs).
3. Features in common include the integration of work experience or workplace learning with academic study, and the opportunity to progress onto a full undergraduate degree with further study (foundation degrees in particular). The purpose of this research was to concentrate on those qualifications with a technical focus; we have broadly defined these qualifications as covering Science, Engineering, Technical and Mathematics (STEM) subjects.²
4. There are currently approximately 440 technical foundation degree courses available in England (19% of all foundation degrees); 316 HNDs (33% of all HNDs); 13 technical OUG courses (9% of all OUG courses in England).

Methodology

5. A mixed methodological approach was adopted, with the research focusing on five economic sectors of importance to the economy and chosen to ensure coverage of sectors with different characteristics: aerospace; construction; energy; information economy; and life sciences. The work involved:
 - A literature review;
 - Forty depth interviews with stakeholders within further education (FE) and higher education (HE), as well as with sector bodies such as professional institutes, trade associations and others involved in technical education;

¹ From HEFCE’s Invitation to Tender

² For the purpose of this research, technical subjects include all of those contained within HEFCE’s definition of STEM. This definition includes the following subjects: Anatomy and physiology; Biological sciences; Chemistry; Computer sciences; Earth, marine and environmental sciences; Engineering and technology; Mathematical sciences; Pharmacy and pharmacology; and Physics.

- A survey of over 500 employers in the five sectors;
- A series of 50 follow-up interviews with employers who took part in the survey;
- Depth interviews were also undertaken with 20 providers with the highest take-up of intermediate technical education.

Intermediate technical qualifications

6. In recent years, the number of full-time equivalent (FTE) entrants to intermediate qualifications has declined by some 45% between 2009-10 and 2013-14; the most substantial decline being in foundation degrees. This occurred against a backdrop of rising numbers of entrants to undergraduate courses, reaching a peak of 418,189 in 2011-12.
7. Take-up of intermediate technical qualifications alone fell by almost 40% between 2009-10 and 2013-14 to a low of 33,638 FTE. The sharpest falls were seen in diploma courses and foundation degrees with patterns of take-up of HNCs and HNDs being more complex and, although numbers declined, the fall was less dramatic.³
8. Reasons for the decline are numerous: the acute drop in numbers pursuing foundation degrees coincided with the introduction of the equivalent or lower qualifications (ELQ) rule, which stopped funding for HE students studying a second qualification at a level equal to or lower than those already held. Funding of foundation degrees was also revised, and the economic recession was at its peak. It is also highly probable that conversion of HNDs into foundation degrees was partly responsible for a decline in the former. Notwithstanding these changes, policy on intermediate qualifications has remained fairly static over the last 10-15 years (since the introduction of foundation degrees) whilst FE and HE policy has seen tremendous change.
9. Intermediate level and higher vocational education is currently a focus of Government policy, being an important feature of industrial strategy, apprenticeship Trailblazers and University Technical Colleges (UTCs). Intermediate technical and professional education and higher apprenticeships feature strongly in the Government's Productivity Plan, which highlights a need for further investment in technical and vocational skills.

Intermediate roles

10. Defining the market for intermediate technical education is challenging. Roles for which these qualifications may be appropriate vary by sector and size of organisation, and they are often described as 'technician-level' (somewhere between Levels 3 and 5). Furthermore, the lack of a clear definition of what is meant by the term 'technician' means that some workers in those roles are not appropriately classified as such; predicting future need for these roles – and the associated qualifications - is therefore problematic.

³ Figures are based on analysis of the Higher Education Statistics Agency (HESA) standard registration population at publicly funded higher education institutions (HEIs), and the equivalent population registered at English further education colleges (FECs). UK, EU and international entrants between 2005-06 and 2013-14.

11. To gain a better understanding of the potential market for intermediate technical qualifications, the research began by identifying the qualifications usually looked for by employers when recruiting to technician-level roles. The survey of employers found a degree to be most sought after (and sometimes a post-graduate qualification – depending on the sector) when recruiting technicians, despite the fact that many of these roles do not require this level of qualification.⁴ The research found this practice to be growing and likely to be a consequence of increased numbers of graduates in the labour market, rather than graduates being better suited, per se, to technician-level jobs than those with other qualifications. The situation has the potential to create issues for retention within the workforce: high levels of over-qualification in the technician-level workforce leading to high staff turnover, loss of innovation, loss of competitiveness and inappropriate deployment of skills.⁵
12. Survey findings suggest employers also value other types of qualifications when recruiting technicians: apprenticeships are sought after (by one in five employers) and work experience is also often cited by employers as a valuable form of ‘qualification’.
13. Of those recruited into technician roles, graduates are found to have the most pronounced skills gaps, followed by school leavers. Desk research identified practical experience, leadership skills and technical expertise as the areas in which these individuals are most deficient.⁶ Additionally, jobs demanding intermediate skills tend to have high proportions of skills shortages, and these are most likely to be found in small or medium-sized enterprises (SMEs).⁷
14. The survey of employers and stakeholder interviews confirmed intermediate roles as suffering from substantial unmet need in skills developed primarily through work experience, or practical learning.
15. Whilst the availability of a large pool of graduate labour may be attractive to employers, in the longer term the evident skills mismatches may cause employers to question the value of graduate skills. This may suggest there being space for a technically/practically focused intermediate-level alternative.

Supply of intermediate technical qualifications

16. Overall, employers have a reasonable awareness of the different types of intermediate qualifications, being most familiar with HNCs and HNDs (79%), followed by foundation degrees (67%). Of all intermediate qualifications, employers are least familiar with higher apprenticeships (46% being either not very familiar or not at all familiar). Their relative newness – being first introduced in 2006-07 – most likely accounts for limited awareness. Findings from stakeholder interviews and roundtables however suggest higher apprenticeships are increasing in popularity.

⁴ Jagger et al (2010) *SET Based Technicians, Lessons from the UK and European Labour Force Surveys*

⁵ Kelly, S (2011) *Defining skills need: The role of recognition of technician status*, Gatsby Charitable Foundation

⁶ Institution of Engineering and Technology (2014) *Skills and Demand in Industry Survey, Annual Survey 2014*

⁷ UKCES (2014) *The Labour Market Story: The State of UK Skills, Briefing Paper*, UKCES

17. Despite reasonable awareness levels reported in the survey, only very few employers recruit individuals with intermediate qualifications. Likewise for upskilling: employers typically chose different methods, favouring in-house training. Only 12% of employers surveyed will chose higher-level on-the-job or part-time learning for upskilling technician-level staff.
18. Reasons for not choosing intermediate qualifications are complex and varied. Insufficient choice is unlikely to be a factor for all, but in some niche sectors such as aerospace and energy a lack of sufficient vocational pathways could be pushing people towards degrees. Insufficient promotion and low public awareness of intermediate routes is another factor put forward by stakeholders. Although a reasonable number of employers are aware of these qualifications, the primary research suggests they may not fully understand them and their distinctive purpose, instead prioritising degrees because of their status and 'prestige'.
19. Apprenticeships were identified through this research as a possible means of reinvigorating intermediate technical provision. To-date, take-up of higher apprenticeships has been subdued: in 2014-15 only 7,000 starts were recorded, accounting for just 3% of all apprenticeships.⁸ However the impetus given to apprenticeships by new Trailblazer developments, and Government commitment to them – such as funding of £20 million to co-invest with employers in financial year 2014-15 to 2015-16 – may see this change.

Employer involvement in intermediate technical qualifications

20. Intermediate technical qualifications rely on employer involvement. Foundation degrees were intended to respond to identified skills shortages in the labour market, to be designed by employers and delivered in the workplace. HNCs and HNDs use a similar model of workplace delivery.
21. Employers are often involved with universities and colleges primarily to gain access to potential new recruits⁹; offering work experience is the most common form of involvement.¹⁰ Interviews with employers and providers conducted for this research confirm that relationships are instigated by both parties, but that, on balance, providers will usually approach employers first.
22. To forge and maintain successful relationships providers will use a range of mechanisms in combination, such as employing an employability team, employing a placement officer, compelling qualification writers to consult with employers etc. The most important factor cited by providers is making sure employers gain a business benefit in return.
23. Indeed, being able to see a business benefit is highlighted by employers as the most important motivating factor for them, followed by some form of financial incentive. Most employers (68%) also suggest investment in vocational education needs to increase. Based on analysis of

⁸ House of Commons (2015) *Briefing Paper number 06113, Apprenticeship Statistics: England*

⁹ Parry et al (2012) *Understanding Higher Education in Further Education Colleges*, Department for Business Innovation and Skills

¹⁰ Pye Tait (2014) *Employer involvement in qualifications delivery and assessment, Research report*, Department for Education

primary evidence from this research, many employers may be basing this assertion on limited understanding of current policy, however. Conversely, there is also a reasonable appetite amongst employers to co-invest in intermediate qualifications, scoring this as '5' (on a scale of 1 to 10 where '1' is 'no involvement' and '10' is 'extensive involvement').

Demand and latent demand

24. There is evidence throughout this research of considerable confusion in the marketplace as to what intermediate technical skills are, how they are of value in the current economy, and, perhaps most importantly, how they will be of value in the future.
25. Employers and stakeholders – but mainly the former – exhibit uncertainty as to what intermediate technical education is, and what its value is to them. That confusion extends to the way in which Government policy will work to drive (or not) the need for such skills. As with all markets, imperfect information can distort the market itself and potentially lead to future distortions and product failure.
26. Various factors have been identified through the course of this research, creating barriers and opportunities for future demand for intermediate technical qualifications:
27. **A complex system** – The research found confusion and a lack of understanding in the marketplace for intermediate skills and qualifications. Stakeholders are concerned at the extent to which this affects employers. The situation is largely a product of successive changes to education policy which have caused employers to disengage due to myriad factors such as: the unsuitability of graduates; inadequate resourcing in FECs; complex and changeable funding; and the language and jargon used in the education arena.
28. **Information and awareness** – Promotion of technician-level roles and pathways into technical sectors was widely regarded by stakeholders, providers and during roundtable discussions as being key to stimulating demand for intermediate technical education. The limited promotion not only affects employer understanding of the intermediate pathways, but also extends to those responsible for advising and guiding young people. Many contributors to the research suggest that current arrangements for providing careers advice are responsible for much of the issue by continuing to prioritise 'traditional' education routes through universities.
29. **Recognition and status** – The complexity of cultural drivers is an incredibly important factor when contemplating the issues of prestige and recognition where intermediate technical qualifications are concerned. The education 'market' was frequently highlighted as leading individuals to aspire to a degree, regardless of ability or future career aspirations. As this research has found, this leads to a skills mismatch in employment, which can result in high churn and low retention. In the view of some stakeholders and providers (FECs), the lack of prestige attached to intermediate qualifications can result in HEIs focusing on undergraduate degrees in preference, thereby compounding the issue.

30. **Funding** – Successive and on-going changes to funding in FE and HE were argued by many contributors to the research as having caused a decline in take-up of intermediate technical qualifications. Multiple interests involved with funding at intermediate levels (which include HEFCE, universities, employers, etc) are regarded by FECs and HEIs as barriers to finding a suitable mechanism to direct funding. The impact of the reduction in the adult skills budget in the FE sector, is also regarded as being likely to push learners towards apprenticeships, and drive FECs to prioritise this type of provision.
31. **Higher and degree-level apprenticeships** – In some sectors, apprenticeships are viewed as a potential recruitment remedy. However, the integration of degrees and apprenticeships was largely viewed – by those who cited them – as confusing. The availability of technical degrees alongside technical apprenticeships was also identified as hampering the flow of young people at 14-19 into work and further confusing an already crowded market.
32. **Policy** – The Labour Government’s policy of promoting degree education (with the 50% target) was put forward as a major factor contributing to the decline of vocational routes, and diluting the value of a degree. Some contributors to the research suggested a reintroduction of polytechnics (or a similar model) could help address the issue by focusing attention on technical skills and qualifications.
33. The research also identified other drivers of future demand, many of which with a macro-influence, being high-level drivers beyond the direct influence of education policy. Such drivers include: an ageing workforce; sustainability; regulation; the impact of technology; globalisation; competition between industries and rapidly changing economic conditions.
34. The extent of impact of each of these drivers will most likely differ between sectors, however the transformative effect of factors such as the influence of technology and changing economic conditions is universal.

Conclusions

35. Findings from this research with 40 stakeholders, 500 employers and 20 providers indicate a trend for intermediate qualifications to be regarded as a stepping-stone to, or even a sub-set of, a degree. The ability to progress to a full bachelor’s degree is a positive feature, but it should not define intermediate qualifications. Indeed, in a great many cases, not only is a degree unnecessary for technician-level roles, but over-qualification can lead to high levels of employee churn.
36. The market for intermediate technical qualifications has changed, with links between supply and demand becoming more complex as the labour market evolves and re-shapes. Jobs have also evolved as a response to various drivers discussed above. For this, and many other reasons, using qualification levels to define technician-level occupations is problematic, as is the use of Standard Occupational Classification (SOC) codes which confuses the technical roles with non-technical ones at roughly the same employment level.

37. This situation suggests a pressing need for linkages and progression routes between qualifications and job roles but, **firstly, it requires a clear definition of what is meant by technician-level roles.**
38. The research has demonstrated the value employers place on the types of skills developed through work-related technical qualifications. Employers also value highly the features of intermediate qualifications being delivered in the workplace and being achievable part-time. However, the findings from employers and the desk research illustrate very clearly that employers currently prefer graduates ‘because they know what they are getting’ – or they believe they do.
39. There is evidence to suggest that employers may be starting to attach less value to a degree, due to reported skills gaps amongst graduates relating to ‘work readiness’ and a lack of work experience in technical roles. Employers recruiting technicians report that degrees are de-valued as a result of this mismatch: intermediate technical qualifications may be a better fit for these roles.
40. This research indicates latent demand for intermediate technical qualifications, whose features, employers say, should include flexibility, completion partially in work, and up-to-date high level technical knowledge and skills. But these distinctive characteristics will need to be known and then well understood by employers and potential learners for this hidden demand to be released.
41. Among employers there appears to be a good appetite for involvement in shaping these programmes, and this is confirmed by providers. But it is dependent on employers seeing value from their involvement: that they will get something out of it, whether that is access to a steady pool of skilled workers for recruitment, or assurances that current workers are being upskilled to the right standards to meet workplace requirements.
42. There are a number of levers which may help to stimulate development and demand, should there be a desire to do so. These are outlined in the following section.

Recommendations

Defining intermediate technical roles and qualifications

43. This research has found a great deal of variation in the way that intermediate technical roles and intermediate technical qualifications are defined and understood by employers and stakeholders. Work is being undertaken by the Science Council and partners through the development and promotion of 'technician status'.
44. More can be done to better define and promulgate the role; this will require working in partnership with organisations such as UKCES, the Science Council and other professional bodies to provide and agree clear definitions of what is meant by technician level.
- 45. Technician levels, qualifications and roles should be defined and widely publicised.**
- 46. Consideration might be given to legislating a specified 'technician' appellation and the roles and sectors it can be used within.** There are examples of where this already works in certain sectors (e.g. Pharmacy Technician and Architectural Technician), where protected titles are well-known and respected amongst industry colleagues. In these cases the title is also used to assure the public that the individual has satisfied requirements of knowledge, skills and experience in their particular profession.

In an age of increased labour mobility and globalised labour markets, a legally protected appellation is also an effective tool for ensuring competence and qualification levels.

Publicising technical pathways

47. Better documentation and promotion of different career and qualifications pathways into and through technical roles is suggested as a necessary precursor to stimulating demand. Actions could include ensuring that different routes are:
 - More clearly articulated (based on the above definitions);
 - Communicated using a common and standardised language;
 - Named in a standard manner (perhaps using the 'technician' appellation and legislating it to be restricted to specified roles and sectors);
 - Linked to different qualifications and the distinctiveness of those qualifications explained.
48. Collectively, these actions could help to re-invigorate the 'brand' of intermediate technical qualifications, which has become blurred as similarly the lines between FE and HE have overlapped.
49. This would require long-term collaboration with relevant organisations with an interest in supporting intermediate technical education and technician-level roles. Examples include

Gatsby, The Science Council and other professional bodies involved in supporting technician status.

50. Regarding general careers advice, there is an opportunity to engage with the National Careers Service, the Careers Development Institute and Careers England to communicate clear messages about intermediate technical qualifications.

Higher apprenticeships

51. The use of intermediate technical qualification as components of higher apprenticeships is perhaps the most immediate, as well as an extremely efficient, vehicle for stimulating demand and take-up. Current government skills policy continues to promote apprenticeships, with a specific emphasis on higher and degree-level apprenticeships. Trailblazer groups are currently involved in designing apprenticeship standards, with higher and degree-level programmes being targeted at Level 4+. As a component of these programmes, intermediate technical qualifications can provide the required technical knowledge and competency aspects of training.
52. **Consideration might be given to branding technical higher apprentices appropriately – e.g. as ‘Technician Higher Apprenticeships’.**
53. This action will require liaising closely with the Department for Business, Industry & Skills (BIS) and the National Apprenticeships Service to encourage the inclusion of intermediate technical qualifications in relevant apprenticeship standards.

Publicising intermediate technical education

54. One action that requires consistency over time involves active promotion of intermediate technical qualifications: HNCs, HNDs, foundation degrees, etc. Employers strongly favour promotion of these types of qualifications with some suggesting there may be a role for employer endorsement. They stressed however that the definitional issue and clear branding were prerequisites.
55. Mechanisms for communicating promotional messages about qualifications could include industrial partnerships with professional bodies. Employer organisations such as the Federation of Small Businesses and local Chambers of Commerce should also be considered as useful conduits to reach employers.

Supporting providers in engaging with employers

56. Some providers will struggle to engage successfully with local employers for the purposes of increasing awareness and understanding and of stimulating engagement and take-up. Support could usefully be designed to help instigate relationships, such as through case studies and toolkits highlighting good practice in involving employers in the design of intermediate technical qualifications. The examples included in the appendices could be expanded for this purpose.

57. There will also be value in employers being guided to be clearer in promoting their needs to providers, for example on the types of skills and experience employers require of workers when recruiting to technician-level roles.
58. The support of providers might also be extremely valuable to employers for advertising their vacancies in the most effective ways – for example using the ‘technician’ appellation.

Engage with National Colleges

59. The National Colleges are promoting a ‘hub and spoke’ model of delivery to make qualifications accessible to learners and reduce the burden on employers. Consideration should be given to working with the National Colleges on their skills agenda to ensure the use and promotion of existing intermediate technical qualifications. A direct relationship between HEFCE and the National Colleges will also help to introduce clarity about exactly how these will work and the potential implications for redirecting funding away from universities.

Further research

Assess capacity and infrastructure

60. The lack of adequate definitions makes accurate statistics of technician roles and qualifications impossible. Further research should be conducted to establish reliable data on these roles and qualifications (taking into account the confusion of types of intermediate role in the existing SOC structure).
61. Provision of technical courses is usually more expensive than other types of provision. Should demand for intermediate technical qualifications be stimulated, providers must be able to respond adequately. The capacity and infrastructure available within providers should be examined to understand how well they may be able to meet demand, the barriers and opportunities.

Learners

62. Consider investigating demand with learners and potential learners to better understand the influencing factors. Areas for investigation could include:
 - Levels of awareness of intermediate technical qualifications amongst potential learners, school and college learners and views on the value and purpose of these qualifications;
 - Factors considered by learners when making decisions about which types of courses to study; factors that might influence demand for intermediate technical qualifications;
 - Destinations of graduates with intermediate technical qualifications to assess skills utilisation and perceptions of their value.

Introduction

Intermediate higher education in England

63. For the purposes of this study, intermediate higher education comprises qualifications at Levels 4¹¹ and 5¹² on the Framework for Higher Education Qualification (FHEQ) in England, Wales and Northern Ireland.¹³ These qualifications are also described as ‘other undergraduate’ (OUG) qualifications and are:

- Higher National Certificates (HNCs);
- Higher National Diplomas (HNDs);
- Diplomas of Higher Education (DipHEs);
- Foundation Degrees (Fds).

64. A diagram of the Framework is included in Appendix A.

65. Higher Nationals (HNDs and HNCs) and foundation degrees have a vocational focus. They typically take between one and four years to complete, depending on the mode of study and can be completed flexibly through part-time or full-time learning at a higher education institution (HEI), or a further education college (FEC) or an alternative provider. They are intended to appeal to learners who are looking to enter a particular profession, those in work looking to upskill or those wishing to pursue Continuing Professional Development (CPD).

Foundation Degrees

Foundation degrees were introduced by the former Department for Education and Skills (DfES) in 2000. The policy intention was for them to be developed by partnerships of employers and providers to meet a perceived shortfall in the numbers of people qualified at intermediate level, and to meet the aspirations of widening participation in HE.^{14,15}

In addition to employer engagement, the distinctive features of foundation degrees include:

¹¹ Defined as: Students awarded Level 4 qualifications will be able to evaluate the appropriateness of different approaches to solving problems related to their area(s) of study and/or work; communicate the results of their study/work accurately and reliably, and with structured and coherent arguments; undertake further training and develop new skills within a structured and managed environment.

¹² Defined as: Students awarded Level 5 qualifications will be able to use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis; effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively; undertake further training, develop existing skills and acquire new competences that will enable them to assume significant responsibility within organisations.

¹³ Quality Assurance Agency for Higher Education (2008) *The framework for higher education qualifications in England, Wales and Northern Ireland*, QAA

¹⁴ Greenwood, M et al (2008) *Report to Foundation Degree Forward on the Impact of Foundation Degrees on Students and the Workplace*, Centre for Higher Education Research and Information; Open University; Learning and Skills Network

¹⁵ Department for Education and Employment (2000) *Foundation Degrees Consultation Paper*. DfEE

- The possibility for learners to progress on to other HE awards;
- For them to be achieved flexibly (e.g. through part-time and distance learning); and
- delivered in partnerships of education providers (i.e. between HEIs and FECs).

Whilst separately none of these features is unique to the foundation degree, in combination and with the underpinning element of work-based learning, they are a distinct qualification.¹⁶

Graduates of foundation degrees are able to progress onto a full bachelor's degree, or go on to study professional qualifications or higher level National Vocational Qualifications (NVQs).

66. DipHEs are usually available in subjects which enable students to access a profession upon completion. They are equivalent to the first two years of a degree.
67. An HNC can be converted to an HND with further study; HNDs, foundation degrees and DipHEs can be converted to a full bachelor's degree with additional years' study.
68. Higher and degree-level apprenticeships are also relevant in this context because of their potential inclusion of intermediate qualifications. Apprenticeships usually consist of a package of features which combine on- and off-the-job training and must include one or more nationally recognised qualifications which address occupational competence and technical knowledge.¹⁷ Higher Nationals and foundation degrees can and do therefore feature as component parts of higher apprenticeships.
69. The purpose of this research was to focus on intermediate technical qualifications; we have broadly defined these qualifications as covering Science, Engineering, Technology and Mathematics (STEM) subjects¹⁸.

About this research

70. In spring 2015, Pye Tait Consulting was commissioned by the Higher Education Funding Council for England (HEFCE) to conduct an exploratory piece of work investigating employer demand for intermediate technical education in England.
71. The central aim was: *"To test the hypothesis that there is, or will be, unmet demand for intermediate technical education in HE, and to identify the impact of previous Government initiatives in this area."*¹⁹

¹⁶ Quality Assurance Agency for Higher Education (2014) *Foundation Degree Characteristics, Draft for Consultation, UK Quality Code for Higher Education, Part A: Setting and Maintaining Academic Standards*

¹⁷ Department for Business, Innovation and Skills (2015) *Specification of Apprenticeship Standards for England (SASE)*

¹⁸ For the purpose of this research, technical subjects include all of those contained within HEFCE's definition of STEM. This definition includes the following subjects: Anatomy and physiology; Biological sciences; Chemistry; Computer sciences; Earth, marine and environmental sciences; Engineering and technology; Mathematical sciences; Pharmacy and pharmacology; and Physics.

¹⁹ From HEFCE's Invitation to Tender

72. This work was instigated in response to a number of factors, including the documented decline²⁰ in the take-up of intermediate technical education and the growing attention given to, and importance placed on, intermediate-level job roles in the economy. The Government's Industrial Strategy^{21,22} developed by the Coalition, brought to the fore the importance of intermediate level roles focusing on a select number of sectors of high value to the UK economy, and in which Government identified it could make the most difference. These sectors use high levels of technology and rely on high levels of innovation, knowledge and skills.
73. The research has focused on investigating the potential demand for intermediate technical education in five priority sectors:
- Aerospace;
 - Construction;
 - Energy;
 - Information Economy;
 - Life Sciences.
74. The sectors were chosen to ensure coverage of a range of economic activities with different characteristics: for example, differences in the number of businesses; numbers employed, and the economic contribution of each of the sectors.
75. The work was conducted using a mixed-method approach of:
- A literature review;
 - Forty depth interviews with stakeholders within further education (FE) and higher education (HE), as well as with sector bodies such as professional institutes, trade associations and others involved in technical education;
 - A survey of over 500 employers in the five sectors;
 - A series of 50 follow-up interviews with employers who took part in the survey;
 - Depth interviews were also undertaken with 20 providers with the highest take-up of intermediate technical education.

Full details of the methodological approach are included in Appendix B.

²⁰ HEFCE (2014) *Undergraduate courses other than first degrees, An analysis of recent trends*, HEFCE

²¹ Industrial Strategy is described by Government as a “long-term, whole-of-government approach to support economic growth”. It has five main strands: skills; technologies; access to finance; government procurement; sectors.

²² HM Government (2013) Industrial Strategy, Government and industry working in partnership:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/364455/industrial-strategy-booklet-3.pdf

Intermediate technical qualifications

Current availability of intermediate technical qualifications

Foundation degrees

76. Whichever source is used – the UCAS website or UNISTATS – technical/STEM-related courses^{23,24} account for approximately 19% of all foundation degree courses available in England.²⁵ That is around 440 courses, of which some 320 or so are within the scope of the current research.
77. There are over 320 courses relating to the five sectors covered by this study; those in IT-related disciplines being most numerous (183 courses²⁶). Courses related specifically to the other four sectors are far less prevalent, particularly in specialist sectors such as aerospace (12 courses²⁷) and energy (14 courses²⁸). The research identified 60 construction-related courses²⁹ and 52 covering life-science disciplines.³⁰

Higher Nationals and Diplomas of Higher Education

78. Business and Technology Education Council (BTEC) Higher Nationals (HNCs and HNDs) – awarded in England by Pearson UK³¹ – are available in 40 different subjects. In terms of technical subjects, these include Applied Biology and Applied Chemistry as well as those in more vocational areas including Construction and the Built Environment, Aeronautical Engineering and Manufacturing Engineering.

²³ By ‘courses’ we mean the numbers of discrete programmes offered at HEIs and FECs in England.

²⁴ UCAS ‘Foundation Degree Course Search’: http://fd.ucas.com/CourseSearch/Default.aspx#results_new

²⁵ From the UNISTATS website page ‘Which course features are you interested in?’: <http://unistats.direct.gov.uk/course-assistant/>

²⁶ Search criteria: Applied computer studies; business computing; business information technology; computer applications; computer communication; computer engineering; computer games; computer graphics; computer information systems; computer management studies; computer networking; computer networks; computer programming; computer science; computer studies; computer systems engineering; computers; forensic computing; information science; information studies; information systems; information technology; management information systems; software engineering; technology; web design.

²⁷ Search criteria: Aeronautical Engineering; Aerospace Engineering; Aircraft Engineering; Aircraft Maintenance; Aviation.

²⁸ Search criteria: energy; energy efficiency; energy engineering; energy studies; nuclear engineering; offshore engineering; power engineering; power systems technology; waste engineering.

²⁹ Search criteria: Architectural building studies; architectural conservation; architectural technology; architecture; building; building maintenance; building management; building services; building surveying; building technician studies; built environment; civil engineering; construction; construction management; construction technology; electrical installation work; electrical systems; structural engineering.

³⁰ Search criteria: animal biology; animal science; applied biology; biochemistry; biological sciences; biology; biomedical sciences; biotechnology; human biology; marine biology; medical biochemistry; medical chemistry; medical physics; microbiology; pharmacology; pharmaceutical sciences; physiology; science; zoology.

³¹ BTEC Qualifications are developed by the awarding organisation Pearson UK. As well as HNCs and HNDs, there are also Firsts (Level 2), Nationals (Level 2), Foundation (Levels 3-4), Specialist and Professional (Levels 4-7) Diplomas offered under the BTEC brand.

79. According to the UNISTATS website, there are 316 technical/STEM-related HND courses offered in England (approximately 33% of all HND courses in England), and 13 technical/STEM-related courses classified as OUG (approximately 9% of all OUG courses in England).^{32,33}

Higher and Degree Apprenticeships

80. Apprenticeships are designed as an apprenticeship ‘framework’, which contains: details of entry conditions; qualifications the apprentice will complete; the transferable skills which will be developed and how the apprenticeship will be delivered. The framework also includes information on which job roles are covered by the apprenticeship, and the sorts of roles the apprentice might progress to, on completion.

81. Table 1 illustrates the number of frameworks currently available in England at Level 4+, and those of a technical nature within scope of this study.³⁴

Table 1: Apprenticeship frameworks in England at Level 4+

Framework level	Total number	‘Technical’
Level 4	35	11
Level 5	15	5
Level 6	3	2
Level 7	1	-
Total	54	18

82. New types of apprenticeships, designed by groups of employers, called ‘Trailblazers’, are currently in development. To date, 13 new apprenticeship ‘standards’ – which replace ‘frameworks’ – are ready for delivery at Level 4+.³⁵ These are listed in Table 2.

³² ‘OUG’ courses include Certificates and Diplomas of Higher Education

³³ From the UNISTATS website page ‘Which course features are you interested in?’ <http://unistats.direct.gov.uk/course-assistant/>

³⁴ This information has been taken from a search of the Apprenticeships Framework Online database: <http://www.afo.sscalliance.org/frameworkslibrary/index.cfm#current>

³⁵ Apprenticeships.gov (no date) *List of apprenticeship standards ready for delivery*, from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/440035/List_of_apprenticeship_standards_ready_for_delivery.pdf

Table 2: New Trailblazer standards at Level 4+

Sector	Apprenticeship standard	Level
Actuarial	Actuarial Technician	4
Automotive	Control/Technical Support Engineer	6
Automotive	Electrical/Electronic Technical Support Engineer	6
Automotive	Manufacturing Engineer	6
Automotive	Product Design and Development Engineer	6
Dental Health	Dental Technician	5
Dental Health	Dentist Practice Manager	4
Digital Industries	Network Engineer	4
Digital Industries	Software Developer	4
Digital Industries	Degree Apprenticeship Technology Solutions	6
Financial Services	Relationship Manager (Banking)	6
Financial Services	Investment Operations Specialist	4
Nuclear	Nuclear Welding Inspection Technician	4

Qualification trends

Intermediate qualifications in HE and FE

83. In recent years, there has been a marked decline in the take-up of intermediate qualifications. Full-time equivalent (FTE) entrants registered at English HEIs and FECs have declined by 45% between 2009-10 and 2013-14 (Figure 1).³⁶
84. The sharpest decline was in foundation degrees, the take-up of which dropped from a peak of 44,992 in 2009-10 to 31,261 in 2013-14: a fall of 31%. The take-up of HNDs also slowed during this period, although the fall was less dramatic (16%). The HEFCE report *'Undergraduate courses other than first degrees, An analysis of recent trends'* suggested that the introduction of foundation degrees appears to have contributed to this accelerated decline as many existing HNDs were converted into foundation degrees.³⁷
85. Conversely HNCs saw some growth of c. 30% over the same period (from a comparatively low base of 5,100 in 2009-10) (Figure 1).
86. This is set against a backdrop of growing numbers of FTE entrants onto undergraduate programmes. In 2013-14 there were 404,933 entrants onto undergraduate programmes, following a peak of 418,189 in 2011-12 (Figure 1).

Intermediate qualifications in FE

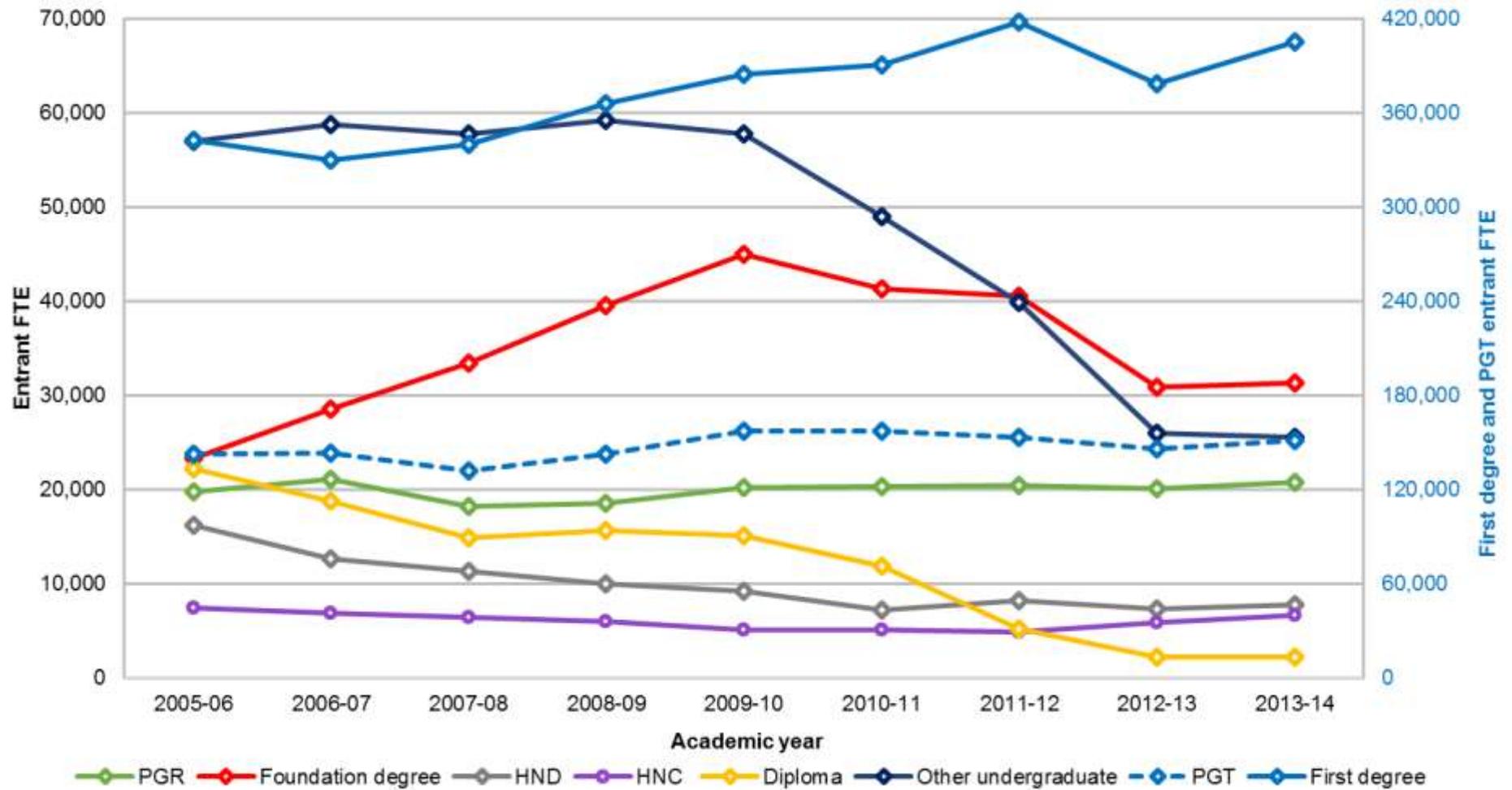
87. In contrast to the overall picture of decline, HEFCE analysis found the take-up of intermediate qualifications in FECs increased during 2010-11 and 2012-13, resulting in a slight compensatory effect. The numbers registering at FECs increased by 5,000 during this period: composed of 3,000 entrants to foundation degree courses and 2,000 additional entrants to HNDs.³⁸

³⁶ The figure of 45% is derived from data on foundation degrees, HNDs, HNCs, Diplomas and OUG courses.

³⁷ HEFCE (2014) *Undergraduate courses other than first degrees, An analysis of recent trends*, HEFCE

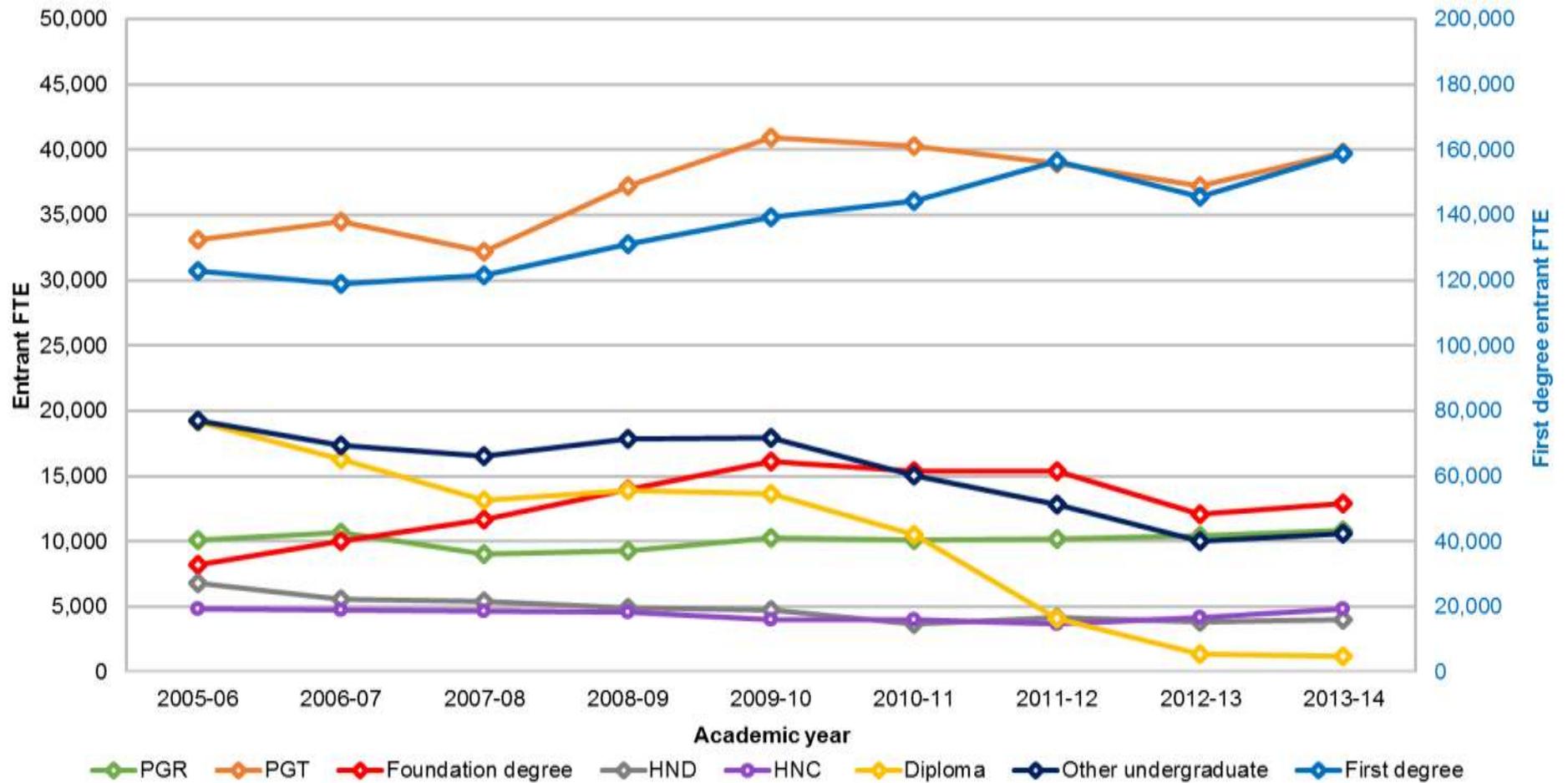
³⁸ Ibid.

Figure 1: Numbers of FTE students registered at publicly funded HEIs and FECs between 2005-06 and 2013-14: all subjects and levels



* First degree and PGT entrants (blue lines) plotted against the right hand axis.

Figure 2: Numbers of FTE students registered at publicly funded HEIs and FECs between 2005-06 and 2013-14: technical subjects – all levels



* First degree entrants (blue line) plotted against the right hand axis.

Intermediate technical qualifications

88. In terms of intermediate technical subjects (i.e. those classified as STEM) studied in HEIs and FECs, take-up fell from a high of 56,344 FTEs in 2009-10, to 33,638 in 2013-14: a decrease of almost 40% (Figure 2).
89. The sharpest decline in technical subjects was in diploma courses: a fall of 91% between 2009-10 and 2013-14.

Higher Nationals Diplomas³⁹

90. In aggregate terms HNDs in technical subjects dropped in take-up by some 40% during the period 2005-06 to 2013-14 (Figure 2). The fall was most substantial between 2005-06, and 2009-10, with take-up fairly steady over the next four years; this is in contrast to the picture for all HND courses (which declined), indicating a downturn in the popularity of non-technical HND subjects.
91. Between 2005-06 and 2013-14 the most substantial fall was in the following HND technical subjects (Figure 13):
 - Architecture, building and planning (61%);
 - Computer science (55%);
 - Agriculture and related subjects (53%);
 - Physical sciences (45%).

Higher National Certificates⁴⁰

92. Overall, the numbers of FTE students on technical HNC courses remained fairly static over the period 2005-06 to 2013-14, with low points in 2009-10 and 2011-12 (Figure 14).
93. Against this backdrop, there is a high degree of variation by subject (Figure 14). For example:
 - From a high of 1,825 in 2007-08, FTE entrants onto architecture, building and planning courses had fallen by 61% by 2013-14;
 - Entrants to agriculture and related subjects also saw a fairly steady fall of 50% over the same period.
94. In contrast, FTE entrants to engineering and technology HNCs rose by a total of 29% from 2,313 in 2005-06 to 3,003 in 2013-14 (following a slight dip in 2007-08). Two other technical subjects also saw a net increase: subjects allied to medicine, and biological sciences (Figure 14).

³⁹ Please see Appendix C for accompanying charts.

⁴⁰ Please see Appendix C for accompanying charts.

Foundation degrees⁴¹

95. Entrants to technical foundation degree courses peaked at 16,115 entrants in 2008-09, however by 2013-14 this number had fallen by 20% (Figure 2).
96. The most dramatic fall between 2009-10 and 2013-14 was in FTE entrants to Architecture, Building and Planning foundation degrees, which dropped from a peak of 1,169 to 303: a fall of 74% (Figure 15).
97. Computer Science FTE entrants fell by 36% during the same period (Figure 15).
98. FTE entrants to Biological Science foundation degrees increased steadily however. Between 2005-06 and 2013-14, the numbers of entrants rose by 55%, belying the sharp slump in entrants to most other foundation degree subjects.

Other undergraduate⁴²

99. Take-up of OUG technical programmes (this includes institutional credit and certificates) declined almost continually (despite a slight peak between 2007-08 and 2008-09) between 2005-06 and 2013-14 (Figure 16). Student numbers dropped by 45% (net) during this period, with the most sizeable declines being in:
 - Computer Science (89%);
 - Mathematical Sciences (63%);
 - Physical Sciences (61%);
 - Subjects allied to Medicine (43%).
100. Only one technical subject saw growth: numbers of FTE entrants to Agriculture and related subjects increased by just over 100% (net) between 2005-06 and 2013-14 (Figure 16).

Mature and part-time learners

101. The balance of entrants to technical subjects is weighted heavily in favour of mature learners, with the exception of Chemistry and Material science. A number of subjects have seen a steady fall in the number of mature entrants since 2008-09 and 2009-10 (Engineering and technology; Anatomy, physiology and pathology; Pharmacology, toxicology and pharmacy; and Biological sciences), with all others seeing a fairly steady decline over the entire ten year period 2002-03 to 2013-14.⁴³

⁴¹ Please see Appendix C for accompanying charts.

⁴² Please see Appendix C for accompanying charts.

⁴³ HEFCE interactive tool 'Time series of other undergraduates in higher education subjects': <http://www.hefce.ac.uk/analysis/supplydemand/oug/>

102. As a comparison, the number of mature entrants to all OUG programmes fell steadily between 2005-06 and 2013-14 by a total of 66%; the number of entrants in the under-21 age group (classified by HEFCE as 'young') declined by 40% over the same period.⁴⁴

Summary

Intermediate qualifications are available in various subjects; the balance of technical and non-technical varies by qualification type: for example technical subjects account for 19% of all foundation degrees courses offered in England, in contrast to c. 30% of all Higher National courses.

There are presently few higher apprenticeship frameworks available in technical subjects – 18 in total. More are being developed through apprenticeship Trailblazers, including nine specifically for Technicians (at Levels 3-5). As the numbers of available standards continue to increase this may lead to an expansion in take-up and this is certainly the intention of Government, policy being geared towards a further three million apprenticeship starts by 2020.

The take-up of intermediate qualifications at HEIs and FECs is declining, dropping by 45% between 2009-10 and 2013-14; this is in large part accounted for by a decline in foundation degrees. This is in contrast to growing numbers of entrants to undergraduate degrees.

The average decline in technical intermediate qualification was almost 40% (2009-10 to 2013-14). Although foundation degrees suffered substantial losses, entrants to diplomas in technical subjects fell by as much as 91% during the same period.

Entrants to HNDs are also declining, however the fall is most notable in non-technical subjects; the patterns of take-up of HNCs are more complex, with an increase in popularity of engineering and technology courses.

Subjects suffering the greatest losses (across different types of intermediate qualifications) include:

- Architecture, Building and Planning;
- Computer Science.

⁴⁴ Ibid.

“Whilst many colleges and providers have long and established records in offering Level 4 technical and professional qualifications, this has been a neglected area in policy terms for some time, particularly around what has become known as ‘non-prescribed higher education’.”

Department for Business Innovation and Skills (2011) *New Challenges, New Chances: Further Education and Skills System Reform Plan*

103. Over the 15 years since the introduction of foundation degrees, policy on intermediate qualifications has remained largely static while the wider educational landscape in both FE and HE has changed tremendously.
104. Intermediate technical education has, arguably, fallen between two stools, occupying as it does a position somewhere between FE and HE and therefore being influenced indirectly by policy decisions on both sides of that divide.
105. Many intermediate technical qualifications are delivered by FECs through franchising arrangements with HEIs who validate the courses; some FECs validate and award their own qualifications (such as providers with Foundation Degree Awarding Power (FDAP)) and some have their awards accredited by an awarding organisation (AO), such as Pearson in the case of BTEC Higher Nationals. In some cases HEIs will develop, deliver and award their own programmes. It is a mixed picture of provision across the country.
106. This complex relationship between FECs and HEIs has existed for many years, as far back as the 1950s.⁴⁵ In the late 1990s however, FECs were encouraged to expand their HE provision as recommended by the Dearing Inquiry, which suggested that Government should have a long-term aim to respond to predicted growth at a ‘sub-degree’ level. The 1997 Dearing report also recommended that funding be prioritised towards institutions with a commitment to widening participation.⁴⁶
107. However, under the Labour Government established the same year, colleges adopted a different role, instead being encouraged to both collaborate and compete with universities in order to drive the expansion of HE.⁴⁷ This was very much a supply-side model which aimed to drive up participation by improving accessibility for those not previously able to access HE.

⁴⁵ Parry et al (2012) *Understanding Higher Education in Further Education Colleges*, Department for Business Innovation and Skills

⁴⁶ Dearing (1997) *Higher Education in the learning society, Main report*

⁴⁷ Parry et al (2012) *Understanding Higher Education in Further Education Colleges*, Department for Business Innovation and Skills

108. The following years saw a considerable expansion in HE provision – thanks in part to foundation degrees. One of the distinctive purposes of foundation degrees was to widen participation in HE and facilitate progression onto full undergraduate and advanced vocational programmes. The 2003 Skills Strategy White Paper acknowledged the achievement of foundation degrees in meeting their purpose and re-affirmed the then Government’s desire to increase support for higher level skills.⁴⁸ At this time, higher level skills support for technician-, higher craft- and associate professional-level roles was targeted at “*skills and qualifications to Level 3*”.^{49, 50}
109. By 2005, participation in HE was at its peak and the Government set an ambitious target of 50% for the proportion of 18-30 year olds participating in HE.⁵¹ Funding councils (HEFCE and the then Learning and Skills Council (LSC)) were encouraged to target funding appropriately to help meet employer need, illustrated within Sector Skills Agreements (SSAs). These were aimed at supporting the supply of skills provision at a local level.
110. To further boost supply, new 14-19 Diplomas (later re-badged simply as ‘Diplomas’) were introduced during the late 2000s. These new qualifications were to be delivered by consortia of schools and colleges as a means of preparing young people for employment or HE by combining academic and vocational learning with work experience.⁵² However, when the Coalition Government came to power in 2010, all new development was stopped and the full Diploma ‘entitlement’ removed.^{53,54} A small number continue to be taught.
111. Concurrently to the reform of the FE skill system, the HE sector also responded; HEFCE supported the development of foundation degrees by funding the widening participation strategy to reach the 50% target set by Government⁵⁵ and supported the delivery of foundation degrees with a 10% premium for providers in recognition of the additional costs of partnership approaches to delivery.⁵⁶ Further work was supported by HEFCE following the 2007 Leitch Review of Skills, which placed a focus on the achievement of Level 4+ skills to help the UK ‘become a world leader in skills by 2020’.⁵⁷ This work involved supporting HEIs to develop links with employers and fund additional student places, co-funded with employers.⁵⁸ Leitch made the case for investment in upskilling, due in part to the effects of an ageing population, and developing economies being increasingly dependent on their skills bases. The report identified

⁴⁸ HM Government (2003) *21st Century Skills Realising Our Potential, Individuals, Employers, Nation*

⁴⁹ Ibid

⁵⁰ Since this time ‘higher level’ in a vocational skills context is more usually associated with Level 4+ qualifications.

⁵¹ HM Government (2005) *Skills: Getting on in business, getting on at work. Part 1 NOT IN BIBLIOGRAPHY*

⁵² Department for Children Schools and Families (2007) *Delivering 14-19 Reform: Next Steps*

⁵³ The requirement to make all Diploma subjects available to all pupils.

⁵⁴ Hansard (2011) *Public Bill Committee, Tuesday 29 March 2011, Education Bill Clause 28, Repeal of diploma entitlement for 16 to 18 year olds NOT IN BIBLIOGRAPHY*

⁵⁵ Greenwood, M et al (2008) *Report to Foundation Degree Forward on the Impact of Foundation Degrees on Students and the Workplace*, Centre for Higher Education Research and Information; Open University; Learning and Skills Network

⁵⁶ Foundation Degree Forward (2004) *Foundation Degree Task Force Report to Ministers – A Summary*

⁵⁷ Department for Innovation, Universities and Skills (2007) *World Class Skills: implementing the Leitch Review of Skills in England*

⁵⁸ Greenwood, M et al (2008) *Report to Foundation Degree Forward on the Impact of Foundation Degrees on Students and the Workplace*, Centre for Higher Education Research and Information; Open University; Learning and Skills Network

the importance of intermediate skills to the UK's future prosperity, emphasising a need to improve the "esteem, quantity and quality of intermediate skills".⁵⁹

112. The trajectory of reforms to HE funding (instigated by Dearing's recommendation for scrapping maintenance grants⁶⁰) paralleled ever higher tuition fees for undergraduate courses. The £1,000 a year fee introduced in 1998 by the Labour Government⁶¹ had, by 2006, tripled,⁶² and by 2012 had tripled again up to £9,000.⁶³ Yet student numbers on undergraduate courses continued to rise over the same period, in spite of advocates of widening participation suggesting the move would deter economically disadvantaged young people from going to university.⁶⁴
113. Accompanying the increases in tuition fees were further changes to incentives. The equivalent or lower qualifications (ELQ) rule was introduced by the Labour Government in 2008-09. This stopped funding for HE students studying a second qualification at a level equal to or lower than those already held. The Government predicted this had the potential to increase by 200% the tuition fees of those starting a second degree,⁶⁵ arguably those looking to re-skill or upskill. The proposal received a hostile response from HEIs and students.⁶⁶
114. During this period, funding of foundation degrees was reviewed and fee loans for part-time study introduced. During this period co-funded student numbers were also being phased out.⁶⁷
115. All of this occurred against a backdrop of HE funding reforms first instigated in 2012-13, which meant many students met the cost of university by accessing publicly funded loans.⁶⁸ The reforms also saw changes to student number controls intended to make the allocation of student places more responsive to student choice, at the same time controlling student finance costs. The Government announced in the 2013 Autumn Statement that student number controls would be lifted in 2015 to enable a further 60,000 young people to go to university every year.⁶⁹ The controls affected HEIs and also FECs delivering HE as part of a franchising agreement. HEIs indicated to HEFCE that colleges were looking to fill their own places ahead of remaining places franchised from a university, causing some universities to review their franchised provision.⁷⁰

⁵⁹ Leitch, S (2006) *Prosperity for all in the global economy – world class skills, Final Report*. HMSO

⁶⁰ Dearing (1997) *Higher Education in the learning society*, Main report

⁶¹ As a result of the 1998 Teaching and Higher Education Act

⁶² As a result of the 2004 Higher Education Act

⁶³ From Government new article (2001) 'Changes to tuition fees and higher education':

<https://www.gov.uk/government/news/changes-to-tuition-fees-and-higher-education>

⁶⁴ Dearden et al (2010) *BIS Research Paper Number 11, The Impact of Higher Education Finance on University Participation in the UK*, BIS

⁶⁵ House of Commons (2008) *Withdrawal of funding for equivalent or lower level qualifications (ELQs); Third Report of Session 2007-08, Volume 1*

⁶⁶ *Ibid*

⁶⁷ HEFCE (2014) *Pressure from all sides, Economic and policy influences on part-time higher education*

⁶⁸ HEFCE (2013) *Higher education in England - Impact of the 2012 reforms*

⁶⁹ HM Treasury (2013) *Autumn Statement 2013*

⁷⁰ HEFCE (2013) *Higher education in England - Impact of the 2012 reforms*

116. During this period immediately after the depths of the economic recession, interest turned again to employer co-investment, particularly in the FE sector, which was also undergoing reform. The move was partly driven by a desire by the Coalition Government to delegate certain responsibilities from the machinery of Government and give employers the opportunity to influence provision, achieving closer relationships between supply and demand.
117. Local Enterprise Partnerships (LEPs) are also now a component of the employer-led agenda. Each of the 39 LEPs is run by a group of local employers on the basis of local economic priorities. A key part of this is developing local skills policies.⁷¹ The devolved approach to determining local skills strategy is currently being taken forward through the current Government's *Localism in Skills* agenda. Councils, LEPs and Combined Authorities are encouraged to work together to address skills issues, including an ageing workforce and adult skills gaps.⁷²
118. The UK Commission for Employment and Skills (UKCES) is also helping to drive the employer-led agenda in the vocational skills arena, managing the implementation of two funding competitions: the Employer Investment Fund (EIF) and the Growth and Innovation Fund (GIF) as part of their Employer Ownership of Skills (EOS) policy. The funds aimed at employers, employer-led bodies, and Sector Skills Councils (SSCs) called for innovative, co-funded proposals for skills solutions. Successful bids were in alignment with the Government's Industrial Strategy, with many focused on apprenticeships and the development of higher level skills.⁷³
119. Apprenticeships continue to be a key component of the current Government's skills agenda. Given new impetus by the last Labour Government, apprenticeship numbers expanded rapidly over the last decade or so with a very large increase between 2009-10 and 2010-11 mainly accounted for by those aged 25 and over.⁷⁴ Higher apprenticeships – leading to Level 4+ qualifications – were introduced in 2006-07, and in 2014-15 accounted for 3% of all apprenticeship starts (approximately 7,000 learners).⁷⁵ These higher apprenticeship learning programmes must include a higher level qualification, such as an HNC/D, foundation degree or NVQ.
120. Current reforms to apprenticeships centre on a new, simplified approach to their specification, led by groups of employers. These 'Trailblazer' groups are developing apprenticeships at different levels, including Higher and new Degree Apprenticeships in various sectors including aerospace, automotive, construction and digital industries.⁷⁶ New mechanisms for funding

⁷¹ UK Government (2015) *Policy paper, 2010 to 2015 government policy: Local Enterprise Partnerships (LEPs) and enterprise zone* NOT IN BIBLIOGRAPHY

⁷² NIACE (2015) *2015 Localism Prospectus for Local Enterprise Partnerships, Combined Authorities and Local Government*

⁷³ The full list of projects funded by Employer Ownership of Skills is available via the archived UKCES website:

<http://webarchive.nationalarchives.gov.uk/20140108090250/http://www.ukces.org.uk/ourwork/investment/portfolio>

⁷⁴ House of Commons (2015) *Briefing Paper number 06113, Apprenticeship Statistics: England* NOT IN BIBLIOGRAPHY

⁷⁵ Ibid

⁷⁶ Department for Business, Innovation & Skills (2015) *Apprenticeship Reforms – progress so far*

apprenticeships – routing funds through employers – are also being trialled in 2014-15, with an apprenticeship levy on large employers to be introduced.⁷⁷

121. Proposals currently being consulted on suggest the levy will be calculated on the basis of employee earnings; this would be paid through their PAYE return to HMRC. The overarching intent behind the levy is one of simplification, and employer ownership.⁷⁸

122. Higher level skills development is also an aim of the fledgling network of National Colleges focused on sectors important to the UK economy including advanced manufacturing, digital, wind energy and creative industries. The National Colleges aim to have capacity to train 10,000 students by 2020, and are being funded over two academic years by £80 million of Government capital funding, matched by employers.⁷⁹ It comes on the back of the Government's 'Call for Engagement' during the summer of 2014, which acknowledged the value of higher level vocational education pathways in supplying the economy with the skilled individuals that employers need.⁸⁰ Although the call for engagement stresses the importance of collaborative relationships between employers, universities, FECs, University Technical Colleges (UTCs) and schools, the scope of the initiative is focused largely on the FE sector.

Summary

In the last decade or so, education policy has evolved considerably. A notable shift has occurred from an arguably supply-centred model to one very much focused on demand-led provision, accompanied by significant and progressive funding reform.

At the start of the new millennium, the policy intent around support for intermediate level skills was clear, with the determination that foundation degrees would respond to recognised technical skills shortages in the labour market. Government and other commentators continued to stress the importance of intermediate skills over the next few years and, through landmark papers such as Leitch and Wolf, support was given for upskilling to meet the demands of a modern, dynamic economy.

However, following the attention given to this policy area during the early to mid-2000s, focus on intermediate programmes was arguably a victim of wider HE policy reforms: the unintended consequence of increasing tuition fees, funding reviews and changes to student numbers caps.

A decline in take-up of intermediate programmes was perhaps inevitable, considering the accompanying adoption by the FE sector of Level 3 as the 'gold standard'.

⁷⁷ From the gov.uk website 'Summer Budget 2015: key announcements' 08/07/15:

<https://www.gov.uk/government/news/summer-budget-2015-key-announcements>

⁷⁸ Department for Business, Innovation & Skills (2015) Apprenticeship Levy, Employer Owned Apprenticeship Training. Department for Business Innovation & Skills.

⁷⁹ UK Government (2014) *Press release: Cable: new generation of National Colleges will lead revolution in hi-tech skills:*

<https://www.gov.uk/government/news/cable-new-generation-of-national-colleges-will-lead-revolution-in-hi-tech-skills>

⁸⁰ UK Government (2014) *National Colleges – a call for engagement NOT IN BIBLIOGRAPHY*

Cut to 2015: intermediate, Level 4+ and 'degree level' provision is once again a focal point. Trailblazer apprenticeships, National Colleges and UTCs are creating opportunities for expanding technical provision at this level. The Government has confirmed its support for the growth in intermediate technical skills through industrial strategy, as well as the Productivity Plan and in the 2014 Autumn Statement – most significantly in its commitment to create over three million new apprenticeship starts over the next five years.

A timelined policy summary is provided in Appendix D.

Intermediate technical occupational roles

The characteristics of intermediate technical roles

123. Roles for which intermediate level technical education may be appropriate vary by sector and size of organisation.

124. Many roles at an intermediate level within technical sectors (such as those within the scope of this study) can be described as technician level or performing a technical support function. There will also be many other roles that are not technical in nature, such as those in administration, and marketing functions. Examples of technical roles at intermediate level are listed in Table 3.

Table 3: Example Technician roles in technical sectors

Sector	Role
Aerospace	Engineering Technician Aircraft Technician Electrical Technician
Construction	Architectural Technician Computer Aided Design (CAD) Technician Building Service Technician (e.g. Electrical, Plumbing)
Energy	Nuclear Chemistry Technician Sustainable/Renewable Energy Technician Wind Turbine Technician
Information economy	IT Support Technician Telecommunications Technician Computer Technician
Life sciences	Scientific Laboratory Technician Animal Technician Process Technician

125. In some sectors – such as energy – there are well-recognised intermediate-level qualification routes for mid-level roles, such as those in safety-critical occupations. Examples include qualifications with a ‘time-served’ element, such as HNCs for Nuclear Engineer/Technician roles, and Competent Persons in sectors such as electrical and renewables. Competent Persons are mainly in the construction sector, and allow workers to self-certify certain types of building work.

126. It is, however, extremely challenging to create exact matches between qualifications and job roles. Research conducted on behalf of the Gatsby Charitable Foundation found weak links between qualifications and specific occupations and less sectoral linkage in the employment of Science Engineering and Technology (SET) technicians in the UK than in other EU countries.⁸¹

⁸¹ Kelly, S (2011) *Defining skills need: The role of recognition of technician status*, Gatsby Charitable Foundation

127. The latter research made a distinction between Level 3 and Level 4 Technicians, concluding however that, although both of these occupational levels are generally thought of as requiring ‘sub-degree-level’ qualifications, many are in reality qualified to degree level.⁸²
128. Research suggests that inconsistent use of job titles can also create issues, recommending the consistent use of “*sector and qualification specific job titles in order to simplify reliable labour market information*”.⁸³
129. Recent attempts to introduce consistency, and recognition of, technician occupations in the UK have been led by bodies such as the Science Council and Gatsby. The creation of the Technician Council in 2010 is testament to this, with the employer-led organisation launching a new ‘Technician Status’, as described in Figure 3.

Figure 3: ‘Technician status’^{84 85,86,87}

Registered Engineering Technician (EngTech)	Registered Science Technician (RSciTech)	Registered IT Technician (RITTech)
<ul style="list-style-type: none"> •A scheme licensed by the Engineering Council, which provides professional recognition for those working in technician roles in engineering. •Three professional bodies are leading on a campaign (EngTechNow) to promote the profession - and recognition of the role. •The campaign is intended to support employers in raising the status of their technician staff and to identify the benefits of professional recognition. 	<ul style="list-style-type: none"> •The Science Council in 2010 introduced a new status for science technicians: the RSciTech, or ‘Registered Science Technician’. •Registered individuals are awarded professional status through their own professional membership body, which is then licensed by the Science Council. 	<ul style="list-style-type: none"> •The BCS, the Chartered Institute for IT, is developing the very latest professional recognition for technical roles. •A new register is planned for launch in 2015 following the development of standards for recognition. It is aligned with the new apprenticeship in IT.

⁸² Jagger et al (2010) *SET Based Technicians, Lessons from the UK and European Labour Force Surveys*

⁸³ Ibid

⁸⁴ From the Gatsby Foundation’s website: ‘Professional Registration for Technicians’:

<http://www.gatsby.org.uk/education/programmes/professional-registration-for-technicians>

⁸⁵ Membership bodies include: The Institute of Biomedical Science (IBMS); The Institute of Science and Technology (IST); The Association for Science Education (ASE); The Institution of Chemical Engineers (IChemE); The Institute of Water; The Institute of Physics and Engineering in Medicine (IPEM); The Institute of Materials, Minerals and Mining (IOM³); The Institute of Food Science and Technology (IFST); The Society of Biology; The Royal Society of Chemistry

⁸⁶ From the Science Council’s website, ‘Our Activities’, Professional Registration:

<http://www.sciencecouncil.org/professional> (accessed 06/07/2015)

⁸⁷ From the Gatsby Foundation’s website: ‘Professional Registration for Technicians’:

<http://www.gatsby.org.uk/education/programmes/professional-registration-for-technicians>

The need for intermediate technical roles

130. Much of the attention paid to the role of technicians stems from labour market intelligence projections which suggest demand for skilled individuals in these roles will increase in coming years. There has also been significant attention paid in recent years to the need to develop a 'knowledge-based' economy focusing on intermediate and higher-level technical and STEM skills (e.g. Coalition Government statements in 2013 and 2014 and the Report by the Work Foundation in 2010⁸⁸).

131. Various sources support the prediction. For example:

- Growing demand for 'mid-level technical skills' is supported by the Institute for Public Policy Research; their estimate puts the forecast net demand for science, research, engineering and technology professionals and associate professionals at in excess of 1.1 million by 2022.⁸⁹
- EngineeringUK predicts a need for 366,000 engineering technicians and machine and transport operatives in the transport sectors by 2017; plus an additional 389,000 engineering technicians and other skilled trades by 2017 in the construction sector.⁹⁰
- Research quoted by the Science Council in 2012, predicted a requirement for 450,000 extra technicians in the UK by 2020.⁹¹
- The Edge Foundation also supports the contention of a general increase in demand for jobs requiring high-level technical skills and qualifications, but attributes this to an increase in the proportion of managers, professionals and associate professionals, as well as technician roles.⁹²

132. One of the primary sources of projections of future growth in technician-level roles is the data produced by Working Futures. Working Futures reports are "*quantitative assessments of employment prospects in the UK labour market*". They have been conducted over a ten-year period. Each report provides a ten-year forecast, the results of which are intended to provide a "*sound statistical foundation for reflection and debate*" and are based on official Government data including the Labour Force Survey (LFS).⁹³

⁸⁸ The Work Foundation (2010) *The Knowledge Economy Strategy*, The Work Foundation NOT IN BIBLIOGRAPHY

⁸⁹ Institute for Public Policy Research (2014). 'Winning the Global Race'. Available at:

http://www.ippr.org/assets/media/publications/pdf/winning-global-race_June2014.pdf

⁹⁰ EngineeringUK (no date) article *Over half a million new engineering and manufacturing workers needed by 2017*

http://www.engineeringuk.com/View/?con_id=130

⁹¹ Science Council (2012) *Media Release Science Council answers call to develop the technician workforce in the UK*, Science Council

⁹² The Edge Foundation (2008) *Charting the vocational landscape*, The Edge Foundation

⁹³ Wilson et al (2014) *Working Futures 2012-2022*, UKCES

133. Working Futures 2012-2022 states as one of its key messages: “*While intermediate skill level roles are in overall decline, the task of replacing those exiting the workforce ensures that large numbers of job openings will exist across the skills range, including in manufacturing industries and skilled trade occupations*”.⁹⁴ Where intermediate, or technician-level, roles are projected to increase this is not necessarily going to be as a result of growth, but in response to replacement demand.

134. Whilst the data provide interesting possible future scenarios for future jobs, there are a number of caveats that need to be borne in mind when using the data to make predictions about technicians, in particular:

- ‘Technicians’ in the UK are not always clearly and consistently defined. References to this role can be found at Level 3 and Level 4 of the qualifications framework, but job roles and titles can have different meanings in different companies and sectors. In particular, it is unclear whether employers classify technicians as ‘managerial, professional and technical’ roles as predicted in Working Futures data to increase between 2012 and 2022 or as ‘skilled trades’ predicted to decline during the same period. As the authors of Working Futures themselves point out “*what Working Futures doesn’t explore is how those categories themselves are constantly evolving*”.⁹⁵
- The labour market is changing: mid-level roles which would traditionally have required an intermediate-level qualification are now being increasingly filled by graduates,⁹⁶ meaning that job roles and the way they are defined are also likely to be changing.

135. Whilst some of the data associate an increase in demand for associate professional roles with an increase in technicians in the labour market, findings by Gatsby cast some doubt on this. For example, the report ‘*Science and Engineering Technicians in the UK Economy*’, suggests that only 30% of SET Technicians are to be found in associate professional occupations and 70% in skilled trades occupations.⁹⁷ UK Working Futures data forecast employment demand in the latter occupations to decline over the next seven years (up to 2022).

136. Conversely, the BIS *Plan for Growth: Science and Innovation* suggests “*the UK has an above average proportion of the workforce equipped with the skills to face a technology-rich environment*”.^{98,99} The paper draws on OECD rankings and Programme for International Student Assessment (PISA) results of the UK’s ranking, specifically: “*the UK ranks 25th among OECD countries for the share of the workforce accounted for by technicians and associate*

⁹⁴ Brown, D (2014) *Working Futures 2012-2022: Introduction and Commentary*, UKCES

⁹⁵ Ibid

⁹⁶ Kelly, S (2011) *Defining skills need: The role of recognition of technician status*, The Gatsby Charitable Foundation

⁹⁷ Mason, G (2012) *Science, Engineering and Technology Technicians in the UK Economy*, The Gatsby Charitable Foundation

⁹⁸ Organisation for Economic Cooperation and Development (2013) ‘OECD Skills Outlook 2013: First Results from the Survey of Adult Skills’, OECD Publishing. Paris. Available at: <http://dx.doi.org/10.1787/9789264204256-en>

⁹⁹ Department for Business, Innovation & Skills (2014) *Our plan for growth: science and innovation*, BIS

professionals in science and technology".^{100,101} Although above average, the figures demonstrate that the nation is lagging well behind some other comparator nations.

137. The OECD Science, Technology and Industry Scoreboard defines occupations differently from those in the Working Future dataset. The latter uses UK Standard Occupational Classifications (SOC) codes, whilst the OECD figures are based on ISCO-08 codes which define occupations slightly differently. This difference is crucial when considering the technician class. Table 4 includes a comparison.

Table 4: Comparisons of occupational classifications

Standard Occupational Classifications (SOC)	International Standard Classification of Occupations (ISCO-08)
1. Managers, directors and senior officials	1. Managers
2. Professional occupations	2. Professionals
3. Associate professional and technical occupations	3. Technicians and associate professionals
4. Administrative and secretarial occupations	4. Clerical support workers
5. Skilled trades occupations	5. Service and sales workers
6. Caring, leisure and other service occupations	6. Skilled agricultural, forestry and fishery workers*
7. Sales and customer service occupations	7. Craft and related trades workers
8. Process, plant and machine operatives	8. Plant and machine operators and assemblers
9. Elementary occupations	9. Elementary occupations

*This is included in group 7 below it.

138. The lack of a clear definition of what is meant by the term ‘technician’ means that some workers in those roles are not appropriately classified as such. The issue is discussed by Gatsby,¹⁰² and was also raised at round table events for this research. An example given was of a particular job role in the energy sector, where incumbents are classified as ‘managers’, when in reality they are technicians, requiring no higher level of qualification than GCSEs and two years’ experience. This confirms the difficulty in defining the technician ‘level’, and the differences between sectors.

“Chemical engineering is often a Masters-level industry and technicians do not consider themselves as chemical engineers, instead they would be classed as ‘process operators’: pharmaceutical, energy, oil and gas – they are top-end technicians. There is a big difference between a chemical engineer and a technician working with chemical engineers, and even bigger differences between engineering and chemical engineering”

Stakeholder – Professional Body

¹⁰⁰ Organisation for Economic Cooperation and Development (2013). ‘OECD Science, Technology and Industry Scoreboard 2013: Innovation for Growth’, OECD Publishing. Available at: http://dx.doi.org/10.1787/sti_scoreboard-2013-en

¹⁰¹ Department for Business, Innovation & Skills (2014) *Our plan for growth: science and innovation*, BIS

¹⁰² Kelly, S (2011) *Defining skills need: The role of recognition of technician status*, The Gatsby Charitable Foundation

“Within an NHS employer, technicians can manage a whole unit”

Stakeholder – Life Science

139. The challenge in estimating potential supply and demand issues is also highlighted in evidence submitted to the Science and Technology Commons Select Committee by Education for Engineering (E4E), which acknowledges the lack of connections between school, FE, HE and workplace data. As the Committee noted: *“There is a particular need to improve the collection of data on employment by discipline and degree class following higher education. Current data gives scant information on which to base policy. We would urge the Committee to examine the case for matching datasets of learners throughout the education and training system and for improving data collection of employment of graduates.”*¹⁰³

140. Predicting potential demand for intermediate technical qualifications is more than merely highly challenging. We have, for the purposes of this study, broadly described intermediate level roles (for which intermediate technical education is aimed) as technician-level roles. We have done so with recognition that technicians work at various levels (Levels 2 to 4) and that employer definitions of these types of roles vary considerably, depending largely on the sector.

Qualifications sought by employers when recruiting to intermediate technical roles

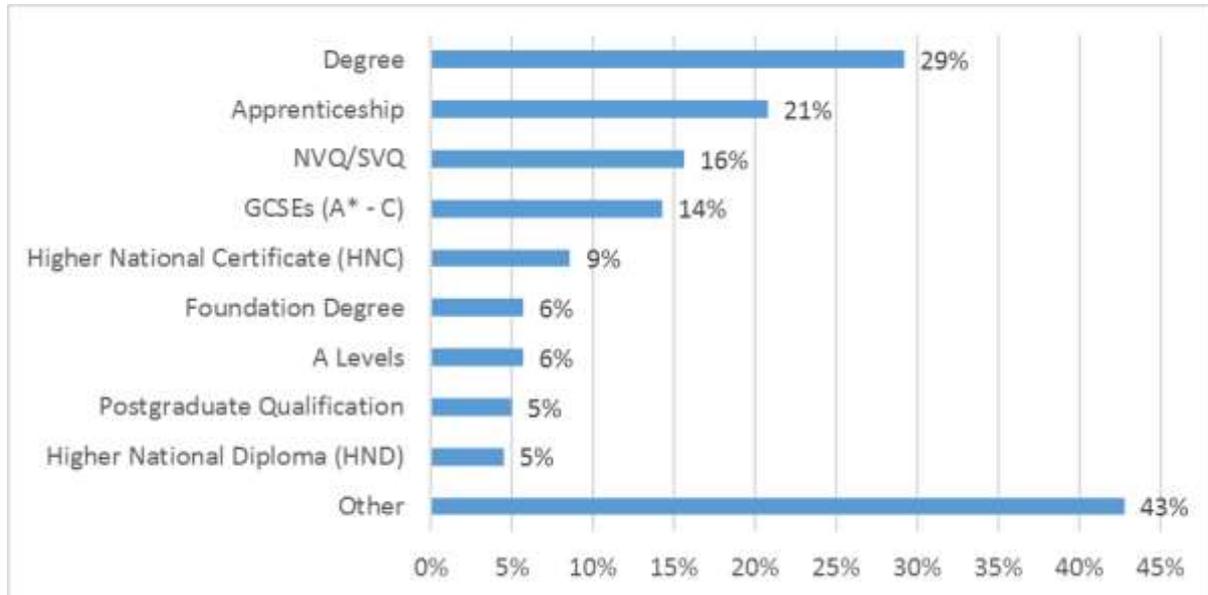
141. The survey of employers for this research sought to understand the types of qualifications that they will usually look for when recruiting to technician, or mid-level roles.¹⁰⁴ The findings (Figure 4) represent the views of employers in the five sectors and their supply chain within the scope of this study. The questionnaire asked specifically for the type of qualification employers require, for technical roles at intermediate-level, or for technicians.

142. Although apprenticeships are not qualifications in their own right, they are often recognised as such by employers. For ease of reference therefore apprenticeships were included in the list of qualifications explored in the employer survey.

¹⁰³ Science and Technology Commons Select Committee, *Written evidence submitted by E4E – Education for Engineering* <http://www.publications.parliament.uk/pa/cm201213/cmselect/cmsctech/665/665vw16.htm>

¹⁰⁴ Aerospace; Construction; Energy; Information Economy; Life Sciences

Figure 4: Qualifications sought by employers when recruiting to technician-level roles



Base: 442 respondents; Pye Tait Survey, 2015

Undergraduate degrees

143. Results from the employer survey support the majority view of stakeholders also participating in the research: that degrees are valued and sought by employers. Twenty-nine per cent of respondents to the employer survey will look for a degree when recruiting to technician-level roles. Stakeholders tended to explain the situation as being due to increased numbers of graduates in the labour market, rather than graduates being better suited, per se, to technician-level jobs than those with other qualifications.

144. The practice of recruiting graduates to technician-level roles was also highlighted in evidence submitted to the Commons Select Committee, which described the difficulty of attempting to align ‘level of certification’ and ‘skills’ and ‘occupations’.¹⁰⁵ The evidence quoted research undertaken by the Gatsby Foundation, which commented on trends in the qualification of SET roles. It noted that, as the supply of graduates has expanded in the last 20 years, “*the graduate share of SET associate professional employment has risen sharply – up from 23% in 1994 to 32% in 2000*”.¹⁰⁶ The share then dropped in 2001 before increasing again between 2005 and 2009.¹⁰⁷ The research also found the graduate share of SET skilled trades workers in SET service sectors to have increased over the same period; the same trend was not evident however in the SET production and construction sectors.¹⁰⁸

¹⁰⁵ Science and Technology Commons Select Committee, *Written evidence submitted by E4E – Education for Engineering*: <http://www.publications.parliament.uk/pa/cm201213/cmselect/cmsctech/665/665vw16.htm>

¹⁰⁶ Mason, G (2012) *Science, Engineering and Technology Technicians in the UK Economy*, The Gatsby Charitable Foundation

¹⁰⁷ Ibid

¹⁰⁸ Ibid

145. The situation has the potential to create issues for retention within the workforce. Stakeholders described graduate recruitment to technician roles as leading to high levels of churn in some companies. Graduates will enter at a technician level, but soon look to progress to a more senior position. Desk research suggests the issue relates to high levels of over-qualification in the technician-level workforce, leading to high staff turnover, and a consequent loss of innovation.¹⁰⁹

Apprenticeships

146. Apprenticeships are also a valuable proposition for employers. Just over one in five respondents to the employer survey will look for former apprentices when recruiting at technician level (Figure 4). NVQs/Scottish Vocational Qualifications (SVQs) are the third most popular qualification amongst employers (16%). Research by UKCES found the largest proportion of all apprenticeships is taken by technicians and trades workers (47%).¹¹⁰ Reasons for this are unclear but likely to relate to both the levels at which apprenticeships are most widely available (mostly at Levels 2 and 3) and the industries where apprenticeships are longest-established: such as construction, engineering, building services etc.

“Employers use apprenticeships increasingly to address these skills needs. A lot of apprentices stay with employers which means a lot in reducing recruitment costs. Some are vastly over-subscribed and some employers have difficulty finding [apprentices]”

Stakeholder – Science education body

147. Evidence from Gatsby suggests however that the share of apprenticeships within the technician workforce has been in decline for some time, despite the apparent suitability of apprenticeship training which combines work-based training with off-the-job, classroom-based study.¹¹¹ Accompanying this trend is a decline in the share of ‘upper intermediate level’ qualifications in the SET technician workforce, and a slight increase in the share of these qualifications held by SET skilled trades during the same time period.¹¹²

Other types of qualifications

148. However, many employers who took part in this research often look for other types of qualifications (43%). Of those who identified ‘other’ qualifications as being important when recruiting technicians, the majority (49 respondents) cited work experience.¹¹³ This suggests that, rather than an accredited, ‘official’ qualification, what employers often look for and value is some other form of skills recognition. This may be evidenced by ‘time served’ in another company or similar industry.

¹⁰⁹ Kelly, S (2011) *Defining skills need: The role of recognition of technician status*, The Gatsby Charitable Foundation

¹¹⁰ Vogler-Ludwig et al (2012) *International approaches to the development of intermediate level skills and apprenticeships, Case study report, Evidence Report 42 – Volume 2*, UKCES

¹¹¹ Mason, G (2012) *Science, Engineering and Technology Technicians in the UK Economy*. The Gatsby Charitable Foundation

¹¹² Ibid

¹¹³ Other responses included: CSCS or CPCS card in the construction sector(17 respondents); No qualifications (12 respondents); MCSE or other Microsoft qualification (10 respondents); Gas qualifications (four respondents)

“In specific areas of employment, on the job training is more valuable than the qualification itself – this is what foundation degrees were trying to deliver – they had compulsory work-based learning”.

Stakeholder – HE sector

149. Other industry-specific qualifications include:

- CA licence,¹¹⁴
- BA or B2 qualifications,¹¹⁵
- IOSH, NeBoSH, etc.¹¹⁶

The value of qualifications

150. There is a sense from stakeholders that (disregarding degrees), of the available intermediate technical qualifications in the market place, Higher National qualifications are seen as most valuable to employers. The results from the employer survey broadly support the assertion with 9% of employers looking for an HNC when recruiting to technician level roles, followed by foundation degrees (6%).

151. According to one stakeholder some employers will view a foundation degree as being at a higher level than a Higher National and therefore attach more value to it. The stakeholder representing employers in the science sector explained that employers may have a different view, but their standpoint is based on a lack of understanding of the education landscape. The respondent viewed Higher National qualifications as declining, and foundation degrees as increasing due to the attractiveness (to the student) of blended and distance learning. Here the stakeholder was focusing on the way the qualifications are delivered, rather than their content or value. The move – they assert – has been taking place over the last three years.

152. A small number of other stakeholders, however, suggest a lack of understanding of the various qualifications available at intermediate level is because employers may not attach much value to them. As a consequence employers will use their own experience as a means of judging the value of qualifications, rather than any more objective measure. The argument follows that employers do not value some intermediate technical qualifications because of a lack of clarity on the differences, if any, between Higher Nationals and foundation degrees. Because some senior staff have obtained the qualification themselves HNCs/Ds are well-regarded by many employers in technical sectors.

153. The latter point is an important one. Research by Gatsby suggested that matching employer skills needs to qualifications presents a challenge, but that some long-standing qualifications such as Higher Nationals are well understood by employers.¹¹⁷ Their report quoted earlier research by the OECD and by the New Engineering Foundation whereby employers found it

¹¹⁴ Aircraft maintenance engineer licence

¹¹⁵ Licensed aircraft engineer training

¹¹⁶ Health and safety qualifications

¹¹⁷ Kelly, S (2011) *Defining skills need: The role of recognition of technician status*, The Gatsby Charitable Foundation

difficult to match new entrants' qualifications with their occupational requirements, and to articulate their needs to Government.¹¹⁸

Employer skills shortages, gaps and needs

Skills shortages: recruitment difficulties caused by a shortage of individuals with the required skills in the accessible labour market.

Skills gaps: skills deficiencies in an existing workforce.

154. Evidence from the Institution of Engineering and Technology suggests that, among those in engineering, IT and technical disciplines, there are notable skills shortages. Their ninth annual skills survey found shortages were most pronounced amongst graduates (54%), followed by school leavers (44%). Skills in which graduates are deficient include practical experience, leadership skills and technical expertise.¹¹⁹
155. Research undertaken by UKCES reports that jobs demanding intermediate skills tend to have high proportions of skills shortages, and suggests these are more likely to be found in SMEs.¹²⁰ Further research undertaken on behalf of Gatsby found a serious issue with 'incomplete' skills (i.e. skills gaps) at technician level.
156. Based on analysis of the 2007 National Employer Skills Survey (NESS) the research suggests that just over a third of hard-to-fill vacancies at that time were in occupational groups associated with technician-level skills.
157. The analysis on the following pages (Table 6) provides a very brief, high-level overview of the types of skills currently in demand from employers in the five sectors. The information is taken mainly from Government Industrial Strategy as well as Sector Skills Insights published by UKCES.

¹¹⁸ Kelly, S (2011) *Defining skills need: The role of recognition of technician status*, The Gatsby Charitable Foundation

¹¹⁹ Institution of Engineering and Technology (2014) *Skills and Demand in Industry Survey Annual Survey 2014*

¹²⁰ UKCES (2014) *The Labour Market Story: The State of UK Skills, Briefing Paper*, UKCES

Table 5: Skills needs in technical sectors

Sector	Skills needs
Aerospace	<p>According to the Government Industrial Strategy, some of the most severe shortages are faced by firms seeking to recruit technicians skilled in working with composite materials, which require different skill sets to those trained and experienced in metallics.^{121,122}</p> <p>Although high growth is expected in the demand for composites within the UK aerospace and automotive sectors, there is expected to be a shortage of necessary skills at nearly all levels from operator, craft, technician, professional and management roles. Higher-level technical skills will in particular be at a premium as these are the roles that are also in high demand from other sectors within advanced manufacturing.¹²³</p> <p>The Industrial Strategy identified maintenance, repair and overhaul as one of the key areas of focus, where demand is likely to grow. Services will include composite in-service support repair and disposal; integrated health management technologies; aircraft and equipment recycling and deployment; skills for service: availability of skilled and licensed technicians.¹²⁴</p>
Construction	<p>Rising demand for professional occupations and technical occupations is regarded as being consistent with increased need for research and development and innovation in construction. These skills are identified as being key to maintaining competitiveness as well as supplying more service-based products to both the domestic and export markets.¹²⁵</p> <p>There is relatively strong demand in the sector for people qualified to an intermediate level with 33% qualified at Qualifications and Credit Framework (QCF) 3-4 in 2010 compared with 24% in the economy as a whole.¹²⁶</p> <p>A lack of higher-level skills has been noted in project management, planning and design, particularly in architecture, civil and construction engineering and domestic house-building sectors.¹²⁷</p>
Energy	<p>Engineering graduates and technicians are in high demand from the domestic sectors, and replacement of retirees affects the sector more than the rest of the UK economy because of a relatively older cohort of higher-skilled workers.¹²⁸</p>

¹²¹ A Study of Technician Duties, Skills, and Training in the UK Aerospace Industry, Lewis 2012

¹²² Department for Business, Innovation & Skills (2013) *Industrial Strategy: government and industry in partnership. Lifting Off – Implementing the Strategic Vision for UK Aerospace*. HM Government.

¹²³ Ibid

¹²⁴ Ibid

¹²⁵ Gambin et al (2012) *Sector Skills Insights: Construction, Evidence Report 50*, UKCES

¹²⁶ Ibid

¹²⁷ Ibid

¹²⁸ Speckesser et al (2012) *Sector Skills Insights: Energy, Evidence Report 51*, UKCES

	<p>Further regulation to increase efficiency and raise quality across the sector is likely to increase demand for higher- and intermediate-level technical skills.¹²⁹</p> <p>New forms of technology will also require new intermediate-level skills to maintain new equipment and machinery. This is likely to take the form of a change in the type and range of skills and experience required, rather than necessarily an increase in the number of people with those skills.¹³⁰</p>
<p>Information Economy</p>	<p>It is expected that there will be 300,000 more managers, professionals, and associate professional occupations between 2010 and 2020 as the sector grows – an increase of over 20% on 2010 employment levels. Between 2010 and 2020, the number of associate professional and technical roles is also predicted to increase by 22.9%. Technological innovation will require continual skill development among technology professionals and technicians</p> <p>The increase in demand for workers with low levels of qualifications is also expected to be greater than the average for the economy as a whole as is the decline in demand for workers skilled to intermediate levels (intermediate skills are classified as being at Levels 2, 3, and 4).¹³¹</p>
<p>Life Sciences</p>	<p>The sector requires mainly high-level skills, however the sector suffers from hard-to-fill occupations in scientific and technical disciplines. There is some evidence to suggest that a quarter of graduates in the sector are being recruited into jobs at a lower level than their qualification.¹³² There are also concerns surrounding the supply of vocational training for technical and process operators, however research suggests that due to insufficient data on vocational destinations it is difficult to evidence shortfall at this level.¹³³</p> <p>Sectors are also identified as converging due to technological and systems innovations, driving the development of new multi-disciplinary qualifications.¹³⁴ The workforce is therefore predicted to need skills in engineering as well as biological and cell-based medicine, high-tech medical devices and information-driven health systems.</p>

¹²⁹ Ibid

¹³⁰ Ibid

¹³¹ Williams et al (2012) *Sector Skills Insights: Digital and Creative, Evidence Report 49*, UKCES

¹³² Cogent (no date) *Life Sciences & Pharmaceuticals: A Future Skills Review with Recommendations to Sustain Growth in Emerging Technologies*, Cogent

¹³³ Ibid

¹³⁴ Department for Business, Innovation & Skills (2011) *Strategy for UK Life Sciences*, HM Government

158. The intelligence on skills demanded by employers is helpful to establish the profile of technical job roles in the five sectors in question, and how they are predicted to change in future. The information also confirms the difficulties in defining what is meant by ‘intermediate’ level skills. For example, in construction these are defined as being at Levels 3 to 4; in the information economy, these are regarded as being at Levels 2 to 4.
159. The information also illustrates the highly practical nature of work undertaken by intermediate and technician-level roles and therefore why reported skills gaps in practical experience and technical expertise are potential areas of concern.
160. Gatsby research found a combination of over-qualification (i.e. many technicians unnecessarily qualified to Level 6 and above) and a large proportion of under-qualified workers in technician roles leading to inappropriate deployment of skills, loss of innovation and loss of competitiveness.¹³⁵ However, it should be noted that inhibited performance is not always the result. Skills gaps and the need to update skills can be the consequence of adopting high value-added business strategies that would naturally lead to a more dynamic skills base.¹³⁶ This caveat was also raised in stakeholder interviews.

“Having short term skills shortages is a sign of a dynamic economy. It is not only normal, it is a good sign”

Stakeholder – Industry/HE links

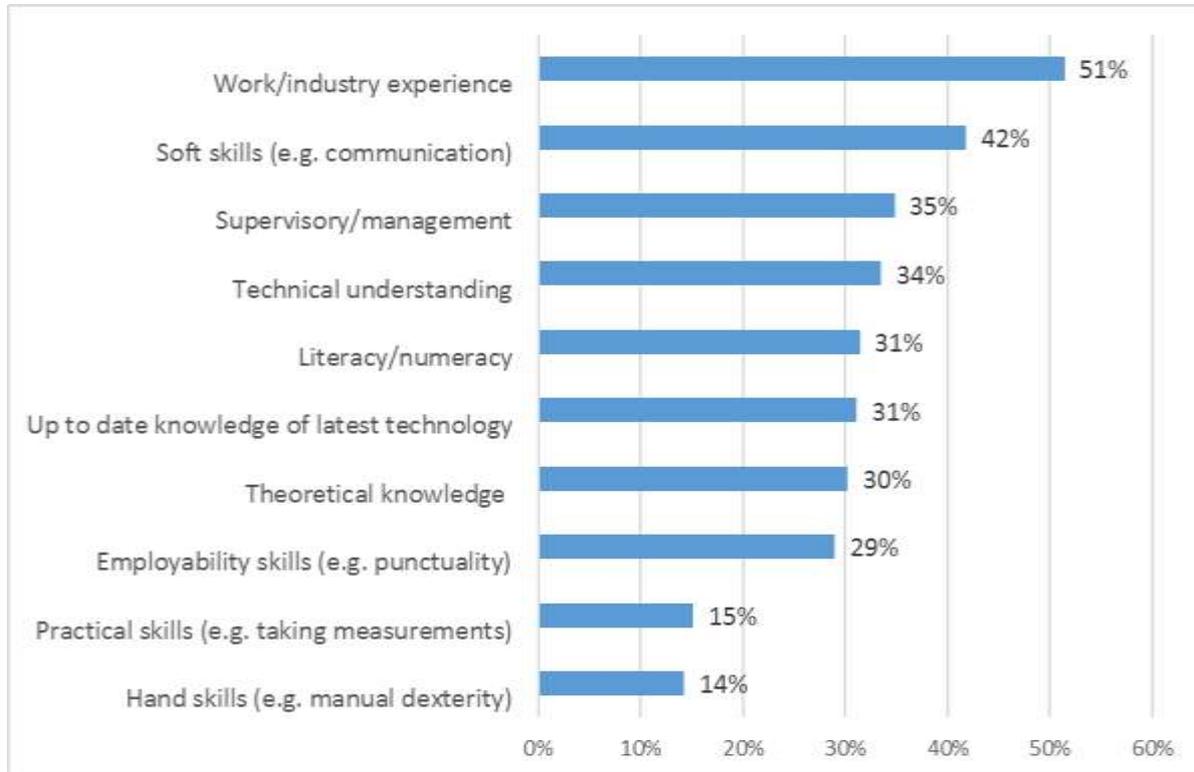
Skills that employers are lacking or are hard to find

161. The survey of employers explored the types of skills and knowledge which are missing or hard to find when recruiting to technician-level roles (Figure 5).
162. Areas of significant unmet need centre around skills developed primarily through work experience, or practical learning – supporting the findings from the literature. Just over half of the employers surveyed report skills developed through work experience as being missing or hard to find when recruiting to technician-level roles.

¹³⁵ Kelly, S (2011) *Defining skills need: The role of recognition of technician status*, The Gatsby Charitable Foundation

¹³⁶ Ibid

Figure 5: Skills and knowledge missing or hard to find in recruits to technician-level roles



Base: 325 respondents, Pye Tait Survey 2015

163. Stakeholders, too, tend to highlight a lack of skills associated with work experience as being a cause for concern in technical roles. These relate most closely to soft skills such as communication, problem solving and ‘employability’ skills; these types of skills were the second most commonly identified by employers in the survey (42%) as being missing or hard to find. This theme was also picked up by stakeholders throughout interviews, respondents suggesting that soft skills are just one part of a broad-based package (including technical skills and subject knowledge) which are sought after by employers, but which are often missing.

164. Stakeholders highlight technical and hand-skills as being in demand but difficult to find. Examples of these include: weighing, measuring, logical thinking, accuracy, precise work, ‘reproduce-ability’. However, this is at odds with the findings of the employer survey; only 15% of employers identifying practical skills as being missing or hard to find, and only 14% suggesting they find similar difficulties with hand-skills. There is some evidence however which suggests that employers tend to compensate for the lack of STEM, writing and soft skills by the use of other in-house resources.

165. Although the impact of increasingly pervasive and developing technologies has been identified both by stakeholders and in literature as creating a skills shortage in industry, this was only identified by just under a third (31%) of survey respondents (Figure 5). The same proportion of employers also identified literacy and numeracy as being missing or hard to find, a sentiment

echoed by one stakeholder in the aerospace sector, and which is also commonly reported in the literature.

“Employers take it for granted that employees won’t have the practical skills they need. They look for aptitude first, then the training is conducted in-house.”

Stakeholder – Engineering sector/HE Institution

166. Another stakeholder noted the lack of practical skills amongst many new entrants to technical level roles as being partly related to a decline in design and technology in schools. Stakeholders with multiple sector interests, or with a general educational interest, pointed to a general decline in the availability of entrants with appropriate technical skills (although here the terms ‘technical’ and ‘practical’ were used interchangeably). These stakeholders tended to highlight a challenge in ensuring qualification routes were sufficiently aligned with the latest industry practices. The result being that new entrants will not always have up-to-date knowledge or ability aligned to new technologies. An example in the construction and energy sectors is the installation and maintenance of renewables.

“Many of the older workforce came from a background of tinkering with cars and developed their hand-skills naturally – that’s starting to disappear now. Some employers only look for hand-skills, others train people in developing their hand-skills. It generally take about a year to get people to a good standard”

Stakeholder – Aerospace Sector

167. This therefore raises questions about the extent to which degrees become devalued due to the skills mismatch of graduate skills versus practical, technical level roles. Whilst the availability of a large pool of graduate labour may be attractive to employers, in the longer-term the evident skills mismatches may cause employers to question the value of graduate skills.

“Holding a degree is becoming less informative to an employer”

Stakeholder – Industry/HE links

168. The issue is discussed in existing literature. Research undertaken on behalf of Gatsby found that some employers were re-evaluating their qualifications and skills mix at technician level because most new graduates had been educated in a classroom setting, rather than through employment-based training.¹³⁷ The result being that graduates employed in technician roles lack the requisite practical skills and experience, problem-solving skills and commercial understanding.¹³⁸ Other research, also by Gatsby, reported that, due to employer frustrations with graduates’ lack of practical skills, aerospace companies were instead beginning to train people in-house using higher apprenticeships.¹³⁹

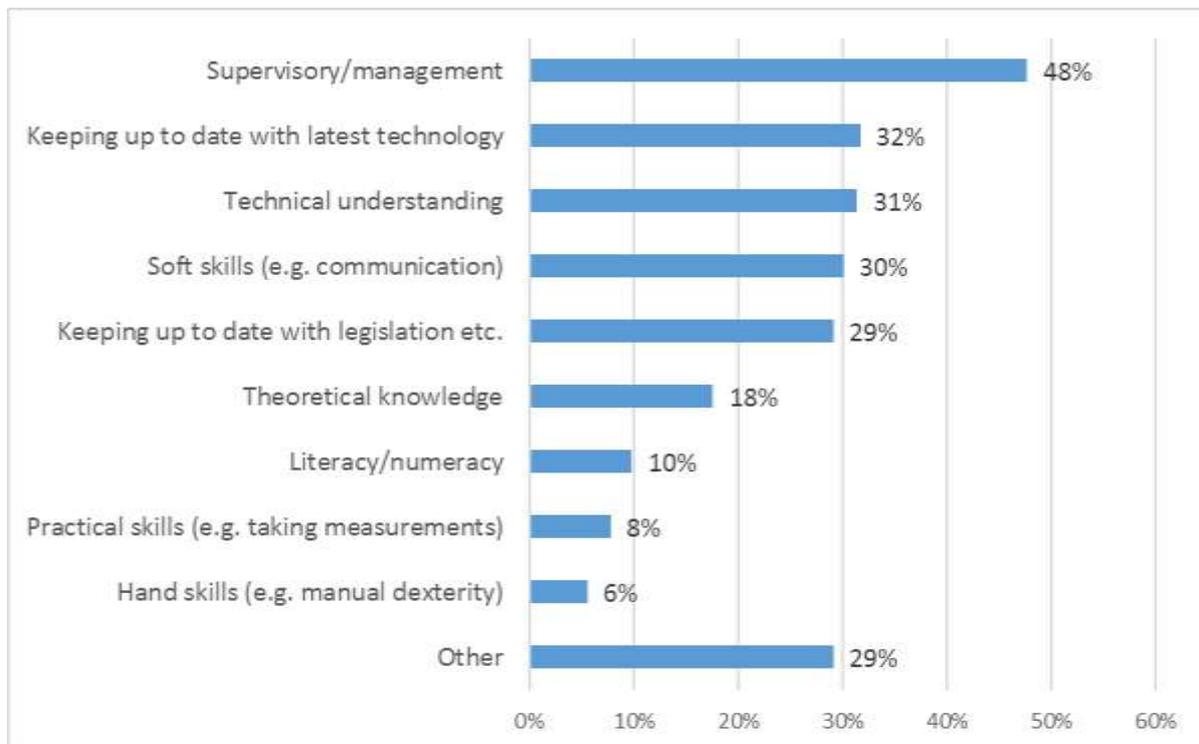
¹³⁷ Mason, G (2012) *Science, Engineering and Technology Technicians in the UK Economy*. The Gatsby Charitable Foundation

¹³⁸ Ibid

¹³⁹ Lewis, P (2011) *Flying High? A study of technician duties, skills and training in the UK aerospace industry*, The Gatsby Charitable Foundation

169. The employer survey also sought to understand the types of skills that employers believe are missing or hard to find when looking to promote technician-level employees to more senior technical roles (Figure 6). Again, it is most usually with transferable and soft skills that employers encounter issues; 48% of employers also finding supervisory and management skills to be missing.

Figure 6: Skills that are missing or hard to find for progression



Base: 306 respondents, Pye Tait Survey 2015

170. 'Other' skills needs identified by employers also generally encompass transferable skills and attributes such as confidence in using IT, people management, punctuality and work ethic, presentation skills, time management, customer management and communications, report writing, leadership, mathematics, and specific software knowledge.

171. This suggests that future priorities for employers when looking to upskill technicians will centre on training that develops broader, cross-sector skills, rather than specific technical skills. Almost a third of employers also recognise issues with employees having sufficiently up-to-date knowledge and ability with technology, and a slightly smaller proportion identify technical understanding as being missing or hard to find when looking to promote technicians to more senior roles.

172. The findings from the employer survey point to a need for training – for existing employees – combining supervisory/management skills development, along with knowledge components addressing technical understanding (e.g. the application of principles or theories in a practical context).

173. The importance of skills training with flexible approaches to delivery was a theme picked up in roundtable discussions. For example, ensuring a sufficient menu of bite-sized units or modules that employers can put together into an appropriate package for their employees. One roundtable discussion felt that Higher National qualifications and foundation degrees could fit into this modular approach.
174. Another suggestion from the roundtable discussions focused on ‘sandwich’ courses which combine work experience or internships, to facilitate a blended-learning approach incorporating practical skills and academic knowledge.
175. Education for Engineering, in their 2011 report ‘*Sandwich courses in Higher Education*’ described a “*downward trend in the number of participants on sandwich placements*” with various factors – such as insufficient supply of students for placements, a lack of encouragement from universities and low employer engagement – most likely to blame.¹⁴⁰
176. Recent research conducted by Higher Fliers however found there to be an “*unprecedented*” number (13,049) of paid work placements available during the academic year 2014-15, offered by 80% of the UK’s leading graduate employers.¹⁴¹ Whilst these placements are aimed at undergraduates, rather than students of intermediate courses, it suggests employers have an appetite to engage with education – and that it is growing. What is important is the motivation behind the practice: the same research noting a shift over the last decade in the reasons why employers offer work experience or placements. Whereas, 10 years ago, employers were considered to offer work experience largely out of altruistic motivations, today these schemes are valued by employers for providing a rich recruitment stream.¹⁴²

Summary

Roles for which intermediate technical education may be appropriate vary by sector and size of organisation. Many are described as ‘technicians’, with some having well recognised qualification routes. However, it is challenging to create exact matches between qualifications and job roles due to the various levels at which they are found, and because of the use of inconsistent job titles.

Various sources predict a substantial increase in the number of technician-level roles over the next five to seven years. However, because there is not a universal definition of ‘technician’, it is uncertain whether employers classify technicians as ‘managerial, professional and technical’ roles predicted to decrease between 2012 and 2022 or as ‘skilled trades’ predicted to decline during the same period. This makes predicting demand extremely challenging.

The survey of employers found that when recruiting to technician or ‘mid-level’ roles a degree is

¹⁴⁰ Engineering for Education (2011) *Sandwich Courses in Higher Education, A report on current provision and analysis of barriers to increasing participation*. Engineering for Education.

¹⁴¹ Higher Flyers (2015) *The Graduate Market in 2015 Annual review of graduate vacancies & starting salaries at Britain’s leading employers*, Higher Flyers.

¹⁴² Ibid

the most sought-after qualification: a finding supported by the desk research. The latter found technician roles as typically requiring sub-degree level qualifications, and that over-qualification is leading to high rates of staff turnover. Stakeholders describe the trend as resulting from an expanding number of graduates in the labour market.

Employers highlighted work experience as another type of 'qualification' looked for when recruiting to technician-level roles. Apprenticeships are also valued by employers; however the share of apprenticeships within the technician-level workforce has been found to be in decline.

Of intermediate technical qualifications in the market place, this research suggests Higher Nationals to be most valued, possibly because many employers have themselves obtained these qualifications. HNCs are most sought after of all intermediate qualifications; the figures on qualification trends broadly support this finding, the take-up of technical HNCs having remained fairly steady over the eight years to 2013-14 – and entrants to engineering and technology HNCs increasing by 29%.

Analysis of skills that employers say recruits lack or suggest are hard to find demonstrates the highly practical nature of intermediate-level roles, and the importance of work experience. Companies employing graduates in technician-level roles find they lack appropriate practical experience, leadership skills and technical expertise: skills that might otherwise be gained through intermediate technical qualifications which integrate on-the-job experience and study.

Skills shortages – i.e. those difficult to find in the labour market – in technical disciplines are most pronounced amongst graduates and include practical experience, leadership skills and technical expertise. The survey of employers carried out for this research confirmed the situation. Jobs requiring intermediate skills are also found to have high proportions of skills shortages.

The consequent skills mismatches occurring as a result of graduate recruitment to technician-level roles may in the long term cause employers to question the value of graduate skills therefore.

When looking to upskill existing technician-level workers, employers most commonly identify supervisory and technical understanding as key areas. Employers tend to value flexible approaches to the delivery of training/qualifications for upskilling, composed of a menu of bite-sized units or modules.

For new entrants courses that incorporate work experience are highly rated, not only because they develop valuable transferable skills amongst workers, but also because the practice exposes employers to a wider pool from which to recruit.

The supply of intermediate technical qualifications

Employer familiarity with intermediate technical qualifications

177. A key element of the research centred on establishing how well employers understand intermediate technical qualifications, the value placed on them as well as any associated barriers.
178. Overall, employers have a reasonable awareness of different types of intermediate qualifications (Figure 7). Employers were most familiar with HNCs and HNDs (79% of respondents being either very or somewhat familiar with both), followed by foundation degrees (67%).
179. Of all intermediate technical qualifications, employers were least familiar with higher apprenticeships: 46% of respondents being either not very familiar or not at all familiar. Although take-up of these programmes has improved since higher apprenticeships were first introduced in 2006-07, in 2014-15 they only accounted for 3% of all apprenticeship starts (approximately 7,000 learners).¹⁴³
180. The fact they have only been in existence since 2006-7 might explain the lack of familiarity; it is also likely that the relatively small number of available frameworks is a strong reason for low take-up.¹⁴⁴ However, familiarity and take-up is growing:
- Research conducted on behalf of UKCES suggests that apprenticeships and higher apprenticeships are increasingly regarded by the digital sector as a pathway into higher-level roles, providing a basis for technical skills and experience required to progress to specialist roles.¹⁴⁵
 - Anecdotal feedback from stakeholder interviews for this research also suggests higher apprenticeships are increasing in popularity in other sectors, such as aerospace, bolstered by the apprenticeship Trailblazers.

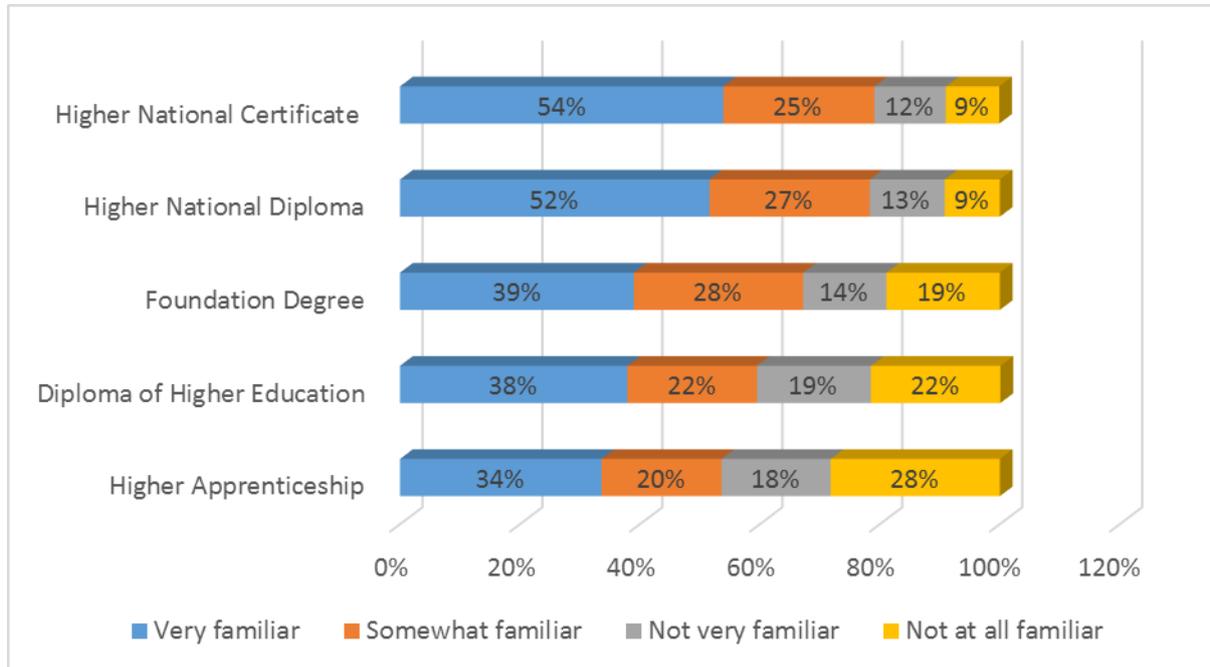
¹⁴³ House of Commons (2015) *Briefing Paper number 06113, Apprenticeship Statistics: England*, HM Government

¹⁴⁴ According to Apprenticeship Frameworks Online there are currently 228 apprenticeship frameworks; those at Level 4+ account for 95 of those, or 42%; 58% are therefore available at Levels 2 and 3. Source:

<http://www.afo.sscalliance.org/frameworks-library/index.cfm#current>

¹⁴⁵ Hollingworth et al (2013) *Technology and Skills in the Digital Industries*, UKCES

Figure 7: Employer familiarity with intermediate technical qualifications



Base: 503 respondents, Pye Tait Survey 2015

181. There is a high degree of disparity between levels of employer familiarity and the numbers of employers who recruit individuals with these qualifications. For example, although 79% of employers suggest they are familiar with HNCs, only 9% of employers will look for these qualifications when recruiting technicians. Research cited earlier also suggests the number of employers in the wider engineering and technology sector who support their employees in achieving these qualifications has declined substantially (c. 20%) between 2013 and 2014.¹⁴⁶

182. HEFCE analysis of OUG provision points to a number of possible factors influencing their decline and these may continue to pose barriers for future take-up of intermediate technical qualifications. Factors include the withdrawal of premiums for part-time study and foundation degrees and the exhaustion of markets for ‘catch-up’ study amongst older workers.¹⁴⁷

183. Stakeholders proposed other factors including differences between awareness levels of technical/operational staff and recruiters/HR personnel. For example, whilst operational staff may attach value to certain intermediate qualifications based on their own experiences, those responsible for personnel may not be as knowledgeable about technical qualifications.

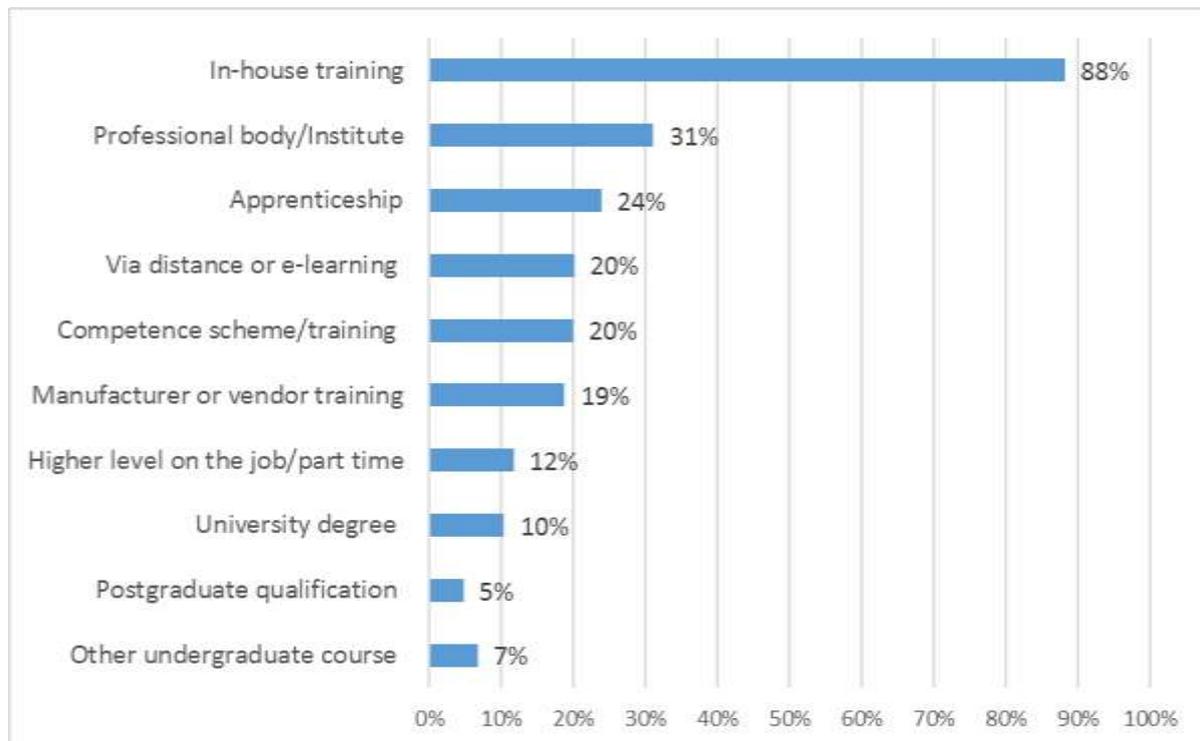
¹⁴⁶ Institution of Engineering and Technology (2014) *Skills and Demand in Industry Survey Annual Survey 2014*, Institution of Engineering and Technology

¹⁴⁷ HEFCE (2014) *Undergraduate courses other than first degrees, An analysis of recent trends*, HEFCE

Types of training favoured by employers when upskilling

184. The employer survey found in-house training to be the first choice mechanism among employers (88%) for providing upskilling training to existing technician-level staff (Figure 8). Apprenticeships are offered by almost a quarter of respondents, with intermediate qualifications such as HNC/D and foundation degrees offered by just 12% of employers.

Figure 8: Methods used by employers for upskilling technician-level staff



Base: 428 respondents, Pye Tait Survey 2015

185. Although the proportion of employers offering intermediate qualifications (i.e. HNC/Ds, foundation degrees, DipHEs) is fairly low (12%), these appear to be more popular than other types of HE, such as undergraduate and postgraduate degrees. However, this may be because employers already prioritise university graduates when recruiting to technician-level roles.

186. After in-house training, the types of qualifications valued by employers appear to be those which provide some form of professional recognition (31% offering professional qualifications), or which can be achieved in a flexible way (20% offering distance, or e-learning).

The sufficiency of vocational and technical pathways

187. Providers and stakeholders were asked their view on the number of vocational and technical pathways available at an intermediate level, and the extent to which they felt these were sufficient to meet employer demand.

188. Stakeholders hold mixed views which are summarised below (Table 6).

Table 6: Views on sufficiency of vocational pathways

Yes, there are sufficient vocational pathways	No, there are not sufficient vocational pathways
<ul style="list-style-type: none"> Probably there are, but the question comes down to take-up Yes, but the situation is confusing. There are apprenticeships, BTECs, NVQs, A levels, HE and professional body accreditations. There are lots of new pathways coming on-stream There are enough foundation degrees in STEM (engineering and construction, but they are under-resourced in others) The landscape is too muddled. Simplification is important We don't need the invention of new route-ways – there are already a suitable number – it's the lack of opportunity that's the problem 	<ul style="list-style-type: none"> Science subjects are notably deficient in vocational pathways The push for degrees has led to vocational routes becoming neglected Probably not in terms of house-building. The issue is a relative scarcity of courses that employers feel have the right focus in terms of industry skills The gap relates to mode of attendance (specifically part-time top-up provision to degree from a foundation degree) There are insufficient routes and apprenticeships are not understood by parents Probably not. They are not well advertised There are no easily defined pathways to lever to attract people into the sector

“Industry expects entrants to get training elsewhere and then join them. But we don't have as many openings now as we used to – we need more routes. The vocational route is very important to get your hands dirty. We're not producing enough people into these jobs.”

Stakeholder – Aerospace sector

189. Where stakeholders were uncertain on whether there were sufficient vocational pathways, some related this to insufficient promotion of the range of pathways available, and insufficient clarity on the distinct purpose of different types of qualifications. The decline in part-time study was cited as a consequence of this. One stakeholder noted that there was little to be gained from creating new qualifications, and the qualifications that already exist should be exploited. The point being made by stakeholders is that a complex qualifications system can cause employers to disengage.

190. Growth in the demand for undergraduate degrees was highlighted as being partly linked, and as having changed employer recruitment patterns. Where an employer might have previously recruited an 18-year old and trained them up, they are now targeting graduates because graduate labour is more readily available (as discussed in Paragraph 144).
191. A lack of public awareness around the existence of different vocational pathways was also cited by those unsure of whether there are sufficient choices. For example, as one stakeholder representing engineering occupations explained, there is a recognised problem with supply and demand. However, the stakeholder was unsure as to whether this was down to a lack of appropriate pathways, or that people were not interested in the pathways available. In his words: *“Is it the pipeline itself, or is it the perception?”*
192. The question is invariably related back to the local supply and demand dynamic, and the requirements of individual sectors. Naturally, this varies. The availability of appropriate pathways will depend on the strength of links between providers and employers, and the characteristics of the local labour market.
193. The question of sufficiency is not solely equated to the number of qualifications, however. When considering the market among existing workers, qualifications also need to be accessible and deliverable in a way which meets employers’ needs. Anecdotal comments suggested modular degrees in certain STEM subjects are becoming more commonplace because they provide the flexibility that employers value.
194. Providers also gave their feedback on the sufficiency of vocational pathways, again with mixed opinions, although the majority were of the view that a lack of pathways was not an issue for employers, or students. What is typically viewed as a challenge spans:
- Getting employers and students to recognise and value intermediate technical qualifications;
 - Students not being provided with clear information on the range of routes available to them;
 - Providing access to qualifications (in the sense of them being delivered in ways which meet the needs of employers and learners);
 - Achieving support from employers (either an in-kind or cash contribution, specifically in supporting the development of foundation degrees).

“So most of our clients appear to be using traditional and existing routes – usually based on the fact that they did it or they know other people from the company who have done it. And when we ask people who say things like ‘I want an HNC in electrical’ – why they want that, it’s because they’ve had somebody who has done that. Basically what they are asking us to do is to clone somebody. They don’t understand what is in the programme but they understand that the programme gave a good graduate the last time and they want another just like him”

Provider – FE College

195. Providers also suggested a range of possible reasons for the decline in the take-up of intermediate technical qualifications, some of which confirm the 2013 HEFCE study and stakeholder views. Many reasons are inter-related and some views are conflicting; these include:

- Providers seeking to secure student places on three-year degrees ahead of intermediate programmes;
- Employers who offer external training cutting back as a result of the recession;
- Changes in fee structures, with providers increasing fees for foundation degrees;
- A ‘decline’ in the FE sector – in terms of staff numbers and finances – as a result of funding cuts making more expensive, technical courses difficult to sustain;
- Students questioning the return on investment of a sub-degree programme;
- Certain intermediate technical qualifications – such as HNCs/Ds – being seen as having less kudos than foundation degrees;
- Industries having a ‘traditional’ view of qualifications, not valuing qualifications such as foundation degrees (the latter having had the most substantial decline in recent years);
- Schools not promoting intermediate technical routes because social stigma causes the public to attach less value to sub-degree level roles;
- The nature of employment in science and engineering industries – dominated by small supply-chain companies – meaning that companies do not always have the infrastructure to support delivery of vocational qualifications;
- Foundation degrees possibly being perceived as the first two years of an undergraduate degree, therefore devaluing their distinctive purpose as a standalone qualification.

Apprenticeships

196. In terms of the availability of different vocational pathways, apprenticeships are viewed by some as a means of reinvigorating intermediate technical provision. Findings from stakeholder interviews suggesting that apprenticeships have tried to stimulate the market in this way (higher and degree level apprenticeships); however, take-up has been subdued as yet. The data confirm the low take-up, and the employer survey illustrates limited awareness.

197. The introduction of new apprenticeships – through Trailblazers – was, however, acknowledged in this research as a possible means of supporting employers in addressing skills gaps in technical occupations. For example:

- Discussion at the roundtable for the Information Economy suggested higher apprenticeships as the ideal vehicle for addressing employer skills needs at the intermediate level;
- New aerospace apprenticeships are viewed as filling gaps in provision at intermediate level.

198. New Trailblazer standards already outnumber the current apprenticeship frameworks generally, and at Level 4 and above¹⁴⁸ with many more set to be developed. Insufficiency, therefore, is unlikely to be a barrier to take-up, but uncertainty over how the qualification elements will be delivered is at the moment unresolved. Although higher apprenticeship frameworks may contain intermediate qualifications as a component part, there is no requirement for them to contain recognised qualifications.

Summary

Intermediate technical qualifications are reasonably well-known by employers, Higher Nationals – having been in existence for the past few decades – being most well-known, followed by foundation degrees and higher apprenticeships.

Despite this finding, however, relatively few employers will look for intermediate qualifications when recruiting to technician-level roles, and the number of employers supporting their employees in achieving these qualifications has declined in recent years.

When seeking to upskill staff, employers instead favour in-house training, professional body qualifications and apprenticeships.

Reasons for not choosing intermediate qualifications are numerous. Insufficient choice is unlikely to be a factor for all, but in some niche sectors such as aerospace and energy a lack of sufficient vocational pathways could be pushing people towards degrees. Insufficient promotion, and low public awareness, of intermediate routes are other factors put forward by stakeholders. Although a reasonable number of employers are aware of these qualifications, the primary research suggests they may not fully understand them and their distinctive purpose, instead prioritising degrees because of their status and ‘prestige’.

Issues of local supply and demand are also crucial factors here: the availability of appropriate pathways depending on links between employers and providers, but also on accessibility. In some regions of England provision is patchy, particularly in niche sectors.

¹⁴⁸ There are currently (as at October 2015) 65 Trailblazer standards at Level 4+, listed here: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/468008/Apps_standards_list.pdf There are 47 live apprenticeship frameworks at Level 4+. These are listed here: <http://www.afo.sscalliance.org/frameworks-library/index.cfm#current>

Apprenticeships are viewed by a number of contributors to the research as a means of reinvigorating intermediate technical provision. There would be a mutual benefit for the developers and providers of apprenticeships, with many hundreds of intermediate qualifications already existing and from which to choose. Trailblazer apprenticeships present an opportunity, however there is still uncertainty over how qualifications elements will be delivered.

Employer involvement in intermediate technical education

Mechanisms of involvement

199. Intermediate technical qualifications rely on employer involvement. Foundation degrees were intended to respond to identified skills shortages in the labour market, to be designed by employers and delivered in the workplace. Higher Nationals (HNCs and HNDs) use a similar model of workplace delivery.
200. Relationships between education and industry are instigated, developed and managed in various ways and can lead to employer involvement in many different activities, such as provision of work experience, guest speakers, workplace assessment/testimonials etc.
201. According to a 2012 study for BIS, colleges and universities are most usually involved with employers as a source of recruitment, or as a provider of courses. Of those employers surveyed in the BIS research, they used universities roughly equally for both recruitment and CPD for their employers; their interactions with FECs were more likely to be for staff training than for recruitment purposes.¹⁴⁹
202. The report goes on to confirm that, in many cases, where collaboration exists between local employers and institutions this is as a result of long-standing, well developed relationships. However, the foundation degree is highlighted as *“commonly providing a vehicle for new partnerships between colleges, universities and employers.”*¹⁵⁰ Contributors to this research broadly support this finding.
203. Research conducted by the Centre for Higher Education Research and Information in partnership with the Learning and Skills Network found, in 2008, that the involvement of employers in foundation degrees and other higher level qualifications was however *“extremely variable and related to the extent to which an Fd was bespoke or not.”*¹⁵¹ Since that time there has been very little original research on the subject of employer involvement in foundation degrees.

¹⁴⁹ Parry et al (2012) *Understanding Higher Education in Further Education Colleges*, BIS

¹⁵⁰ Ibid

¹⁵¹ CHERI, LSN (2008) *Report to Foundation Degree Forward on the Impact of Foundation Degrees on Students and the Workplace*, Foundation Degree Forward

204. The subject of employer involvement in education is also under-researched at present. A small number of studies exist, such as a Department for Education investigation¹⁵² which looked at ways of stimulating employer involvement in qualifications delivery and assessment.

205. The report – and accompanying examples (in appendices) – describes the provision of work experience as the most common form of employer involvement. However, it can often instigate other forms of engagement and a deeper relationship with education providers. The research also found reasons for involvement to stem from a small number of motivating factors:

- Dissatisfaction with the content and delivery of existing qualifications;
- Concerns about the quality of so-called ‘qualified’ recruits;
- Insufficient coverage across skills levels (at the intermediate level);
- Insufficient real-world experience in existing qualifications.¹⁵³

206. This current research has found these reasons and a number of others as leading employers to become involved in the development and, less frequently, the delivery of intermediate technical qualifications.

207. Interviews with providers and employers confirm that relationships are instigated by both parties; however, on balance, providers state they will usually approach employers first.

“Almost always us. Sometimes we do get employers coming to us and saying ‘we need this, we want that – help us’. But it’s more the other way round. But when we have an idea for design, it is usually based on labour market information. The big barrier we have is that, where there are skill shortages – where there are shortages in industry – it is also difficult to get people to teach on those courses because they can get poached or the pay rates are more attractive in that industry than teaching”

Provider – FE College

Mechanisms used by providers to engage with employers

208. Providers taking part in this research proposed the following as critical success factors for involving employers:

- Offering master classes to employers and students to encourage interest thereby giving employers something in return;
- Stressing ‘*We don’t want your money, we want your time*’;

¹⁵² Pye Tait (2014) *Employer involvement in qualifications delivery and assessment, Research report*, DfE

¹⁵³ Pye Tait (2014) *Employer involvement in qualifications delivery and assessment, Research report*, DfE

- Only engaging with alumni due to their personal connection to the institution and likelihood of them having an altruistic stance on involvement;
- Attending trade shows and talking to exhibitors on the premise that the managing director will be in attendance, making it easier to instigate relationships;
- Keeping an up-to-date record of employer contacts in a Customer Relationship Management (CRM) system;
- Employing an 'employability team' within the provider to communicate with employers;
- Employing a placement officer to find suitable work placements for students;
- Developing a culture among programme leaders to prioritise regular contact with employers;
- Having a curriculum development team which places conditions on those writing new qualifications to involve employers in curriculum design.

209. Providers gave examples of where these factors have been used to develop intermediate qualifications; these are included in Appendix E.

"Occasionally we get approached by an employer ... that doesn't happen so often with the foundation degree. ... Mostly our college partners would come to us with a proposal (based on their contact, market research etc.) ... about the demand about the foundation degree in x. ... What does make these conversations more productive is when we have staff who worked in that sector ... and that helps ... that's how our aircraft engineering course got set up"

Provider - University

210. Stakeholders also contributed their views on the formation of relationships between employers and education providers. The practice is generally perceived as being extremely difficult to instigate with a strong view that the onus should be on employers, and that local dynamics must be a primary consideration. Success factors put forward by stakeholders include (in order of the number of stakeholder suggestions):

- Employers must be able to see what providers are doing is applicable to their work, and that providers are listening and taking on board their feedback;
- Relationships are contingent on trust; the employer will invest time if they trust that the organisation is doing a good job;
- The involvement must take into account the needs of the supply chain;
- For STEM subjects, it is about making contact with networks of large and small employers;
- The qualifications have to be well-regarded by employers to meet their needs/they must have prestige.

“Large employers are there for selfish reasons, but what they do benefits the value chain”

Stakeholder - Industry/HE links

“Professional bodies have a lot to offer in this area – they have the knowledge and professional involvement to help shape valuable qualifications”

Stakeholder – Science subject-specific

211. Stakeholder interviews also sounded a cautionary note concerning the difference between qualification types. For example, Higher National qualifications being designed and regulated in a different way from others, such as foundation degrees. BTEC Higher Nationals for example are, in England, designed and awarded by one AO.¹⁵⁴

212. According to stakeholders the development of foundation degrees is now arguably more autonomous and flexible – allowing institutions to respond better to local employer demand.

Employer appetite for involvement in design

213. When considering the potential market for intermediate technical education, a crucial consideration has to be the appetite for employer involvement in their design and maintenance. An increase in demand would naturally require either greater numbers of employers to engage, or a more significant commitment from those employers already involved.

214. A key objective of the research therefore was to investigate the appetite for employer involvement in qualifications design and co-investment as a way of sharing with Government the responsibility for designing and delivering intermediate qualifications.

215. Providers involved in this research suggest employers are generally keen to input into programmes, however their involvement is typically restricted to programme design and employers can face various barriers (discussed in further detail at the end of this section).

216. The question was also asked of employers. Findings demonstrate a fairly healthy appetite for future involvement, but various caveats were attached:

- The organisation must be able to see business benefits;
- A financial incentive should be offered;
- Tax incentives should be considered.

Business benefits

¹⁵⁴ This has not always been the case. When first introduced and for many decades thereafter, HNDs/HNCs were developed by individual colleges to meet local needs and moderated and validated by another institution.

217. When employers were asked what would encourage them to become involved in qualifications development, the dominant consideration was to ensure that they are able to see a benefit to their business. The consideration of some kind of cost-benefit was highlighted by 37 employers (10%) who answered this question.

218. According to research cited earlier¹⁵⁵ (Paragraph 177) purely altruistic motivations are far less common than they were a decade ago. Today the most common business benefit sought by employers is boosting their recruitment practices by gaining direct access to graduates.

“It depends on what value you get back from it and also what benefits employers would get out of it.”

Medium employer, Aerospace

“More awareness of the benefits that it brings would encourage employers to become involved at this level.”

Large employer, Aerospace

“Seeing a clear benefit; improvement in management and service.”

Medium employer, Information Economy

Financial compensation

219. Twenty-nine employers (8%) identified a financial incentive or financial compensation as a condition which would encourage employer involvement. Those who suggested it felt Government support was the key, in the form of full- or co-investment or sponsorship in return for their ‘in-kind’ contribution.

220. This point is perhaps most pertinent for SMEs, they being less likely to receive the same ‘business benefit’ as a large employer with more regular intakes of new recruits.

“Better assistance from the government financially or co-investment would encourage employers to become involved.”

Small employer, Information Economy

“More support to invest in training and financial support would encourage employers to become involved at this level.”

Medium employer, Life Sciences

“Public advertisement, funding, financial incentive and sponsorship would encourage employers to become involved.”

Small employer, Aerospace

¹⁵⁵ Higher Flyers (2015) *The Graduate Market in 2015 Annual review of graduate vacancies & starting salaries at Britain’s leading employers*. Higher Flyers.

“Some sort of incentive; financial e.g. tax cut or guarantee of future employees would encourage employers to become involved.”

Small employer, Information Economy

221. A small number of stakeholders and providers also proposed that tax incentives should be considered for those employers who engage with qualifications development (e.g. in much the same way as employers receive tax relief for helping employees back to work after long-term absence).

222. Employers were also asked their views on the extent to which they believed businesses should be involved in various aspects of vocational and technical education, by rating the level of involvement on a scale of 1 to 10 (where 1 is ‘no involvement’ and 10 is ‘extensive involvement’) (Table 7).

223. Most employers gave a score of 5 out of 10 for both co-investment in qualifications and co-delivery, and most employers rated co-designing qualifications as 8 out of 10. This broadly supports earlier findings which showed employers were most attracted to helping design qualifications.

224. Given employers’ request for some kind of financial reward or incentive in return for their involvement the score of 5 out of 10 for co-investment in qualifications is perhaps surprising.

Table 7: Employer views on collaborative involvement in the qualifications market

Involvement	Mode score
Co-designing qualifications	8
Co-assessment	7
Co-delivering qualifications	5
Co-investment	5

Pye Tait Survey 2015

Investment in vocational education

225. The employer survey also asked about levels of investment in vocational education and the extent to which this might need to change in future. Just over two-thirds (68%) agreed that investment should increase by either a lot or a little, with just under a third suggesting it should stay the same.¹⁵⁶

226. Recent reforms to higher vocational education have involved shifting control of apprenticeship funding to employers, as well as support for higher apprenticeships and the introduction of Advanced Learning Loans.¹⁵⁷

¹⁵⁶ Figures are based on responses from 454 employers.

¹⁵⁷ Department for Business Innovation and Skills (2015) *A dual mandate for adult education, A consultation paper*. BIS

227. Specifically, funding of £20 million was made available for the financial years 2014-15 and 2015-16 to co-invest with employers in higher apprenticeships that include an HNC, HND, foundation degree, full-hours degree or Masters.¹⁵⁸

228. Employers' knowledge of recent and ongoing funding reform is uncertain, but employer views on the sufficiency of investment in vocational education suggest dissatisfaction with, or a lack of awareness of, the current approach. Based on the primary evidence from this research, the latter is the most probable explanation.

Barriers to involvement

229. Employers face a number of significant barriers to involvement, which would need to be overcome, should demand for intermediate technical qualifications increase.

230. Time as a barrier to involvement was cited by 40 employers, in two ways:

- Employers being able to find time out of running their businesses to become involved;
- The qualifications system being perceived as unresponsive and taking too long for new qualifications to reach the marketplace.

"Allowing people to give time to it on an ad hoc basis as periods of business would encourage employers to become involved"

Medium employer, Information Economy

"Government support to industry/academia to cover the costs, loss of time, etc. Having worked closely with Xxxx College, time to provide on-site support, without compromising business performance, is a key challenge for industry. As the economy steadily improves, I would hope to see an increase in industry involvement in education."

Medium employer, Aerospace

"More streamlined and transparent, the time it takes to set up is too long - we could have written the programme and identified skills required months before FE/providers. Too many people wanting funding and being out purely for profit and funding."

Large employer, Construction

"Simplicity and low time scales would encourage employers to become involved."

Medium employer, Life Sciences

231. Stakeholders also put forward a wide range of potential barriers, many of which relate to the issues of employer understanding, and perceived prestige of the qualifications. This relates to

¹⁵⁸ Ibid

the earlier point about business benefit. Encouraging employers to become involved will depend on them seeing a tangible outcome for their business. 'Prestige' and 'recognition' were words commonly used in roundtables when discussing the issue.

232. Other factors include the importance of the economic cycle in influencing demand, and the amount of work employers have on their books. This dictates the extent to which they can justify time spent on qualifications. One professional institute described the difficulty of engaging employers during the recession, i.e. when one of the main drivers of involvement – recruitment – diminishes in importance. On the other hand, when a sector is growing, employers often face severe problems in devoting time away from very busy businesses.

233. The issue of a lack of employer familiarity with the education system in general and how it works was also identified as a key barrier. This is discussed further in the following section.

Summary

The success of intermediate qualifications relies on employer involvement in their design and delivery, to ensure provision is effectively meeting the needs of industry. However, employers are changing the nature of their relationship with education: the way in which they support education programmes is fairly consistent (provision of work experience and co-design of qualifications being most popular). However, their reasons for getting involved have become less nuanced. Business benefit is top of the list.

Employers appear willing to give their time where they feel there is something to be gained; the employer survey found a healthy appetite for involvement, but there can be various barriers – time being the most significant. Employers are most in favour of working with providers to design their training programmes, and are less inclined to support delivery, which can be time-consuming and require an on-going commitment.

However, this research identified numerous examples of where providers have overcome these barriers to form mutually supportive and beneficial relationships with employers. In these cases a holistic approach is taken, using various mechanisms in combination. To be successful, however, these must be underpinned by a commitment – at an organisational level – to employer engagement.

Demand and latent demand

234. If one considers intermediate technical education as a 'product' in the traditional economic sense, awareness of the product (market knowledge) and of its benefits and costs, are fundamental prerequisites to its take-up. Demand measures in themselves are of little value if the market has imperfect understanding and awareness of intermediate technical education.
235. There is evidence throughout this research of considerable confusion in the marketplace as to what intermediate technical skills are, how they are of value in the current economy, and, perhaps most importantly, how they will be of value in the future.
236. Employers and stakeholders – but mainly the former – exhibit uncertainty as to what intermediate technical education is, and what its value is to them. That confusion extends to the way in which Government policy will work to drive (or not) the need for such skills. As with all markets, imperfect information can distort the market itself and potentially lead to future distortions and product failure.
237. Other research has shown that employers can often compensate for missing skills in a variety of ways. For example, our research on maths and English skills in the workforce¹⁵⁹ found employers using older, internal mentors in maths or automating key maths-based requirements (through pre-designed spreadsheets, for example), or even sub-contracting technical skills overseas (e.g. software-programming).
238. The effect of this is to mask or disguise a need, and this may account for some element of the apparently relaxed employer attitude to the need for intermediate technical skills, and, of course, to the providers being uncertain of what courses and standards may be needed.
239. The lack of clarity in the definition of intermediate technical skills and qualifications is almost certainly a contributory factor in these processes.
240. This section draws together the main factors **identified by the research** as creating barriers and opportunities for future demand for intermediate technical qualifications. The reader should note that there may well be other factors of which research participants are unaware.
241. Demand for intermediate technical skills and qualifications is determined by a complex web of drivers which include:
- The system itself – i.e. the degree of its transparency and complexity;
 - Information – to both employers and potential employees – i.e. the careers system;
 - The degree of recognition and perhaps the prestige of the qualifications;
 - The funding system;

¹⁵⁹ Pye Tait (2015) *The Data Source for 'Making Maths and English Work for All' – Conversations and Desk Research* NOT IN BIBLIOGRAPHY

- The promotion and availability of higher level apprenticeships (to degree level);
- The policy environment.

A complex system

242. The current research showed very clearly the confusions and lack of understanding in the marketplace for intermediate skills and qualifications.

243. Stakeholders are concerned at what they consider to be a distinct lack of employer understanding of intermediate level qualifications and of the way such qualifications can be utilised to support and boost their businesses.

244. The situation naturally varies by employer and by sector, however stakeholders describe the issues created by successive changes to vocational education which, in their opinion, has caused employers to partially or wholly disengage, due to:

- A surplus of graduates in the labour market causing employers to employ those with undergraduate and/or post-graduate degrees even though they might not be entirely suitable for the posts to which employers are recruiting;
- The infrastructure and resources in FECs being regarded as out of date, and incapable of equipping learners with the technical skills employers need;
- Funding of vocational and intermediate qualifications being viewed as complex and changeable (i.e. not offering sufficient certainty that such funding systems will survive for the time necessary to educate/train at intermediate technical level);
- The language used in the education arena being seen as impenetrable to employers, particularly SMEs which have limited time to educate themselves on the system (e.g. the 'new' names for qualifications, the rapid change in apprenticeships, and even the concept of 'levels'). Several respondents highlighted their confusion with levels, saying that they had "always" thought that the system had four or five but that "nowadays there seem to be a whole stack of new levels and we don't know what they mean" (SME employer).

"The more things change the less employers will understand, and the less they want to"

Stakeholder – Provider representative body

245. Respondent feedback argues that this leads to:

- Employers using degrees or A-levels as arbitrary 'filtering' devices when recruiting because they lack understanding of the value of different types of intermediate technical qualifications;

- Employers relying on a small number of institutions – universities and/or colleges – from which to source labour, based on assumptions about reputation (e.g. Russell Group universities);
- Employers not attaching as much value to intermediate technical qualifications, compared to well-entrenched and publicised routes such as A levels and degrees, with a consequent loss of status for the intermediate technical qualifications;
- Work experience being prioritised by employers because it is something that relates directly to their business.

“We find work experience becoming more and more important to employers. It’s about ‘Try before you buy’ because they don’t understand the qualifications”

Stakeholder – Engineering sector

“Employers usually know what they need, but they can’t always find it”

Stakeholder – Professional body

Information and awareness

246. Promotion of technician-level roles and pathways into technical sectors was widely regarded by stakeholders, providers and during roundtable discussions as being key to simulating demand for intermediate technical education – which they regard as essential to ‘balance’ the system. Respondents pointed to the apparent lack of balance for an increasingly technically targeted economy in an education system which seems to focus on A Levels and degrees and which therefore omits an arguably vital middle ground in highly valuable technical areas.

247. As discussed above, employers do not feel that they have sufficient awareness of or information on intermediate technical qualifications. This, stakeholders say, leads to employers ‘skipping’ these intermediate qualifications, employing inappropriate graduates, and training or upskilling those graduates in-house.

248. As important as the lack of employer awareness in stakeholders’ minds is, what they see as the paucity of awareness and understanding of the intermediate technical skills and qualifications among those responsible for advising and guiding young people.

“The industry needs to do a lot of in-house training especially in the specialised skills. This means the early careers pipeline is very important”

Stakeholder – Aerospace sector

249. Many contributors to the research suggest that current arrangements for providing careers advice are responsible for much of the issue by continuing to prioritise ‘traditional’ education routes through universities. The Coalition Government made efforts to resolve the situation

with new duties placed on schools in 2012. These duties concerned the provision of careers guidance which includes *“information on all options available in respect of 16-18 education or training, including apprenticeships and other work-based education and training options.”*¹⁶⁰

250. The Education Act stipulates young people must be advised about all routes, including apprenticeships. There is, however, still a very strong sense from stakeholders and employers that schools prioritise placing students into university because they receive ‘credit’ and status for this, and are able to use university entrant proportions to attract parents and children to their institutions. There is some recognition that apprenticeships have become more accepted in recent years but still considerable concern that careers advisers in schools have a vested interest in avoiding the intermediate routes, and that those outside the school system are insufficiently trained in the pathways and qualifications available.

“There is a mismatch in dialogue between employers and universities and schools. There needs to be a change in the schools system – the pipeline of 15-19 needs to be shaken up. It needs simplification”

Stakeholder – HE sector

251. As noted earlier, without informed and impartial careers information, sectors traditionally viewed as less attractive – usually those on the non-services side of the economy such as construction, manufacturing, energy, etc. – are likely to continue to suffer difficulties in attracting suitably qualified individuals at the intermediate technical level.

252. Some research respondents suggest skilled individuals are most likely to be attracted to sectors such as aerospace and automotive ahead of construction or energy. This has the potential to create barriers for stimulating demand for sector-specific qualifications.

253. Respondents suggest a further role for employers in the delivery of careers advice and guidance – in addition to contributing to the development of qualifications – but it might prove difficult for them to fulfil such a role given the more pressing demands of their businesses.

Recognition and status

254. The complexity of cultural drivers is an incredibly important factor when contemplating the issues of prestige and recognition where intermediate technical qualifications are concerned. A number of stakeholders point to comparisons with other developed nations – such as Germany, the USA and Singapore – where, they argue, the ‘technical class’ is more highly esteemed than in the UK.

255. They highlight the German attitude towards ‘engineers’ and their very strict definitions of ‘technicians’ and ‘technical qualifications’. Unlike in the UK both types of role are protected in law and no-one is permitted to use the appellation ‘engineer’ unless their qualifications fit into

¹⁶⁰ House of Commons Education Committee (2012) *Careers guidance for young people: The impact of the new duty on schools, Seventh Report of Session 2012-13, Volume 1*. UK Government

the prescribed list. Stakeholders argue quite strongly that such an approach in the UK or England would significantly assist providers and employers and would certainly clarify the careers and qualifications environment for careers advisers and employers.

256. The example of the ‘associate degree’ in the US was cited by two stakeholders who highlighted this as a successful model, with many employers actively seeking out individuals with this qualification. The associate degree is usually completed in two years, full-time, and is studied at a community, technical or junior college in the US. It is intended as an alternative to a full four-year bachelor’s degree. Usually, an associate degree can be topped-up with further study.¹⁶¹

257. While the approach is similar to that for a foundation degree there are subtle differences which may contribute to the success of associate degrees. These are very definitely standalone qualifications (albeit ones which can be added-to to bring the holder up to degree level) whereas the very name ‘foundation degree’ implies that it is a stepping stone only.

258. One HE stakeholder suggested that by offering this model in England, it could be a means of strengthening FE and HE and also of considerably strengthening the intermediate technical landscape.

259. The education ‘market’ was frequently highlighted as leading individuals to aspire to a degree, regardless of ability. As this research has found, this leads to a skills mismatch in employment, which can result in high churn, and low retention.

260. It can also mean that other types of qualifications are viewed as inferior in comparison to degrees. The ‘aspiration’ culture promoted by successive governments has arguably eroded alternative routes by downgrading them to a lesser status. An extreme example is that A levels were regarded in the 1960s and early 1970s as a perfectly acceptable entry-to-employment qualification which avoided university and which employers could use to subsequently put the young people through both intermediate and advanced technical and professional qualifications on a day-release or block-release basis.

261. The issue is also linked to a lack of understanding of alternatives to undergraduate degrees. Although there appears to be a fairly good level of awareness of what intermediate technical qualifications are, there seems to be limited knowledge of their distinct purpose and structure.

“The ability to progress beyond the intermediate qualification is a constraining point for students – they don’t see that they can progress beyond intermediate level, although some universities offer progression routes. This means fewer people are taking these courses and acquiring the necessary skills”

Stakeholder – Higher Education

¹⁶¹ Information taken from the Fulbright Commission website ‘Two-Year Associate Degrees’: <http://www.fulbright.org.uk/study-in-the-usa/undergraduate-study/getting-started/associates-degrees>

262. In the view of some stakeholders and providers (FECs) the lack of prestige attached to intermediate qualifications can result in HEIs focusing on undergraduate degrees in preference, thereby compounding the issue.

263. The growth in undergraduate student numbers and the imminent removal of the cap could also present a challenge to the growth in intermediate qualifications in both FE and HE. These policies may, therefore, not only be creating a disincentive to take up intermediate technical qualifications, but actually operating in a counter-productive way for the national economy. As one stakeholder commented *“There is a very poor schools system, no genuinely effective careers advice, a huge university sector, and a lack of understanding of technical roles among employers. People are just getting sucked into the system.”*

264. As discussed earlier, stakeholders expressed a view that institutions will naturally structure their provision to prioritise the most prestigious and profitable provision. Removal of the cap may potentially motivate FECs and HEIs to concentrate on their most prestigious courses in a more competitive marketplace. Analysis conducted by the Higher Education Policy Institute (HEPI) proposes quality to be a key concern for Russell Group universities in the face of uncapped student numbers.¹⁶² There is also the potential for division: institutions planning to expand (e.g. smaller and alternative providers) and those seeking to maintain their current status.¹⁶³

265. In this scenario, there is the potential for intermediate qualifications to suffer as full-time undergraduate degrees (supported by tuition fee loans) are prioritised by both institutions and prospective students.¹⁶⁴

“BTEC was always developed to be applied learning. It’s concerning that students may get an HND through a University, but it’s not helpful to employers. These qualifications aren’t prestigious for Universities so they aren’t interested in HNC/Ds. Universities see them a dirty subjects”

Stakeholder – Construction sector

Funding

266. Successive and on-going changes to funding in FE and HE were argued by many contributors to the research as having caused a decline in take-up of intermediate technical qualifications. The funding system is regarded as complex and questions were raised about the way that funding incentivises employers and students in often counter-productive ways, and how it has indirectly, adversely affected labour market dynamics.

¹⁶² Hillman. N (2014) *A guide to the removal of student number controls*. HEPINOT IN BIBLIOGRAPHY

¹⁶³ Ibid

¹⁶⁴ HM Treasury (2014) *Autumn Statement 2013*. HM Government

267. The introduction of tuition fees is viewed by some employers as “*an opportunity to recruit school-leavers who might be put off higher education because of the cost.*”¹⁶⁵ Rather than express an appetite or interest in enrolling these individuals onto intermediate technical qualifications, employers in these cases were hopeful that their own internal training programmes would be attractive to school-leavers as a valid and more cost-effective alternative to HE.
268. The complexities concerning funding for intermediate qualifications used in higher apprenticeship frameworks are also a potential barrier. Under the current system funding of intermediate qualifications used in higher apprenticeship frameworks can be complex. Eligibility for public funding, and the eligibility of learners for student loans, will depend on the qualifications being used.¹⁶⁶ This is perceived as creating a barrier for funding these types of qualifications.
269. Added to that, the multiple interests involved with funding at intermediate levels (which include HEFCE, the Skills Funding Agency, universities, employers, etc.) are regarded by FECs and HEIs as barriers to finding a suitable mechanism to direct funding. Sometimes, one stakeholder told us, the complexity of funding simply causes the institution to “*go with the flow*” and run with easier-to-fund degrees instead.
270. The impact of the reduction in the adult skills budget in the FE sector is also regarded as being likely to push learners towards apprenticeships, and drive FECs to prioritise this type of provision.

Higher and degree-level apprenticeships

“Employers are looking for a way of wrapping up knowledge and competence, then putting this into practice in the workplace. In a higher apprenticeship the work is all done for them, it saves the employer a lot of work.”

Stakeholder – Science Employer Partnership

271. There are at least two forces at work in the apprenticeship arena at present. The first is the way in which intermediate (Level 2) and advanced (Level 3) apprenticeships work and are funded; the second is the way in which higher and degree-level apprenticeships will operate to support intermediate-level skills and job roles.
272. In some sectors, apprenticeships are viewed as a potential recruitment remedy. The route was raised by two professional bodies in the construction sector and also at roundtable discussions for the information economy and aerospace as being potentially very advantageous in recruiting at intermediate technical level.

¹⁶⁵ Parry et al (2012) *Understanding Higher Education in Further Education Colleges*, BIS

¹⁶⁶ UK Government (2013) *Developing quality Higher Apprenticeship frameworks for England*, UK Government

273. However, the integration of degrees and apprenticeships was largely viewed – by those who cited them – as confusing. For example, the development of the degree apprenticeship was described by one stakeholder (education representative body) as nothing more than ‘brand-building’. They said that they could not clearly differentiate between a degree and a degree apprenticeship.

“Why put a degree in it? There are many other qualifications that work”

Provider – FE College

274. Other responses suggested the existence of technical degrees alongside technical apprenticeships hampers the flow of young people at 14-19 into work and further confuses an already crowded and often baffling (to employers) qualifications market. Several employers were sceptical of the need for what they regard as a product supporting the degree ‘brand’.

275. The sheer volume of apparent intermediate qualifications – HNDs, HNCs, Foundation Degrees, apprenticeships of an increasingly complex variety, and many degrees which are seen as being roughly equivalent – are also viewed by some as driving careers advisers and employers to a tactic of avoidance. The argument asserts that it is much simpler to focus on the known and ‘high status’ route from GCSE, through A Level, to degree.

276. Employers also stress that the whole system appears to be ‘reinventing the wheel’. HNDs and HNCs were/are intermediate technical qualifications which were – respectively – full-time and part-time. Both were designed and validated by employers. HNCs required periods of work-experience in various formats. These were effectively replaced by foundation degrees which, the employers at a round-table argue, are less flexible and appropriate than the HNC/HND and almost completely drop the work-experience component. Now, it is argued, apprenticeships have been invented at higher levels which effectively duplicate the theory and practice elements of the HNCs/HNDs. This raises questions about how employers will cope if all three broad types of qualification are in the market simultaneously. However, supporting the integration of intermediate technical qualifications into apprenticeships might be seen as a way of addressing this issue.

“The foundation degree was intended to be linked to employers – the degree apprenticeship is now doing the same thing”

Stakeholder – Higher Education sector

Policy

277. The Labour Government’s policy of promoting degree education, with the 50% target, was suggested as having had severe repercussions for the UK economy by diluting the value of a

degree, alongside limiting the value of NVQs by removing a structured approach to learning. Where this issue was raised, FE was regarded as being the most suitable route for addressing intermediate level technical skills needs. The point being made, and supported by a few other respondents, was that the reintroduction of polytechnics (or a similar model) – mirroring their German equivalents – would be of immense national value in focusing attention on technical skills and qualifications.

278. Government was widely praised however for supporting the employer-led agenda for skills in its formation of Industrial Partnerships, attention given to apprenticeships, and the launch of the Employer Ownership Pilot (EOP).

279. By supporting such policy initiatives, the Government is regarded as recognising a skills deficit; however questions were raised over whether Government has an ‘ongoing’ deeper recognition of need in terms of robustness and consistency.

“Policy should not be so politicised – there needs to be a long-term buy-in over 10 years. We always have to spend the money very quickly. It’s a real issue.”

Stakeholder – Vocational education

Drivers of future demand

280. Commentators on future skills needs in intermediate level roles – for example, in associate professional and skilled trades occupations – identify numerous factors that impact on the level of future demand. Sources of intelligence include industrial strategies and sector skills assessments referenced earlier in this report, as well as research into supply and demand for technician skills and STEM skills in apprenticeships.

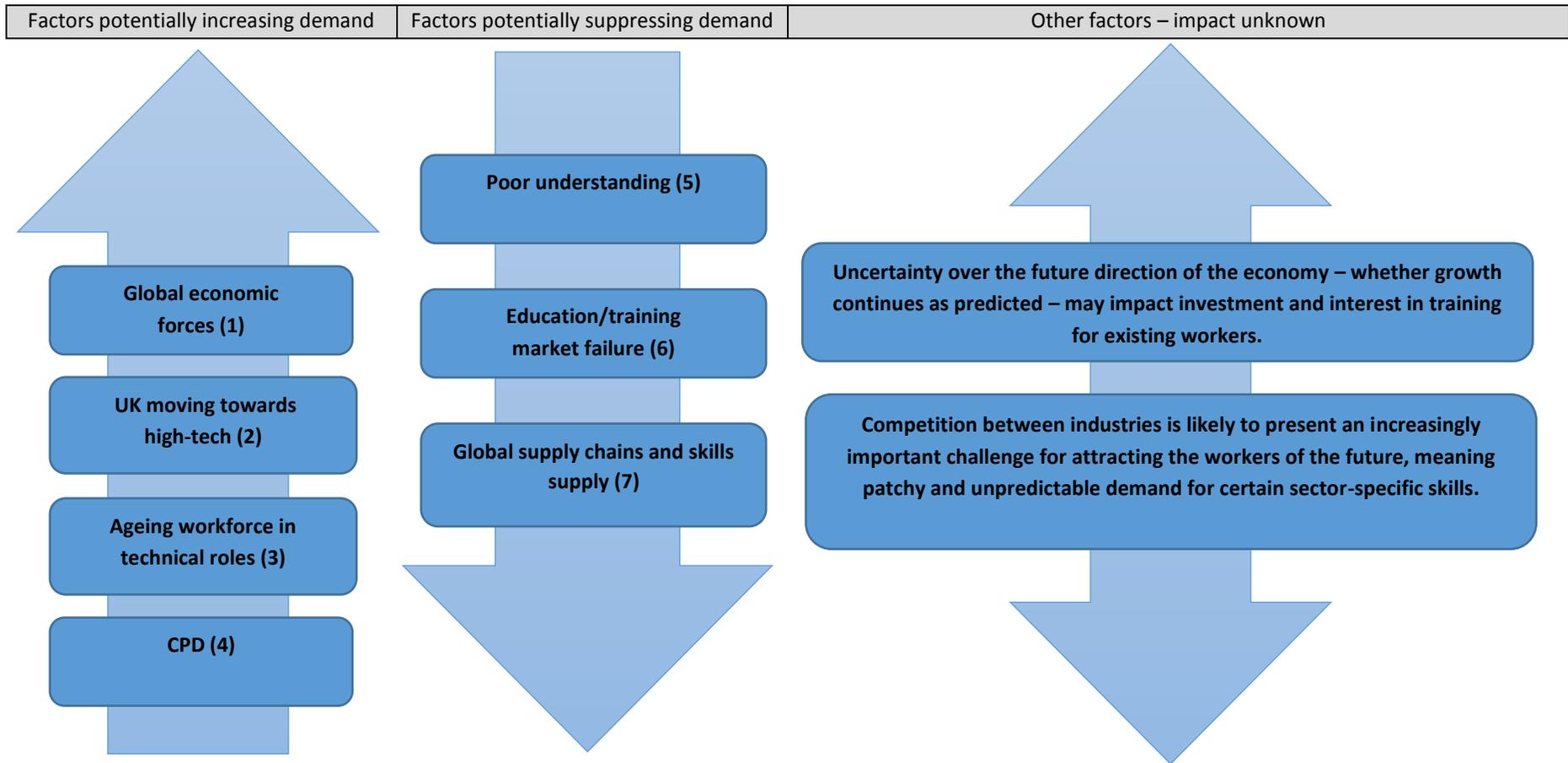
281. The most widely recognised drivers of future demand include an ageing workforce; sustainability or the ‘green agenda’; policy and regulation; the impact of technology; globalisation; competition between industries; and rapidly changing economic conditions.¹⁶⁷ See also Figure 9 which illustrates just a few of the factors involved.

282. Many of these factors are intimately linked to demand issues. What most of them have in common is their macro-influence, being high-level drivers beyond the direct influence of education policy, and requiring long-term interventions to address them.

283. The extent of impact of each of these drivers will probably differ between sectors, however the transformative effect of factors such as the impact of technology and changing economic conditions is global.

¹⁶⁷ McCaig, C et al (2014) *Research into the need for and capacity to deliver STEM related Apprenticeship Provision in England*. BIS

Figure 9: Factors driving future demand for technical skills



See notes overleaf.

- (1) Large rapidly developing nations (China, India, Brazil, etc.) are constraining future markets for lower technology products and services and driving western developed nations into a speedy transition to knowledge-based, highly technical activities.
- (2) An increasing focus within the UK – all nations – on higher technology sectors such as advanced manufacturing, electronics, computing and software, pharmaceuticals, aeronautics, and space.
- (3) Likely to result in a significant need for CPD and upskilling for older workers to keep up-to-date with industry changes (methods of production, policy etc.)
- (4) Workers in highly knowledge-intensive sectors (such as aerospace and life sciences) are likely to need ongoing CPD to keep up to date with technology.
- (5) Should employers not fully understand the need for intermediate technical skills required to support future change.
- (6) Should the education and training sector – including qualifications – not adjust quickly enough to meet both currently known and potential future demand.
- (7) Both are now truly international. A global supply chain means that entire manufacturing centres and skill demands can be relocated to areas of good skills supply.

Summary

This research has identified that there is latent demand for intermediate technical skills and qualifications – mainly in the negative sense of businesses engaging degree holders in the clear understanding that they will be employed in roles which are (theoretically) below their capability, and for which they will require re-training. Other respondents to this study have said that they employ people with lower level qualifications and then upskill in-house.

The scale of this demand is impossible to quantify without further detailed research but it certainly exists and – when linked to the drivers of future demand – it makes a very strong case for action.

However, there are numerous barriers which will need to be overcome, many of which are inter-related and inter-dependent. Firstly, there has to be stability in the system – an appeal strongly made by stakeholders contributing to this research.

Secondly, promotion of **all** the available educational routes is a critical next step to ensure both employers and prospective students have a very clear understanding of the various qualifications available in the marketplace, and their distinct purposes. This must happen if companies and individuals are to make informed choices about their future.

Only once these two fundamental issues are addressed will the nature of true demand become evident. Presently, these and many other issues are potentially masking need.

Conclusions

284. Intermediate technical qualifications are set at an undergraduate level (Levels 4 and 5) and can be delivered in either FE or HE settings. They comprise the following types of qualifications in STEM subjects:

- Higher National Certificates (HNC);
- Higher National Diplomas (HND);
- Foundation Degrees (Fd);
- Diplomas of Higher Education (DipHE).

285. Due to their ability to include an HNC/D or foundation degree, higher apprenticeships in technical disciplines are also within the scope.

The decline of intermediate technical qualifications

286. This research was commissioned as a response to the decline in take-up of intermediate technical qualifications and the need to examine factors surrounding their demand and supply (a 47% decline of entrants to such courses (English HEIs) in the three years to 2012-13).¹⁶⁸ This decline has affected qualifications in technical subjects most of all. Whilst the objective was not to investigate the reasons for that decline per se, they are of significance when contemplating potential future demand for such qualifications.

287. Policy around intermediate qualifications has been fairly static over the past decade or so, with the exception of such things as the shift from grants to loans and reduction of additional funding, the introduction of the equivalent or lower-qualification (ELQ) rule, and the removal of the foundation degree premium. All of which are supply-side factors that may have contributed towards this decline in take-up and pushed prospective students towards other routes, such as degrees.

288. The position of intermediate technical qualifications – falling between FE and HE remits – may be another important factor in influencing demand. Intermediate qualifications have been affected directly and indirectly by policy decisions on both FE and HE, resulting in uncertainty over their future.

289. This research also reveals mixed messages about the purpose of intermediate qualifications – particularly foundation degrees. The original policy intention for foundation degrees was to address technical skills shortages, notably at the intermediate technician level. However, there has been movement away from that original purpose by a broadening out into other non-

¹⁶⁸ HEFCE (2014) *Undergraduate courses other than first degrees, An analysis of recent trends*, HEFCE

technical subjects so that, today, technical (i.e. STEM-related) subjects account for only 19% of all intermediate qualifications.

290. Findings from this research with 40 stakeholders, 500 employers and 20 providers indicate a trend for intermediate qualifications to be regarded as a stepping-stone to, or even a sub-set of, a degree. The ability to progress to a full bachelor's degree is a positive feature, but it should not define intermediate qualifications. It devalues their distinct purpose and position as standalone qualifications (as addressed by the US associate degrees).
291. This research has shown that, in a great many cases, not only is a degree unnecessary for technician-level roles, but over-qualification can lead to high levels of employee churn. In certain sectors therefore high numbers of degree-qualified individuals in technician-level roles can be damaging to the economy because, as staff leave, innovation is lost and recruitment costs increase. Indeed, the work of apprenticeship Trailblazers – many of which have developed standards for technician roles – demonstrates the true level at which these roles are performed (between Levels 3 and 5).

Technician-level roles

292. The market for intermediate technical qualifications has changed, with links between supply and demand becoming more complex as the labour market evolves and re-shapes.
293. As the research has shown, using qualification levels to define technician-level occupations is problematic. Technician-level roles – for which foundation degrees were originally intended – are very poorly defined in England. Not only that, but they exist at different qualification levels (from Levels 3 to 5) within and between sectors. The SOC system also confuses the technical roles with non-technical ones at roughly the same employment level. Furthermore, the supply of graduate labour, because of the shift to degrees for recruitment purposes by employers, has changed recruitment patterns to these roles.
294. This situation suggests a pressing need for linkages and progression routes between qualifications and job roles but, **firstly, it requires a clear definition of what is meant by technician-level roles**. The professional 'technician status' introduced by the Science Council and Gatsby Foundation is addressing the definitional issue, by introducing consistency to improve and increase recognition of technician occupations.
295. There is some small progress being made therefore, but the current lack of a universal definition of 'technician' roles and qualifications makes it extremely challenging to accurately assess latent demand or to predict future labour market demand. It is, consequently, equally challenging to predict future demand for intermediate technical qualifications.

Employer demand for qualifications

296. The research has demonstrated the value employers place on the types of skills developed through work-related technical qualifications. Employers also value highly the features of intermediate qualifications being delivered in the workplace and being achievable part-time.
297. However, the findings from employers and the desk research illustrate very clearly that employers currently prefer graduates ‘because they know what they are getting’ – or they believe they do. There is evidence to suggest that, for technical-level roles, employers may be starting to attach less value to a degree, due to reported graduate skills gaps relating to ‘work readiness’ and a lack of work experience.
298. Employers recruiting technicians report that degrees are de-valued as a result of this mismatch: intermediate technical qualifications may be a better fit for these roles. This research indicates latent demand for intermediate technical qualifications, whose features, employers say, should include flexibility, completion partially in work, and up-to-date high-level technical knowledge and skills. But these distinctive characteristics will need to be known and then well understood by employers and potential learners for this hidden demand to be released.
299. Demand for these qualifications will vary by sector and by region, with different sectors having different needs and volume requirements in terms of the types of skills required. Local need and labour market dynamics are important variables.

Successful examples and market opportunities

300. There are examples of where providers (universities and FECs) have developed intermediate technical qualifications in response to local skill demand. These programmes – some examples of which are included in Appendix E – have been developed through successful partnerships with local employers and employer representative bodies. What they have in common is that they employ an holistic, organisation-wide approach to engagement, employing multiple engagement mechanisms. The act of engaging employers is viewed as a collective responsibility, embedded into the organisation’s culture.
301. Among employers there appears to be a good appetite for involvement in shaping these programmes, and this is confirmed by providers. However, it is dependent on employers seeing a value from their involvement: that they will get something out of it, whether that is access to a steady pool of skilled workers for recruitment, or assurances that current workers are being upskilled to the right standards to meet workplace requirements.
302. There are models of where this is working: apprenticeships are a prime example, but they have taken some time to emerge. Numbers of apprenticeship programme starts, generally, have progressively increased over the last decade, buoyed by a comprehensive publicity campaign including media advertising and high-profile celebrity endorsements. Funding has been bolstered and the Government has pushed the employer-led agenda with the development of new Trailblazer apprenticeships aimed at simplifying apprenticeship programmes.

303. The proposed new funding model of an apprenticeship levy takes the employer-led approach further, putting employers 'at the heart' of the system by giving them control of funding. This, along with the Government ambition to create three million new apprenticeship starts by 2020, secures the position of apprenticeships as a key component of future skills delivery.
304. Higher apprenticeships, which require a foundation degree or HND as a central qualification within the framework, present an ideal vehicle for increasing the take-up of intermediate qualifications.
305. There are a number of levers which may help to stimulate development and demand, should there be a desire to do so. These are outlined in the following section.

What can be done?

"There is a need to stimulate demand. Ten years ago no-one needed a coffee on the way to work – Starbucks et al created the demand"

Stakeholder - Provider representative body

Defining intermediate technical roles and qualifications

306. This research has found a great deal of variation in the way that intermediate technical roles and intermediate technical qualifications are defined and understood by employers and stakeholders. Work is being undertaken by the Science Council and partners through the development and promotion of 'technician status'.
307. More can be done to better define and promulgate the role; this will require working in partnership with organisations such as UKCES, the Science Council and other professional bodies to provide and agree clear definitions of what is meant by 'technician level'.
- 308. Technician levels, qualifications and roles should be defined and widely publicised.**
- 309. Consideration might be given to legislating a specified 'technician' appellation and the roles and sectors it can be used within.** There are examples of where this already works in certain sectors (e.g. pharmacy technicians and architectural technicians), where protected titles are well-known and respected amongst industry colleagues. In these cases the title is also used to assure the public that the individual has satisfied requirements of knowledge, skills and experience in their particular profession.

In an age of increased labour mobility and globalised labour markets, a legally protected appellation is also an effective tool for ensuring competence and qualification levels.

Publicising technical pathways

310. Better documentation and promotion of different career and qualifications pathways into and through technical roles is suggested as a necessary precursor to stimulating demand. Actions could include ensuring that different routes are:

- More clearly articulated (based on the above definitions);
- Communicated using a common and standardised language;
- Named in a standard manner (perhaps using the ‘technician’ appellation and legislating it to be restricted to specified roles and sectors);
- Linked to different qualifications and the distinctiveness of those qualifications explained.

311. Collectively, these actions could help to re-invigorate the ‘brand’ of intermediate technical qualifications, which has become blurred as similarly the lines between FE and HE have overlapped.

312. This would require long-term collaboration with relevant organisations with an interest in supporting intermediate technical education and technician-level roles. Examples include Gatsby, the Science Council and other professional bodies involved in supporting technician status.

313. Regarding general careers advice, there is an opportunity to engage with the National Careers Service, the Careers Development Institute and Careers England to communicate clear messages about intermediate technical qualifications.

Higher apprenticeships

314. The use of intermediate technical qualification as components of higher apprenticeships is perhaps the most immediate, as well as an extremely efficient, vehicle for stimulating demand and take-up. Current Government skills policy continues to promote apprenticeships, with a specific emphasis on higher and degree-level apprenticeships. Trailblazer groups are currently involved in designing apprenticeship standards, with higher and degree level programmes being targeted at level 4+. As a component of these programmes, intermediate technical qualifications can provide the required technical knowledge and competency aspects of training.

315. Consideration might be given to branding technical higher apprentices appropriately – e.g. as ‘technician higher apprenticeships’.

316. This action will require liaising closely with BIS and the National Apprenticeships Service to encourage the inclusion of intermediate technical qualifications in relevant apprenticeship standards.

Publicising intermediate technical education

317. One action that requires consistency over time involves active promotion of intermediate technical qualifications: HNC/Ds, foundation degrees, etc. Employers strongly favour promotion of these types of qualifications with some suggesting there may be a role for employer endorsement. They stressed however that the definitional issue and clear branding were prerequisites.
318. Mechanisms for communicating promotional messages about qualifications could include Industrial Partnerships with professional bodies. Employer organisations such as the Federation of Small Businesses and local Chambers of Commerce should also be considered as useful conduits to reach employers.

Supporting providers in engaging with employers

319. Some providers will struggle to engage successfully with local employers for the purposes of increasing awareness and understanding and of stimulating engagement and take up. Support could usefully be designed to help instigate relationships, such as through case studies and toolkits highlighting good practice in involving employers in the design of intermediate technical qualifications. The examples included in the appendices could be expanded for this purpose.
320. There will also be value in employers being guided to be clearer in promoting their needs to providers; for example on the types of skills and experience employers require of workers when recruiting to technician-level roles.
321. Providers might also be extremely valuable in assisting employers to advertise their vacancies in the most effective ways – for example using the ‘technician’ appellation.

Engage with National Colleges

322. The National Colleges are promoting a ‘hub and spoke’ model of delivery to make qualifications accessible to learners and reduce the burden on employers. Consideration should be given to working with National Colleges on their skills agenda to ensure the use and promotion of existing intermediate technical qualifications. A direct relationship between HEFCE and National Colleges will also help to introduce clarity about exactly how these will work and the potential implications for redirecting funding away from universities.

Further research

Assess capacity and infrastructure

323. The lack of adequate definitions makes accurate statistics of technician roles and qualifications impossible. Further research should be conducted to establish reliable data on these roles and qualifications (taking into account the confusion of types of intermediate role in the existing SOC structure).

324. Provision of technical courses is usually more expensive than other types of provision. Should demand for intermediate technical qualifications be stimulated, providers must be able to respond adequately. The capacity and infrastructure available within providers should be examined to understand how well they may be able to meet demand, the barriers and opportunities.

Learners

325. Consider investigating demand with learners and potential learners to better understand the influencing factors. Areas for investigation could include:

- Levels of awareness of intermediate technical qualifications amongst potential learners, school and college learners and views on their value and purpose of these qualifications;
- Factors considered by learners when making decisions about which types of courses to study; factors that might influence demand for intermediate technical qualifications;
- Destinations of graduates from intermediate technical qualifications to assess skills utilisation and perceptions of their value.

Appendices

A. The Framework for Higher Education Qualifications (FHEQ)

Doctoral Degrees (e.g. PhD, DPhil, EdD)	Level 8
Masters Degrees Integrated Masters Degrees Postgraduate Diplomas Postgraduate Certificate of Education Postgraduate Certificates	Level 7
Bachelor's Degrees with Honours Bachelor's Degrees Professional Graduate Certificate in Education Graduate Diplomas Graduate Certificates	Level 6
Foundation Degrees Diplomas of Higher Education Higher National Diplomas	Level 5
Higher National Certificates Certificates of Higher Education	Level 4

B. Methodology

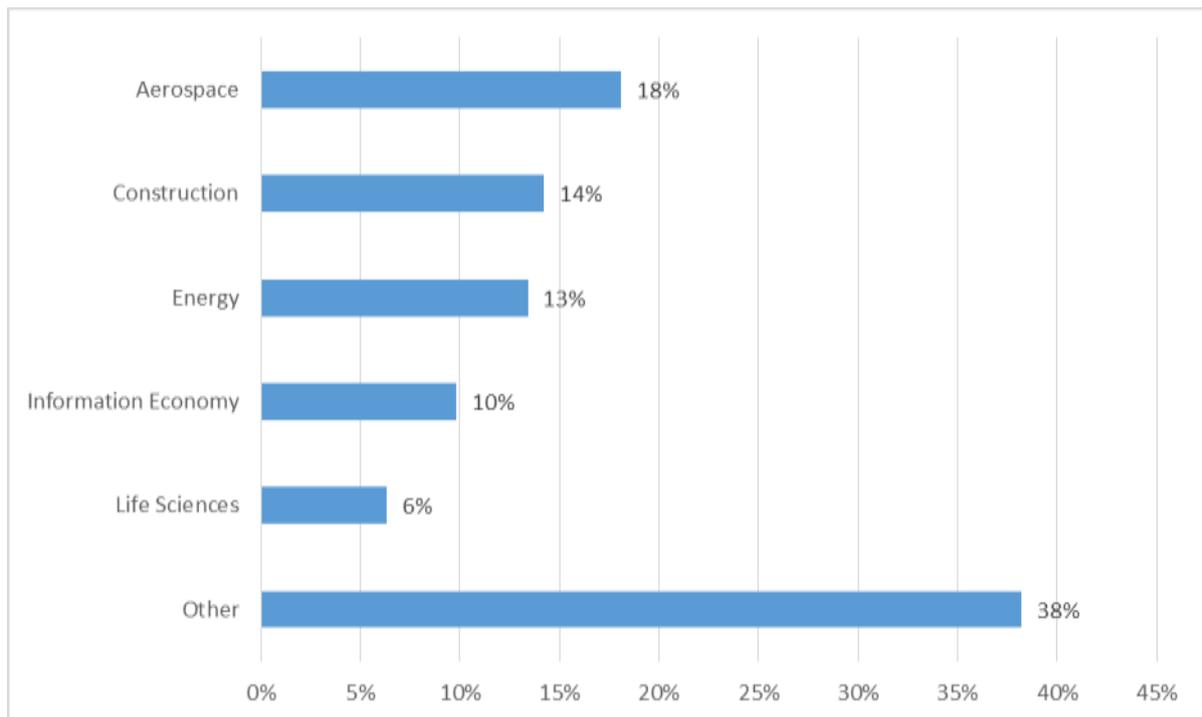
The multi-method approach was adopted, combining qualitative and quantitative techniques. Secondary research comprised:

1. A literature review of education policy and interventions;
2. Analysis of Higher Education Statistics Agency (HESA)/Individualised Learner Record (ILR) data on the supply of intermediate technical qualifications to identify those providers with the most provision;
3. Stakeholder mapping to identify those organisations with an interest in and responsibility for intermediate technical education.

Primary research fieldwork was undertaken during March-June 2015 and comprised:

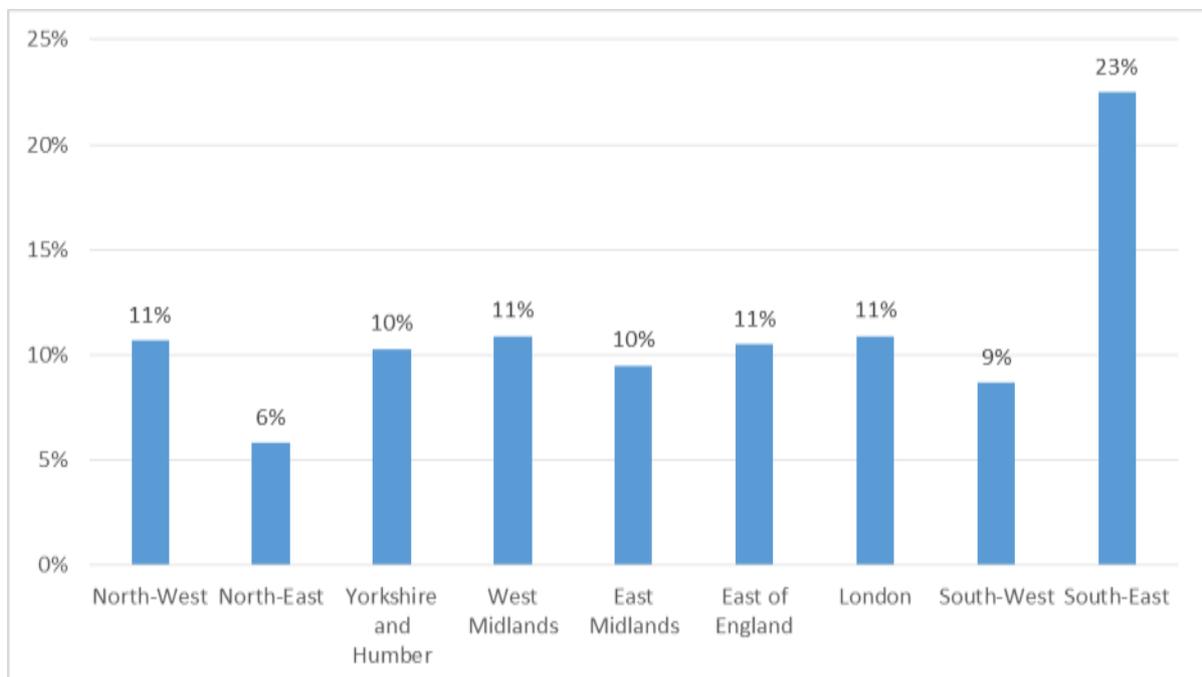
- Forty depth telephone interviews with stakeholder organisations, identified through desk research and in collaboration with HEFCE. The range of stakeholders included Government-funded bodies and agencies; business-led organisations; education/provider representative bodies; and organisations with a sector-specific focus such as professional bodies and institutes. Interviews were conducted with using a semi-structured script and lasted between 30 minutes and an hour.
- Twenty depth telephone interview with providers of intermediate technical qualifications. Interview respondents were identified from the analysis of HESA/ILR data and targeted those validating the highest numbers of qualifications. These included HEIs and FECs. Initially the top 20 providers were identified and contacted; this list was extended to the top 30 as a result of non-responses to requests for interview. Interviews were conducted with using a semi-structured script and lasted between 30 minutes and an hour.
- A telephone survey of 508 employers; a supporting online survey was also made available. The sample was structured to target an equal number (100) of employers in each of the five sectors within the scope. Due to difficulties in achieving the target number of responses in each sector - due to the small population of companies - the sample was extended to include supply chain companies involved in advanced manufacturing.
- Fifty depth follow-up telephone interviews with employers. Of the 508 employers participating in the survey, 359 (71%) agreed to take part in a follow-up call. These calls explored with employers what they felt should change in order to improve current intermediate technical qualifications; the branding of foundation degrees; and their perceptions of how well education providers understood their skills needs.

Figure 10: Employer survey respondent profile: sector



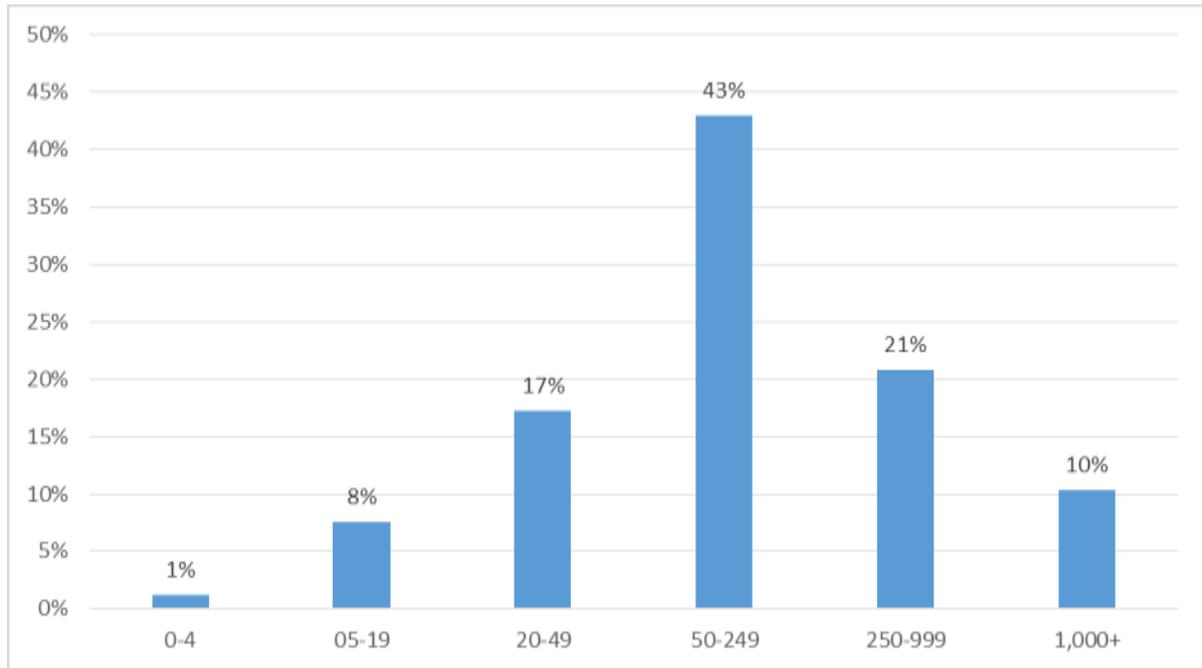
Base: 508 respondents

Figure 11: Employer survey respondent profile: region in which employer headquarters are based



Base: 503 respondents

Figure 12: Employer survey respondent profile: company size



Base: 505 respondents

C. Qualification trends – further charts

Figure 13: Numbers of FTE students registered at publicly-funded HEIs and FECs between 2005-06 and 2013-14: HNDs in technical subjects

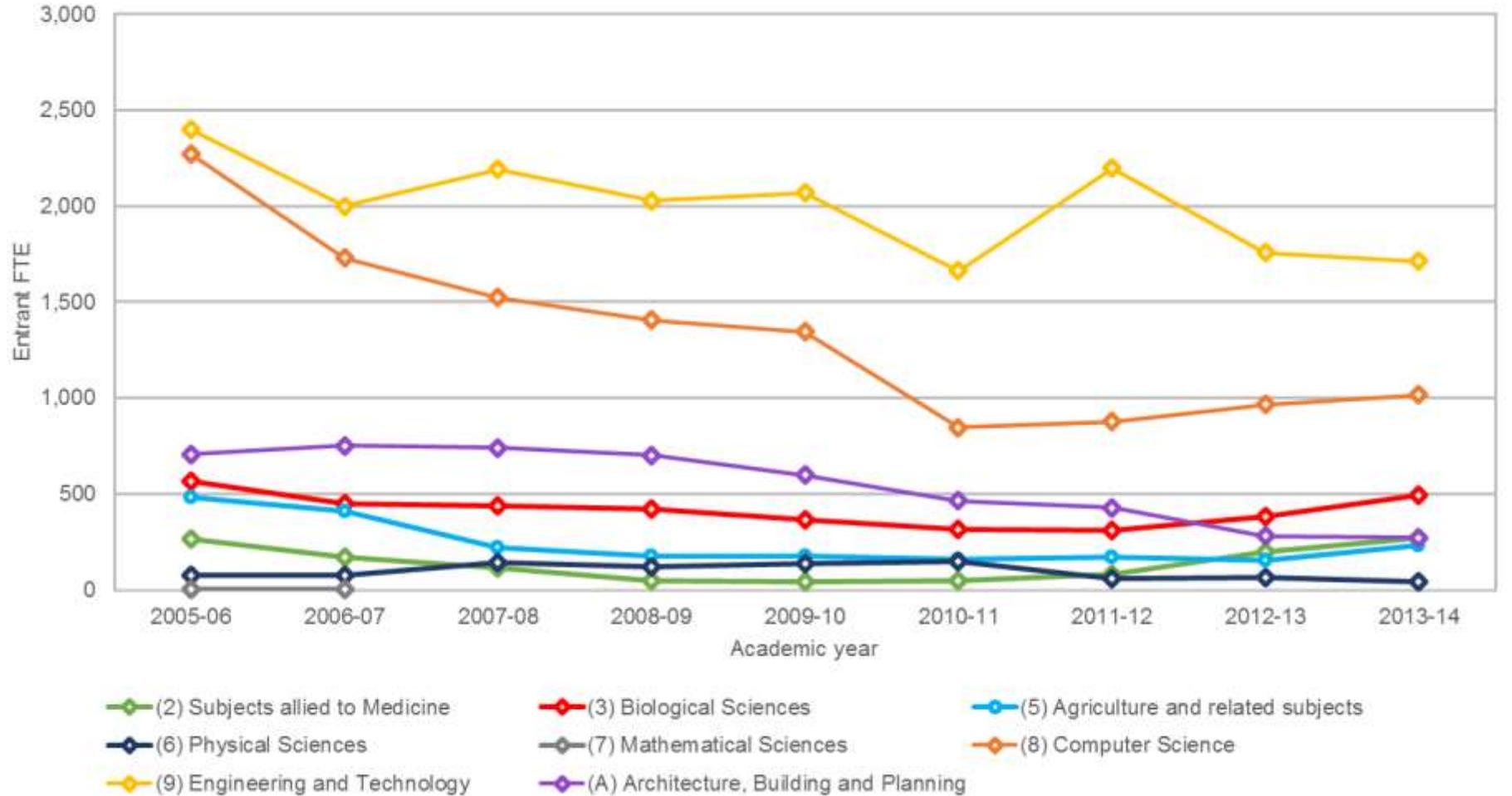


Figure 14: Numbers of FTE students registered at publicly-funded HEIs and FECs between 2005-06 and 2013-14: HNCs in technical subjects

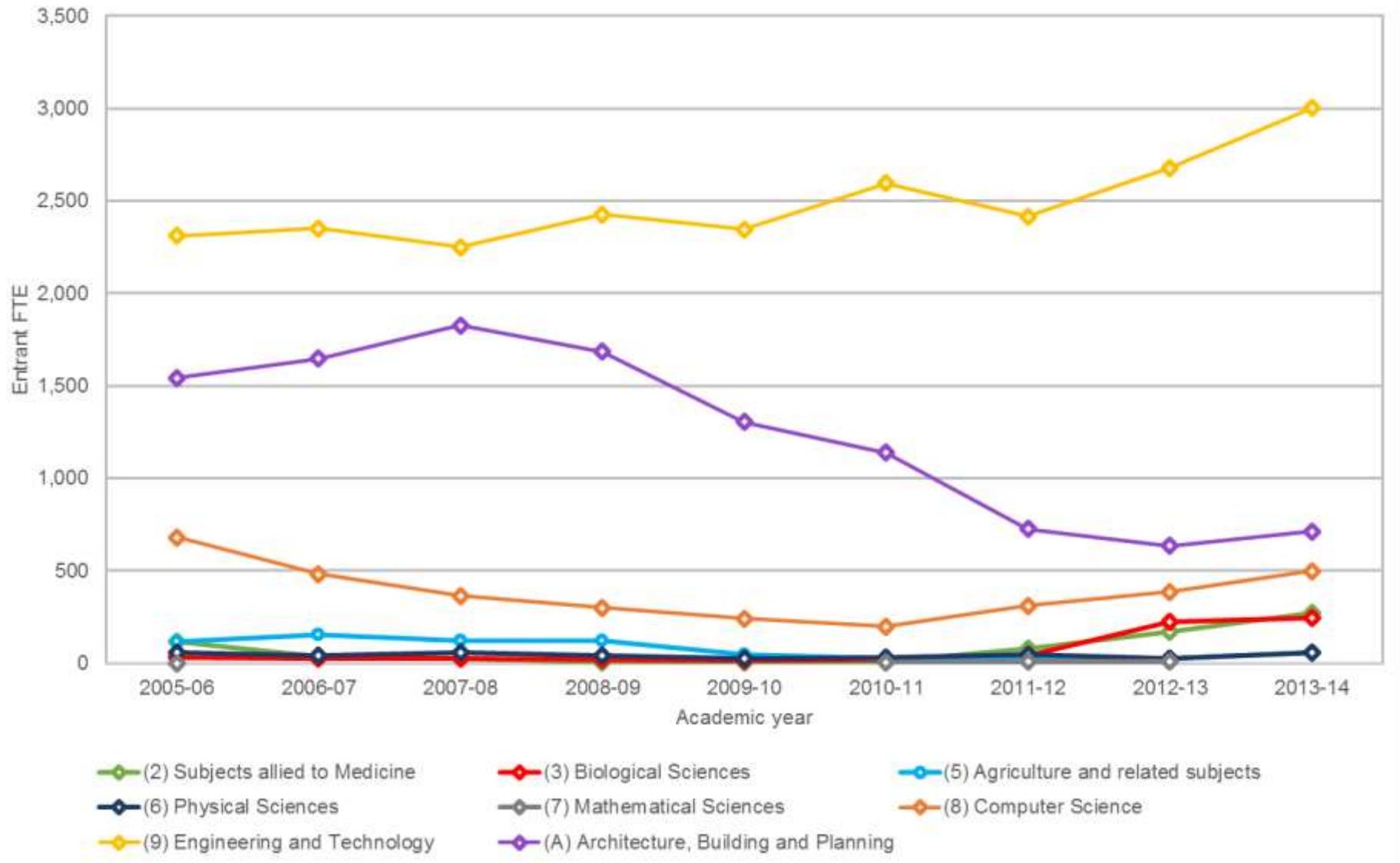


Figure 15: Numbers of FTE students registered at publicly-funded HEIs and FECs between 2005-06 and 2013-14: foundation degrees in technical subjects

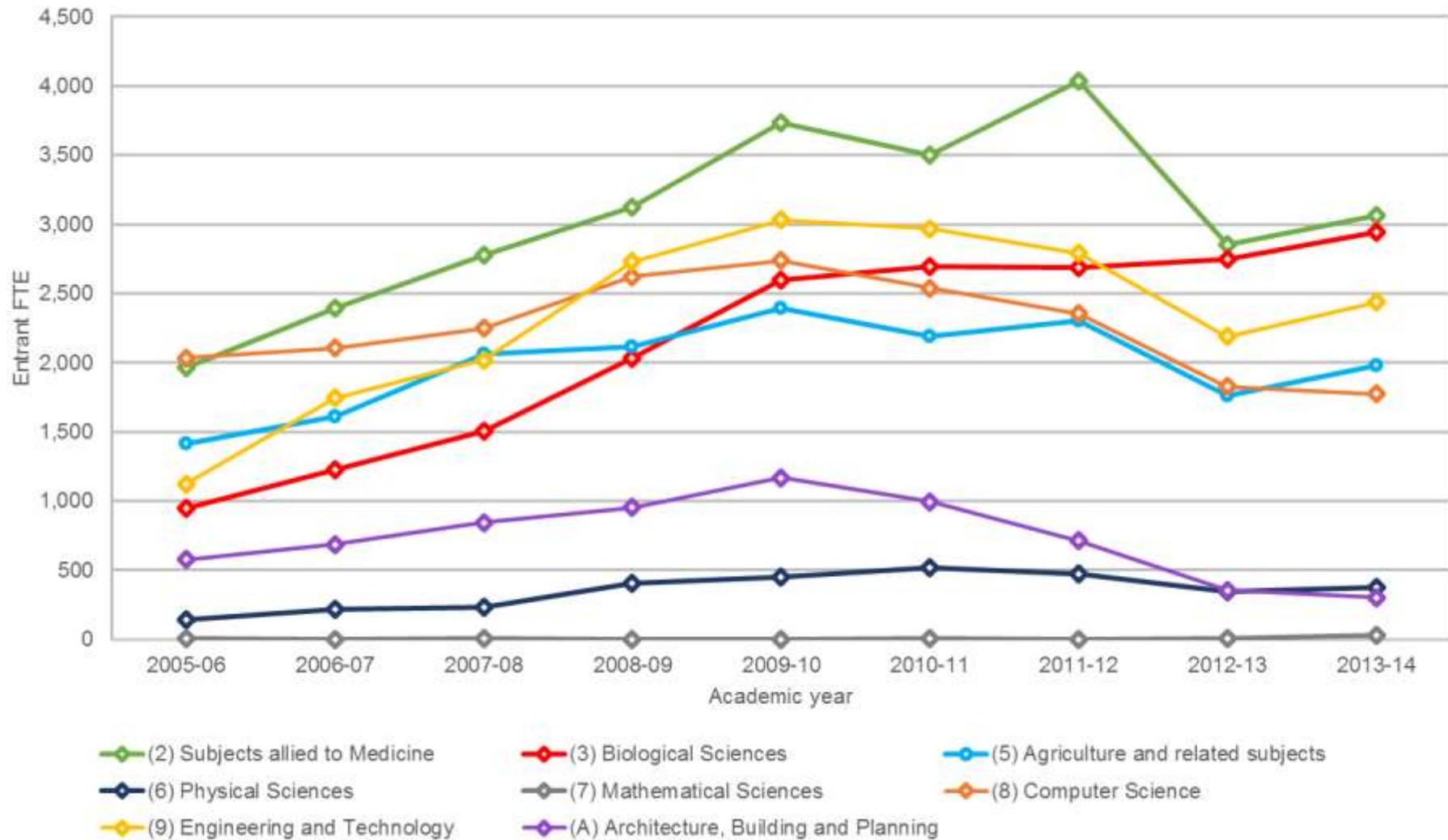
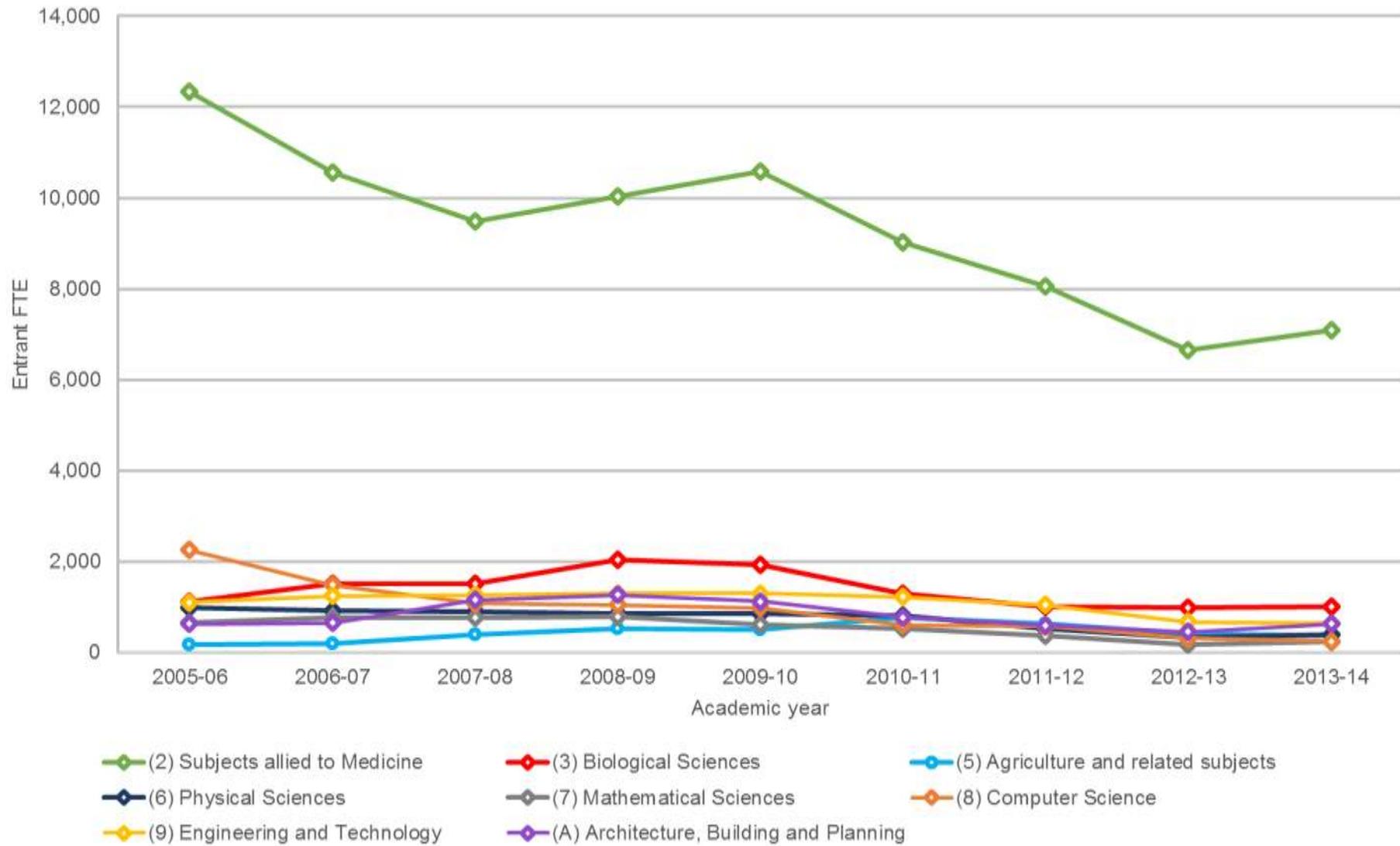


Figure 16: Numbers of FTE students registered at publicly-funded HEIs and FECs between 2005-06 and 2013-14: other undergraduate in technical subjects



D. Timeline of education policy

Date	Policy intervention
1997	Dearing Report suggested that Government should aim to respond to predicted growth at intermediate-level Colleges encouraged to both collaborate and compete with universities to expand HE
1998	Introduction of £1,000 tuition fees for HE courses
2000	Foundation degrees introduced to increase the supply of individuals qualified at intermediate level and to widen participation in HE
2003	The Government Skills Strategy reaffirmed support for higher level skills Higher level skills support for technician, higher craft and associate professional roles was targeted at level 3
2004	Higher Education Act abolished up-front fees
2005	The White Paper ' <i>Getting on in business, getting on at work</i> ' set a target for 50% of 18-30 year olds to participate in HE HEFCE and the LSC were encouraged to target funding based on Sector Skills Agreements
2006	Tuition fees tripled to £3,000 First introduction of top-up fees Higher apprenticeships introduced
2007	Following the Leitch Review of Skills, HEFCE supported the development of links between HEIs and employers and funded an additional 5,000 co-funded student places
2008	14-19 Diplomas introduced. The qualifications were intended to prepare young people for employment by combining academic learning with work experience
2009	The Equivalent or Lower Qualifications (ELQ) rule was introduced Premiums for foundation degrees removed The Browne Review looked at widening participation, affordability of HE and the simplification of student support
2010	Local Enterprise Partnerships (LEPs) are introduced to determine local economic policy; LEPs replaced Regional Development Agencies
2011	UKCES launched the Growth and Innovation Fund (GIF) UKCES launched the Employer Investment Fund (EIF)
2012	Tuition fees tripled again to £9,000
2013	Part-time premium withdrawn and replaced with fee-loans for part-time study Co-funded student numbers phased out Government announced that the cap on student numbers would be lifted in 2015
2014	Apprenticeship Trailblazers start National Colleges call for engagement launched
2015	First new higher and degree level apprenticeships announced The cap on student numbers removed from 2015-16

E. Examples developing intermediate technical qualifications

Provider name: Blackpool and the Fylde College

Blackpool and the Fylde College offers foundation degrees in Marine Biology and Coastal Zone Management, Environmental Science and Human Biosciences, Computing and ITC (Network Engineering and Software Engineering), Nautical Science and a new foundation degree in Aerospace Engineering starting in September 2015. The college also offers a number of HNC courses in engineering (General, Mechanical and Electrical) and a HND course in Marine Engineering.

The college prides itself on its successful links with the employers. This means that their students obtain a valuable industrial experience whilst also applying course content to the relevant sectors.

For example, Blackpool and the Fylde's computing department has maintained links with the major industry players, working with Microsoft and CISCO. Their Software Engineering and Game Development foundation degree was developed with a clear focus on industry requirements.

A newly developed foundation degree course (from September 2015) in Aerospace Engineering has been created through a close consultation with BAE Systems, designed to delivery knowledge, experience and transferable skills required for employment in the sector.

In addition to already mentioned examples, the college has well-established industry partnerships for their nautical and maritime provision.

Provider name: Bournemouth University and Bournemouth and Poole College

Bournemouth University and Bournemouth and Poole College have a strong partnership through the delivery of an integrated engineering pathway. Students can begin the pathway by starting off as an apprentice, or through joining the HNC/FdEng course at Bournemouth and Poole College and can eventually continue onto Bournemouth University to gain their honours degree (BEng) or an extended undergraduate degree (MEng). The pathway allows students to gain the necessary qualifications required to begin or further their career in engineering, with the BEng providing the academic element required to gain Incorporated Engineer status and the MEng giving individuals a Chartered Engineer professional status. The pathway, which can take seven years to complete if all courses are taken, allows for students to start with minimal qualifications and gives them the opportunity to build up a balance of both practical and academic skills and qualifications whilst working, to develop and enhance their career.

The transition from Bournemouth and Poole College to Bournemouth University has been popular with students due to its tailored provision.

- The college and university have sound working relationships, with a link tutor from Bournemouth University visiting students at the college regularly to build up relationships early, as many of these students continue to study at the university. Additionally, college students use facilities at Bournemouth University regularly throughout their course which familiarises them with the environment.
- Although some of the courses run by Bournemouth and Poole College are typically more vocational

in nature, whilst Bournemouth University characteristically builds on a more academic portfolio, both institutions incorporate both elements and provide on-going support throughout the pathway to ensure that students are prepared for the transition.

The BEng (level 6) and MEng (level 7) at Bournemouth University are delivered in a flexible learning format that is run as a predominantly distance learning course, which has proven to be popular as all students are already working engineering professionals. This section of the pathway has particular distinctive features which ensure a successful delivery.

- The course is run online, with discussion forums being the main mode of communication between tutors and students, allowing for a collective and social learning environment. Staff ensure they access the forums at least once a week to keep in touch with the students and ensure all queries are answered.
- Communication is encouraged via the forums rather than emails between tutor and student, this helps to ensure that all students are accessing equal information regarding units and assessments.
- There are six days across the year when students attend face-to-face sessions on campus, allowing for the introduction of each new unit and on-going support during the units.

The integrated pathway with Bournemouth University and Bournemouth and Poole College is therefore both popular and successful with students. The root of its success can be attributed to the strong collaboration between the two organisations, the flexibility of the programme to suit employer needs as well as the smooth and effective transition from the college to the university to ensure students feel capable of, yet challenged by, the progression to levels 6 and 7.

Provider name: Southampton Solent University

Southampton Solent University is recognised nationally as one of the leaders in maritime education. Through its specialised faculty - Warsash Maritime Academy - it offers foundation degree courses in Marine Engineering, Marine Operations and Marine Electrical and Electronic Engineering; the courses *“have a strong emphasis on real-world, problem-based learning, complemented by work-based learning as part of sea training – delivering the engineering knowledge and practical skills to operate safely at sea.”*¹⁶⁹ Through its Maritime Academy, Solent has very strong ties with industry including Shell, BP, Chevron, Carnival group, Maersk, Evergreen, Da Gama Maritime and Burgess.

Provider name: Staffordshire University

Staffordshire University provides a variety of intermediate technical qualifications via their partner colleges; offering a foundation degree in Animal Science with Animal Behaviour, Computing and a range of engineering foundation degrees. They also offer HND and HNC courses in Applied Computing.

Staffordshire University works with many businesses to deliver bespoke courses and one such example is a foundation degree in Environmental Management designed for Veolia Environment UK. Another example is a foundation degree for BT:

¹⁶⁹ Southampton Solent University website (2015): *Course Overview - FdEng Marine Engineering*

*"The Fd is an attractive scheme to A level students who were intending to go to university. Instead they can 'earn while they learn', gain a recognised qualification and valuable work experience."*¹⁷⁰

Provider name: Teesside University

Teesside University runs intermediate technical courses in two ways – as franchise programmes with their FE college partners, covering almost all of the subjects (e.g. chemistry, physical sciences and engineering disciplines). The university also has a large number of part-time students studying for HNC and HND courses on open and distant learning programmes. The courses with the largest uptake at HNC and HND level are in Electrical and Electronic Engineering, followed by Mechanical Engineering and a smaller number of students on Chemical/Petroleum Engineering. Teesside University also has a part-time foundation degree in Computing with partner colleges and a couple of full-time foundation degrees offered on site.

The university has been recognised for its work with employers, in 2009 winning the award for Outstanding Employer Engagement Initiative for the institution's foundation degree in Leadership and Management, developed with the North East Chamber of Commerce. The university's 'Spark Campaign' is part of its commitment to become a leading university for employer engagement.¹⁷¹

Provider name: University of Derby

The University of Derby provides a large number and variety of technical courses at the intermediate level through Buxton and Leek College, which is a part of the university. It offers courses such as foundation degrees in Computing and Clay Technology and an HNC in Mechanical and Manufacturing Engineering. Describing how they worked on developing their courses, the university emphasised the importance of working with different sector bodies and companies (e.g. Institute of Quarrying, Concrete Society) to create a bespoke offer.

The university works in partnership with Buxton and Leek College to deliver intermediate technical qualifications such as foundation degrees in a range of subjects such as Aerospace, Mechanical and Manufacturing Engineering and Nuclear, for example.

*"We are nationally recognised for excellence in engaging with employers and business and continue our work to make sure we are integrated fully with the vision of the city and the county so that we can play our part in maintaining and growing their prosperity."*¹⁷²

Provider name: University of Wolverhampton

¹⁷⁰ Staffordshire University website (2015): *Work-based learning: Case Studies*

¹⁷¹ Teesside University website (2015): *A new look a spark of inspiration*

¹⁷² University of Derby (2015) website: *HNC in Mechanical and Manufacturing Engineering - level 4*

The University of Wolverhampton provides a wide variety of HND and HNC courses. Among subjects offered are: Applied Biology, Chemistry, Pharmaceutical Science, Biomedical Science, Forensic Science, Animal Behaviour and Wildlife Conservation, Mathematics and Computing. The university also offers foundation degrees where students have *“the opportunity to develop their competencies in the theoretical and practical knowledge required”* for work in related sectors. For example, their foundation degree in Healthcare Science (Biomedical Science), is *“delivered using a mixture of work-based learning and university-taught modules covering a wide range of subjects in the Healthcare Life Sciences disciplines”*.

The university is very proud of its successful, award-nominated programme in collaboration with ZF Lemforder UK, a Darlaston-based manufacturer of components and systems for the automotive industry: *“The programme includes all current and future employees in all areas of the organisation. It allows school leavers to enter the business on an apprenticeship and to progress through Advanced Apprenticeships into Higher Level Apprenticeships and Honours Degrees....Our partnership with ZF Lemforder UK Ltd has enabled us to open so many windows of opportunities for keen and driven young people who want to break into industry and gain valuable knowledge and experience as well as for those more established personnel within the company.”*¹⁷³

¹⁷³ University of Wolverhampton (2015): *Business partnership leads to national award nomination*
<https://www.wlv.ac.uk/about-us/news-and-events/latest-news/2015/june-2015/business-partnership-leads-to-national-award-nomination.php>

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