

Educating for our Economic Future

Second report from an independent
advisory group on skills chaired by
Professor Sir Roy Anderson

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Foreword

The first report of this independent advisory group assembled by Pearson, entitled '**Making Education Work**', was published in 2014. Then and now, our membership consists of individuals drawn from the higher and further education sectors, commerce and industry. We all have a deep interest in improving skills in school leavers as they either continue in education or enter employment. The first report was designed to draw attention to a series of areas in education within the UK where improvements could be made in both policy formulation and in the design of school curricula. These included skills gaps, especially those referred to as the 'softer skills', associated, for example, with how individuals communicate effectively with colleagues and customers and how they manage working in teams to meet the changing demands of employers.

We also addressed the management of education policies across government departments, and the need for long term policy formulation, independent of which political party holds the majority in parliament, to mitigate against constantly changing directives to teachers. We also tried to put the employers' points of view concerning the skills they are ideally seeking in school leavers.

Much has changed since 2014, with Brexit in all our minds, and political uncertainty clouding the near future. Economic growth prospects are unclear at present, as are the employment prospects for young people in the United Kingdom. This new report entitled '**Educating for our Economic Future**', seeks to expand on some of the themes outlined in the first report by the provision of more detail and further recommendations. We also address several new topics, including trends in employment over the past three years, quantitative comparisons of the skill levels of school leavers educated in other countries (especially in literacy and numeracy), charting the changing employment landscape in modern economies, the challenges to creating different educational pathways, and how best to develop a culture of lifelong learning. This last point is of high importance, since we need to find ways of facilitating adaptation to an environment, in which employment needs are changing rapidly as new technologies enter at an ever-growing pace.

We have worked in close collaboration with a team led by the chief economist Peter Sellen from the Education Policy Institute which is chaired by David Laws. The members of the advisory group have greatly benefitted from, and enjoyed working with, David, Peter and their team, and the contents of this report reflect their hard work and commitment to this project.



Professor Sir Roy Anderson FRS FMedSci
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Executive summary

In 2012, with the education system at the start of a period of significant reform across all stages, Pearson invited Sir Roy Anderson to chair an independent advisory group to investigate concerns around the lack of readiness of 18-year-old students for the world of work or further study. The Advisory Group was made up of key figures from higher education, further education and industry. The first report of the group, 2014's *Making Education Work*, identified and discussed the skills and knowledge required to support the transition of young people from education to adulthood, and made recommendations to the Government on addressing them in their qualifications reform programme.¹

Some of the recommendations made in that report have been reflected in recent policies in education: the Government is involving employers in a high-profile effort to raise the standing of technical and professional education, curriculum reform has drawn on international practices, a National Careers Service has been developed, and the Department for Education is now responsible for all phases of education. However, many of the challenges identified in that report remain today. Economic developments and technological change make improving our young people's skills increasingly important. Future generations are set to face significant challenges as they navigate increasingly complicated labour markets influenced by demographic pressures on the nation's productivity as the older, non-working, population grows.

Following the referendum on EU membership, with our future supply of skilled workers less certain now than ever in recent decades, England is at a crossroads in terms of meeting its future labour market needs. The 2017 Conservative Government has committed to continuing reform of the education system, improving technical training and creating better pathways to work. This second report of the Advisory Group assesses England's progress in delivering the skills our young people need, focusing on some of the key competencies identified in *Making Education Work*, including literacy and numeracy, digital capabilities and employability skills. It provides recommendations on the design of educational pathways taking them from school to further study, to work and to adulthood.

Key findings

The country faces a range of economic challenges that raise the importance of skills

Since the recession, the UK has struggled with stagnating productivity and wages. Median real hourly pay fell by 12 per cent between 2009 and 2015 for workers under 30, compared to 9 per cent for all employees, and youth unemployment rose faster after the banking crisis in 2008.² Young workers face the prospect of having to fund the care and pensions of an ageing population: the number of people of State Pension Age and over is set to increase by around 33 per cent by mid-2039, whereas the number of people of working age is only projected to rise by 11 percent. Developments in the housing market and the gradual withdrawal of defined benefit pension schemes is concentrating wealth in older generations. A typical 'millennial' born during 1981-85 has only half as much total

¹ Anderson, R., 2014, 'Making Education Work'.

² ONS, 2017.

net wealth at age 30 as a typical adult at the same time five years before them.³ Without significant increases in productivity, wages and housing supply, this creates serious risks to social mobility for the young as well as deepening intergenerational inequality.

Depending on the final Brexit deal, and its impact on the numbers and types of migrant workers in the UK, the public and private sectors may struggle to meet their skills needs. Jobs requiring intermediate, technical skills appear the most vulnerable given the UK's long-standing difficulty in generating these skills in its workforce. If the impact of technology and trade is to cause a 'hollowing out' of middle-skilled jobs, there would be both opportunities and risks: those able to develop their skills and adjust their career paths to take advantage of the high-skilled jobs which will be created will benefit, and those who cannot may become increasingly trapped in insecure, low-level, low-paid, non-routine jobs. In this context, an obvious example is that increased automation in virtually all areas of manufacturing, and in many service sectors, will create a contraction in jobs for those without the technical skills to either develop automation platforms or to service them.

Fiscal constraints and pay restrictions, imposed as part of recent Governments' responses to high levels of public debt, continue to make the teaching profession unattractive. High workloads and a shortage of professional development within schools and colleges contribute to making the profession unappealing to the brightest and best graduates. Increasing numbers of school teachers are leaving before the natural retirement age; early leaving is up from 64 per cent of all leavers in 2011 to 82 per cent in 2016. Of those starting teaching in state funded schools in 2009-10, less than three quarters were still there 5 years later.⁴

The government is rightly acting to rationalise education pathways, but the approach must be comprehensive and focused on the quality of outcomes

In response to the demand for jobs requiring academic knowledge and information-processing skills, young people worldwide are spending longer in formal education. The education system has to strike a balance between equipping students with a general education to prepare for further study and giving them more job-specific skills. On the face of it, England's system has features in common with those of many other developed countries: students follow a broad curriculum before specialising during upper secondary education (at 16), and during that stage some opt for a more vocational education or an apprenticeship. In practice, though, it is almost unique in requiring such high-levels of subject specialisation in the more academic pathway. Whilst our A level system has been broadly successful in facilitating an increase in the number of students willing and able to complete relatively narrow degree programmes, few other successful education systems force learners to specialise so much at this point or to drop native languages and maths after 16. This approach may be cutting off opportunities for young people and depriving the country of a balanced set of work-relevant skills.

Reforms to technical education announced in the Post-16 Skills Plan offer a genuine opportunity to improve upon a complex vocational education system which has too often failed to serve the needs of learners or employers. The grouping of college-based programmes and apprenticeships into one of 15 routes may make providing useful careers education easier, and delivery of a 'common core' of

³ D'Arcy, C. and Gardiner, L., 2017, 'The Generation of Wealth: Asset accumulation across and within cohorts', Resolution Foundation.

⁴ Department for Education, 2017, 'School workforce in England: November 2016'.

English, maths, and digital skills is essential given England's shortcomings in basic skills. In designing the new system, though, it is important to provide a positive route of progression for the many young people, including those choosing applied general qualifications alongside A levels, who are looking to develop knowledge of industries without closing off options to progress to a wide range of occupations or further study. There is a risk that, on both the academic and technical side, young people are forced into choosing among a range of narrow options at the age of 15 with long term implications they do not yet understand. An increase in post-16 educational participation has been a success of education policy, but it raises the challenge of providing adequate provision post-16 for those who are not ready to enter advanced study and who are more likely to be disengaged from education. Judicious use of the transition year, which could include a traineeship, will be key; this is especially so for vulnerable groups such as low-achieving young men and those with learning difficulties or a disability.

Expansion of the system of apprenticeships, funded through the Apprenticeship Levy, is also welcome given levels of satisfaction and established economic returns associated with this form of training. However, there are risks that apprenticeships are increasingly used to validate existing, older workers' skills, rather than preparing younger people for the world of work, and it is essential that newly-provided training is truly additional. If completing an apprenticeship is to enable a student to move upwards and laterally, standards need to be sufficiently broad and deep, while also addressing a specific skill shortage. Transitions between college-based and work-based routes will need to be clarified to ensure students are not at the mercy of local labour market conditions, especially in a country where moving to take up training is made difficult by a shortage of housing.

In order for students to confidently navigate the range of options open to them, and understand the implications of their educational choices, they need access to high quality, independent careers education, information, advice and guidance. The successful introduction of the Post-16 Skills Plan pathways will depend on tackling the current patchy and unsatisfactory provision of advice. Simply placing the responsibility with schools who may have a vested interest in encouraging pupils into a sixth form, or where the teachers have little experience of the technical sector's offer, may not be the answer.

Finally, it is important to ensure there is the right balance between three-year undergraduate degrees and other forms of post-secondary education, including shorter tertiary qualifications and technical training. In 2015/16, almost 400,000 learners were awarded an English undergraduate degree compared to around 14,000 publicly-funded level 4 and above awards in further education, while England has one of the highest proportions of graduates in jobs that do not require their level of qualification in the OECD.⁵ It is important that funding across the adult education system helps young people make decisions based on what works for them and for the economy, rather than arbitrary decisions about what forms of education to prioritise.

⁵ Skills Funding Agency, 2017, 'Statistical first release: further education and skills'. HESA, 2017, 'Statistical First Release 242'. OECD, 2016, 'Skills matter: further results from the Survey of Adult Skills'.

The global recognition of employability and ‘soft’ skills should be reflected in education, but with due regard to the evidence on how to develop them

The importance of soft skills, 21st century skills or non-academic skills is being increasingly recognised in curriculum design internationally. With jobs becoming less procedure-driven and careers evolving and changing over time, employers are also increasingly looking for such skills in new recruits. Whilst employers in the UKCES’s 2015 Employer Skills Survey reported that specialist skills and knowledge are the most difficult to obtain from applicants (64 per cent cite such difficulties), they also described challenges finding people who can manage time and prioritise tasks (47 per cent), possess customer handling skills (39 per cent) and are good team workers (33 per cent).⁶

The evidence for the malleability of non-cognitive skills, and for the effects on wider outcomes of deliberate strategies for enhancing them, is mixed. Allocating core curriculum time to their teaching might not always be justified. Alternatively, variety in the delivery of core course content in schools may offer opportunities to develop these skills, provided it does not detract from the more direct teaching methods that have been shown to be most effective for conferring knowledge of traditional subjects. In fact, given these two sets of traits appear important in combination, and it is not clear how to develop them separately, it would appear that arbitrary distinctions between activities, programmes or educational routes intended to boost knowledge and those intended to build wider skills are unhelpful.

There are risks that an excessive reliance on narrow measures of accountability for schools undermine the provision of broad curricula and the development of well-rounded individuals. Out of school experiences and community projects can support the development of non-cognitive skills, but it is unclear whether these should be developed as national schemes or as part of locally-led programmes.

Schools and colleges are adapting to the changing needs of the economy, recognising that digital skills must be developed at all levels

Digitalisation and automation are changing the number and types of job available and the skills required to carry out existing jobs effectively. Around half of adults in England have basic or no ICT skills, and this is higher than the OECD average. Younger people fare better, but facility with social media should not be mistaken for ‘digital literacy’ and work-based digital skills such as knowledge management and data analysis. Strong ICT skills offer opportunities to overcome the disadvantage of having low formal qualifications in the English job market, but such skills are increasingly being demanded in combination with other higher-order skills such as problem-solving, social skills and literacy and numeracy. The school system has a key role to play in fostering digital skills alongside maths and literacy skills. The teaching of coding in English schools has been a welcome development but many teachers lack confidence in delivering the curriculum.

There is considerable potential for the role of technology to enhance pupils’ learning and to reduce teacher workload. Given the typically large up-front costs involved, the use of technology in the

⁶ UKCES, 2016, ‘Employer Skills Survey 2015: UK Results’.

classroom needs to be underpinned by a sound pedagogical approach with sufficient time given to teachers to make good use of it and so make the investment cost-effective.

Addressing the development needs of existing workers is an important priority – according to the CBI and Pearson’s Education and Skills Survey of 2015, around half of businesses (46 per cent) are aware of deficiencies in their current workforce.⁷ Employers also need to be better at exploiting the existing digital skills of their employees to harness the potential of new technologies to drive business growth, innovation and broader societal development. The new apprenticeship system also offers an opportunity to improve the links between digital skills development, education and use of skills in the workplace to drive up productivity.

The UK’s adults have relatively poor levels of financial literacy, and young people’s proficiency is strongly linked with parental influences. Schools play an important role in financial literacy development through their teaching of maths competencies. It is uncertain how successful the integration of specific financial concepts into citizenship and mathematics teaching has been, but feedback from pupils, particularly from disadvantaged groups, suggest that they are keen to learn. Mixed evidence on the effectiveness of specific financial literacy interventions points towards the benefits of providing experiences which allow pupils to exercise the practical skills they have learnt in the classroom before they are forgotten.

Our long term economic challenges demand a new approach to career development and lifelong learning

Career paths today are often more dynamic than in the past; spanning multiple roles in multiple fields. For an individual well-equipped for this it can be life-enriching. For others it can be daunting, a world away from the security and personal visibility of a ‘job for life’. A grasp of the basic tool kit of practical numeracy, English and life skills can facilitate career flexibility but, beyond this, a commitment to lifelong learning should be at the heart of any credible skills strategy. Research evidence points to a clear link between lifelong learning, national prosperity, reduced inequality, improvements in emotional wellbeing and societal cohesion. The UK has relatively low rates of employment-based training (according to the 2010 Continuing Vocational Training Survey, 31 per cent of UK employees attended vocational training courses at work, compared to an EU average of 38 per cent), consistent with its lightly regulated and high-turnover labour market, its tax system, and its industrial make-up.⁸

Overall rates of training, including informal learning among the wider population, have tended to compare better with those of other advanced economies, but there are deep inequalities in access according to income and prior education, and provision has fallen in recent years. Those who stand to gain the most from undertaking learning are least likely to participate – often due to issues of cost. Inconsistencies in the public funding of qualifications of different types may exacerbate future skills shortages and undermine attempts to raise the standing of technical education. Personal learning accounts – particularly if lessons are learned from the previous discredited Individual Learning Accounts scheme could play a key role in encouraging learning over the life course.

⁷ CBI and Pearson, 2015, ‘Inspiring Growth: Education and Skills Survey 2015’.

⁸ Eurostat, 2016, ‘Continuous Vocational Training Survey’.

Recommendations

Based on the Advisory Group's assessment of the varying issues covered in this report, recommendations of this report are divided into two groups below. The first concerns issues requiring urgent action or which relate to the current reform programme of the Government. The second reflects areas where change is desirable but where options need to be considered over a longer period of debate, to inform the consensus-supported, carefully-implemented strategy that education policy needs.

Recommendations for urgent action

Recommendation 1: The Post-16 Skills Plan offers the prospect of clearer, improved pathways for 16-year-olds seeking a route to skilled employment, via T levels or apprenticeships. However, with the alternative A level pathway providing a focused curriculum designed mainly for entry to undergraduate degrees, there is a risk that the new landscape represents a bifurcation into two narrow paths that fail to appeal to those motivated by a more 'career-based' education, developing knowledge of particular industries whilst leaving a range of options open for technical training or academic study later. Meeting such demand effectively could provide more logical routes to level 4 and 5 training, and help broaden the range of provision in higher education to include more professional, technical and shorter courses. Combined with its promised review of tertiary education, the Government should develop a coherent vision for post-16 education that takes into account the full range of pathways sought by young people, avoids undue focus on access to three-year undergraduate degrees at the expense of other qualifications, and links effectively with the key stage 4 curriculum. T levels should be designed to fit with this wider vision.

Recommendation 2: A cross-party consensus for expanding apprenticeships is a welcome development. However, given the risks of not achieving effective delivery, the Government should avoid focusing on narrow numerical targets and develop broader measures of success that consider the quality of training and its value to employers and learners. Being able to assert with evidence that these routes are beneficial will be a vital part of improving their reputation with learners and their parents. Given the dependence of apprentices on the sustainability of their employer's business for their programme of training, it should consider how to ensure learners can move between apprenticeships and classroom-based technical routes, and whether transparent and portable qualifications should play a role in apprenticeship standards to enable them to market their knowledge more widely.

Recommendation 3: The Government should review the current approach to supporting low-achieving, disengaged students, and those with special educational needs, to ensure it takes into account wider changes in local and national policy and the increasingly limited resources of local authorities responsible for education participation. It should consider the large body of experience and evidence generated by recent interventions including the Youth Contract and the introduction of Traineeships. The transition year proposed as part of the Post-16 Skills Plan should be designed as part of a fully-formed three-year journey, to ensure young people are equipped with the right skills to progress into further education and to re-engage with English and maths over a sustained period.

Recommendation 4: The Government should publish a comprehensive careers strategy. It should commit to ensuring the new educational landscape is complemented with objective careers advice from earlier than key stage 4, alongside more fairly-distributed employer engagement in schools, building on the progress of the new Careers and Enterprise Company. It should carefully review the

implications for careers education of efforts to increase the involvement of universities in running schools and examine a broader range of options to trigger improvements.

Recommendation 5: The Government should retain the ambition for everyone to attain at least a level 2 in English and maths by 19. To support this, it should develop Functional Skills into a high quality, relevant and recognised qualification whose success is measured on progression rates, employment outcomes and equipping young people with basic skills. It should also monitor whether students taking apprenticeships are progressing well enough and review the suitability of this route for those lacking basic literacy and numeracy. The 15 new technical routes could allow for higher contextualisation of maths to help ensure retention and student engagement with the subject.

Recommendation 6: The Government should launch a high-profile national campaign to promote its funding for free training and tuition for any adult wanting to study English and maths up to and including GCSE level, and should proactively help adults in finding the most appropriate and nearest help.

Recommendation 7: The Department for Education should promote the consideration of transferable skills to support career development, but it should ensure this is integrated sensibly in teacher training as part of evidence-based, subject-specific approaches. Working with Ofsted, it should prioritise ensuring that the school and college accountability system supports provision of a sufficiently broad curriculum that offers children a range of experiences, before advocating specific interventions to affect non-cognitive traits or the use of scarce curriculum time for the teaching of generic skills.

Recommendation 8: The Government should develop a fresh and comprehensive strategy, considering early years, school, further and higher education settings, to improve the working conditions, development, professionalism, recruitment and particularly the retention of teachers and other education staff.

Recommendation 9: The Government should assess the extent to which children are being introduced to financial concepts and knowledge in key stage 2, and monitor how national curriculum requirements in secondary schools are being implemented in practice. It should reflect on EEF's emerging evidence on the support given to schools in delivering the national curriculum requirements for financial literacy. Schools should be expected to cover the current student loan system, and the financial aspects of the apprenticeship system in England, as part of the citizenship curriculum or careers education.

Recommendations for longer term policy development

Recommendation 10. The Government should develop formal mechanisms, for instance appointing an independent panel, to ensure that curriculum and assessment policy decisions for school and further education are made in ways that reflect the full range of society's interests and the need for careful implementation.

Recommendation 11: The Government should explore the development of personal learning accounts or other ways to give people better access to training to upskill or change careers in later life, including the provision of maintenance support for a wider range of technical courses beyond those delivered through Institutes of Technology.

Recommendation 12: The recent expansion of the National Citizen Service has broadened the experience of many young people and appears to have been well-received. The government should

heed the NAO's recent warnings to ensure further expansion does not compromise effectiveness. It should consider how the introduction of a Passport for Life might support development of a wider set of locally-tailored interventions – linked with school, college and local authority approaches – with more scope for innovation, subject to safeguards for the quality of provision.

Recommendation 13: Computer use is embedded in school life already, but beyond introducing the computing curriculum and teaching how to develop programmes and coding – which has been a positive step – the Government should continue to seek to raise standards for digital skills in schools, colleges and universities. Familiarity with modern software should be augmented with more workplace-focused skills.

Recommendation 14: The Government needs to develop plans, alongside industry and commerce, to address the changes to employment caused by developments in robotics and automation. Through the development of apprenticeship standards, employers should collaborate at national level to identify gaps in digital skills levels and help establish appropriate minimum standards. Education providers at all levels should ensure their offers are aligned to identified needs, that their workforces can deliver these programmes, and that they appeal to young people.

Recommendation 15: Better use of digital technology could improve pupil outcomes and reduce teacher workload. Following the closure of Becta, the Government should monitor whether schools and multi-academy trusts have adequate support in making cost-effective use of the likely expansion in digital resources, and ensure that teacher training establishes the right core digital capabilities. However, it should continue to work with the Education Endowment Foundation to focus on trialling new approaches and disseminating evidence to schools before encouraging the adoption of any particular technological solutions.

1. Introduction

Background

Business leaders and academia have long complained that students are not as prepared at 18 for the world of work or further study as they should be. In 2012, with the education system at the start of a period of significant reform across all stages, Pearson invited Sir Roy Anderson to chair an independent advisory group to investigate these concerns. The Advisory Group was made up of key figures from higher education, further education and industry.

The first report of the group, 2014's *Making Education Work*, identified the skills and knowledge required to support the transition of young people from education to adulthood, and made recommendations to the Government on how to ensure their qualifications reform programme reflected this. In relation to some of the specific recommendations of that report, progress has been made:⁹

- In 2016, with the creation of the new Department for Business, Energy & Industrial Strategy (BEIS) most education responsibilities were moved to the Department for Education under a single secretary of state, offering an opportunity to develop a shared set of objectives over all forms of education (Recommendation 9).
- Though it does not explicitly align its advice with wider industrial priorities, as recommended the National Careers Service was launched in 2012 and continues to provide young and people and adults with advice and information on careers, training opportunities and the job market, with face-to-face support for adults (Recommendation 6).
- The new national curriculum for primary and secondary education, launched in September 2014, was informed by a review of practices in high performing jurisdictions around the world (Recommendation 10).¹⁰
- Following years of incremental policy changes, the 2015 Government announced an overhaul of apprenticeships and technical education to be delivered over several years based on the findings of Lord Sainsbury's review of technical education. These have the intention of improving the quality and recognition of non-academic educational routes (Recommendation 11).
- Though recruitment remains challenging and results remain to be seen, the Government is currently implementing new programmes to encourage graduates to enter the teaching profession, in order to attract returning teachers, help postgraduates combine research with teaching, and support undergraduate students to engage earlier with the profession (Recommendation 13).¹¹

However, as this report shows, many of the challenges identified by *Making Education Work* remain unaddressed. Economic developments and rapid technological changes make improving our young

⁹ Anderson, R., 2014, 'Making Education Work', pp. 7-8.

¹⁰ House of Commons, 2017, 'Briefing paper: The school curriculum in England'; 'Department for Education, 2011, 'The Framework for the National Curriculum. A report by the Expert Panel for the National Curriculum review'.

¹¹ House of Commons Education Committee, 2017, 'Recruitment and retention of teachers: Government Response to the Committee's Fifth Report'.

people's skills increasingly important. Future generations are set to face significant challenges as they navigate increasingly complicated labour markets in the face of demographic pressures on the nation's productivity and rising automation and robot use. Following the referendum on EU membership, with our future supply of skilled workers uncertain, England is at a crossroads in terms of meeting its labour market needs.

This report

Against this changing context, over 2016 and 2017 the Advisory Group have reviewed England's progress in developing the skills our young people need, focusing on some of the key competencies identified in *Making Education Work*, including literacy and numeracy, digital capabilities and employability skills. With the school system still implementing a raft of Coalition Government reforms to accountability, curriculum and institutional arrangements, the group's primary focus has been on the design of educational pathways from school to further study beyond 18 and adulthood. To inform their deliberations, the Education Policy Institute (EPI) and Pearson hosted a conference of policymakers, businesses and academics, 'Educating Young People for the Modern Economy', in 2016. A summary and presentations from the event can be found on the EPI's website.¹²

Alongside relevant research evidence and statistics, this report outlines the group's key conclusions. The recommendations presented are based on the views of its members, but may not reflect those of the organisations they represent. The remainder of the report is organised as follows:

- **Chapter 2** surveys recent labour market and economic developments, assessing the long-term implications of current trends for today's young people;
- **Chapter 3** reviews the varying pathways available to young people moving from school to work and higher study, assessing the current Government's reform programme for post-16 training, careers education, full time education and apprenticeships;
- **Chapter 4** addresses England's shortfall in literacy and numeracy in school-leavers;
- **Chapter 5** examines the best ways to improve the development of employability skills in young people;
- **Chapter 6** assesses whether our education system is meeting the needs of a rapidly changing economy that requires digital capabilities and financial literacy; and
- **Chapter 7** addresses the challenge of providing people with the future opportunity to continue education throughout adulthood.

¹² Townsley, J., 2016 'Reflections on 'Educating Young People for the Modern Economy' Conference', Education Policy Institute, available from: <https://epi.org.uk/news/reflections-skills-conference/> .

The Advisory Group

Chair: Sir Roy Anderson FRS, FMedSci.

Sir Roy is Professor of Infectious Disease Epidemiology in the School of Public Health, Faculty of Medicine, Imperial College London and Director of the Centre for Neglected Tropical Disease Research. His recent appointments include Rector of Imperial College London and Chief Scientist at the Ministry of Defence, UK. He is a Non-Executive Director of Glaxo Smith Kline. His research interests are in interdisciplinary studies at the interface between medicine, biology, mathematics and computation.

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2. Economic challenges

As the following sections outline, wider economic and political issues mean that it has never been more important to ensure young people leave education with the skills needed to prosper in tomorrow's economy. The global competitive landscape for manufacturing and provision of services, has changed considerably over the past decade, and the pace of change is rising.

Recent developments in productivity and wages do not favour younger generations

Since the financial crisis, productivity and wages have stagnated. While average real pay has similarly struggled to regain the ground lost since the crisis, it is the wages of those aged under 30 which have suffered the most in percentage terms – median real hourly pay fell by 12 per cent between 2009 and 2015 for this group, compared to 9 per cent for all employees.¹³

Historically, real pay and rising living standards generally tend to follow gains in productivity. However, since before the recession, median pay has failed to keep up with changes in output; it has been a fall in the share of workless households and relatively higher salary gains for lower earners that have kept a lid on income inequality during the recovery.¹⁴ Output per hour remains around 16 per cent below the rest of the G7 average, and whilst all developed economies have struggled to regain the ground lost since the recession, the UK has not performed well in comparison over the past few years. The gap between where productivity would be compared to where it is now, based on trends before the recession, was over 15 per cent in 2015, the largest in the G7, and double the average of 7.5 per cent across the rest of the G7.¹⁵

¹³ Gardiner, L., 2016, 'Stagnation Generation: The case for renewing the intergenerational contract', Resolution Foundation.

¹⁴ Machin S., 2015, 'Real Wage Trends', Presentation given at Understanding the Great Recession: From Micro to Macro Conference, Bank of England, September 23/24 2015, available from: https://www.ifs.org.uk/uploads/Presentations/Understanding%20the%20recession_230915/SMachin.pdf;

Belfield, C., et al., 2016, 'Living Standards, Poverty and Inequality in the UK: 2016', Institute for Fiscal Studies.

¹⁵ ONS, 2017, 'International comparisons of UK productivity (ICP), final estimates: 2015'.

Figure 2.1: GDP per hour worked, G7 countries 2014 and 2015¹⁶

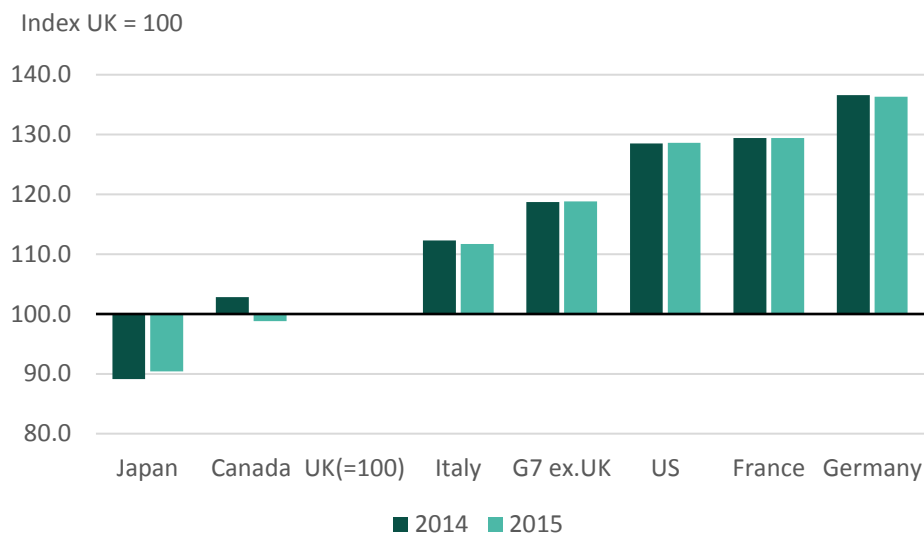
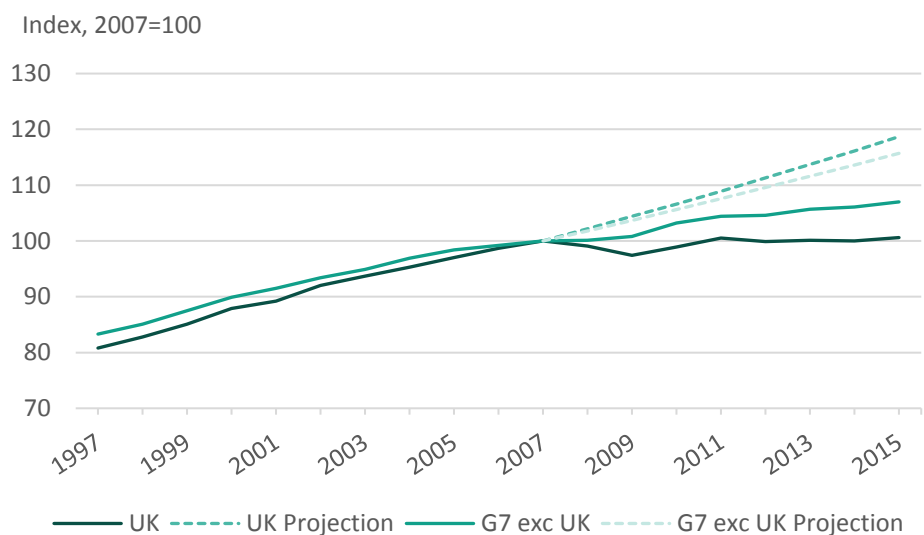


Figure 2.2: Constant price gross domestic product per hour worked, actual and projections, 1997 to 2015¹⁷



As acknowledged by the 2015 Government, in addition to skills issues, the UK’s longstanding productivity deficit compared to other advanced economies can be explained by problems in connectivity and infrastructure, enterprise and innovation, trade and, especially, investment.¹⁸ More recently, part of the explanation for the UK’s weak post-crisis productivity growth - the so-called ‘productivity puzzle’ – may lie in how the UK economy reacted to the shock of the recession. Compared to the US, unemployment levels did not increase as quickly here. As Figure 2.3 shows,

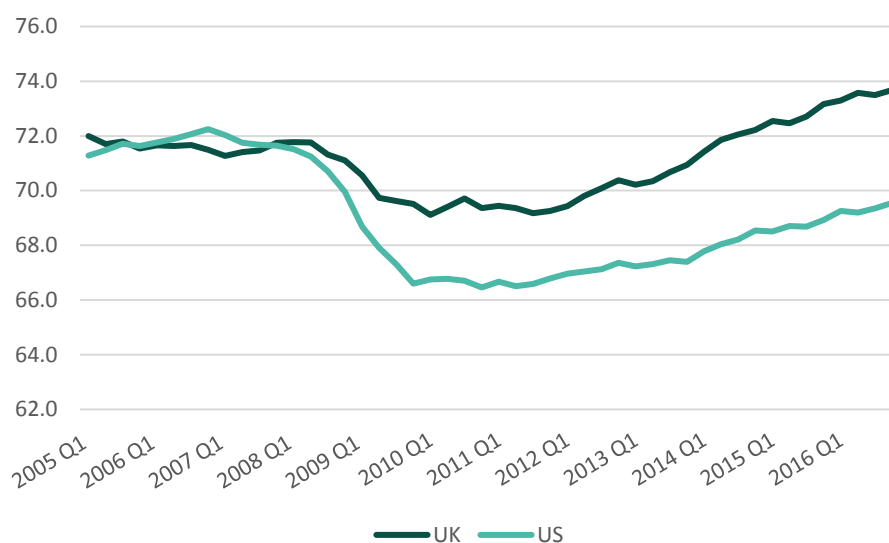
¹⁶ ONS, 2017, ‘International comparisons of UK productivity (ICP), final estimates: 2015’, using source data from OECD, Eurostat, and ONS.

¹⁷ ONS, 2017, ‘International comparisons of UK productivity (ICP), final estimates: 2015’, using source data from OECD, Eurostat, and ONS.

¹⁸ HM Government, 2017, ‘Building our industrial strategy’.

overall employment rates fell less than that in the US and have since grown beyond pre-recession levels.

Figure 2.3: Employment rates US vs UK¹⁹



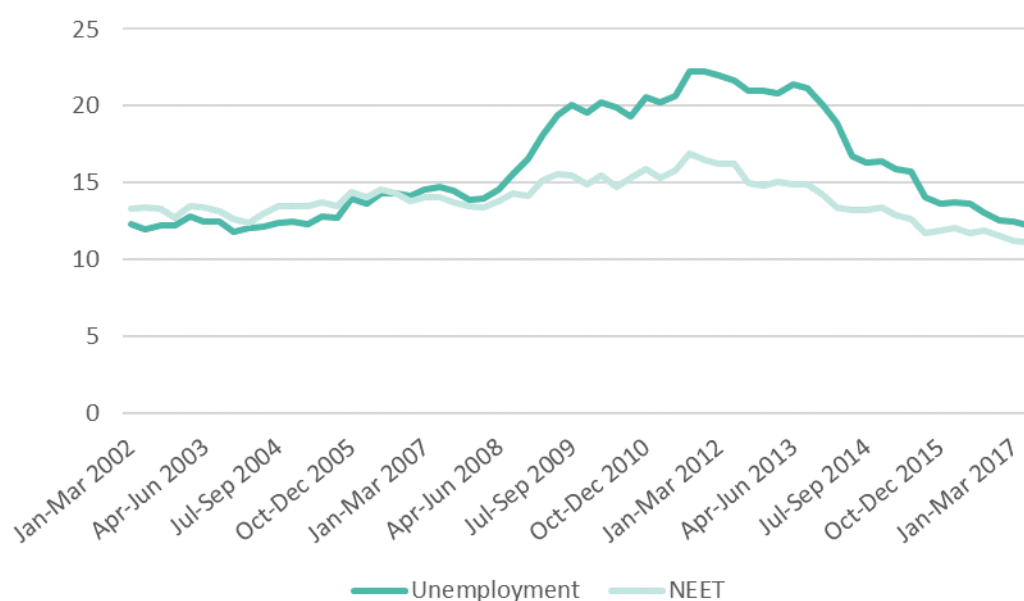
Conversely, youth unemployment in the UK (those aged between 16-24) has been consistently higher than older populations, and rose more rapidly amongst the young in the UK after the recession as it did for most OECD countries (Germany being the notable exception).²⁰ It has been on a downward trend from its height of 22.5 per cent per cent in late 2011. In the first quarter of 2017, it was at 11.9 per cent versus 4.3 per cent for the population as a whole, but the ratio of youth unemployment to those over 25 remains considerably higher than the OECD average.²¹ The youth unemployment rate has, in part, been driven down by the increase in the number of young people going into full-time education and therefore being classified as economically inactive.

¹⁹ ONS, 2017, 'A10: international comparisons of employment and unemployment rates', using OECD data.

²⁰ Bell, D. N. F. and Blanchflower, D. G., 2011, 'Young people and the Great Recession', Discussion Paper series No.5674.

²¹ ONS, 2017, 'UK labour market: September 2017', House of Commons (2017), 'Youth unemployment statistics'; OECD, 2016, 'Society at a Glance 2016: A Spotlight on Youth, How does the United Kingdom compare?'.

Figure 2.4: 16 to 24 years (youth) unemployment in the UK and NEET rates²²



During the same period, the percentage of young people (16 to 24) in the UK who were not in education, employment or training (NEET) was 11.1 per cent, with around 6.5 per cent, or 465,000 young people, either not looking for work or not available for work and so classed as economically inactive.²³ Whilst the causes of becoming NEET can be complex, the costs associated with it are clear. There is strong evidence that young people who become NEET at an early age tend to have worse short and long-term labour market outcomes.²⁴ Young men who are NEET between the ages of 16 and 18 are four times more likely to be out of work in the long term, five times more likely to have a criminal record, and three times more likely to have depression. In addition to these costs to the public exchequer are the opportunity costs of lost income to the economy and the individual, welfare losses, and the impacts of these on the rest of society.²⁵ Whilst, as Figure 2.4 shows, there has been great progress in reducing overall NEET rates for young people, there is evidence that the number of young people who remain out of education, training, and employment for more than one year has increased recently.²⁶

Overall, then, much of the employment adjustment to the recent macroeconomic shock has been associated with falling real wages and stagnant productivity, particularly for young people. Reflecting long term trends driven by trade and technology (see below), the recession's job losses were concentrated in middle-skill clerical and skilled trades roles, as well as labour-intensive jobs. Recent employment growth has been in high-skilled jobs and service-intensive jobs – especially in the care and leisure sectors.²⁷

²²ONS, August 2017, 'Young people not in education, employment or training (NEET), UK: August 2017'; ONS, 2017, 'UK labour market: September 2017', House of Commons (2017),

²³ ONS, August 2017, 'Young people not in education, employment or training (NEET), UK: August 2017'.

²⁴ Crawford, C., et al., 2011, 'Young people's education and labour market choices aged 16/17 to 18/19', Research Report DFE-RR182, Centre for Analysis of Youth Transitions.

²⁵ Audit Commission, 2010, 'Against the odds: Re-engaging young people in education, employment or training'.

²⁶ Impetus-PEF, 2017, 'Youth Jobs Index'.

²⁷ UK Commission for Employment and Skills, 2015, 'Growth Through People: evidence and analysis'.

Figure 2.5: real average weekly earnings in 2015 prices (January 2008=100)²⁸



Faced with the challenge of securing well-paid, stable work, too many of our young people, however, are leaving education with low basic skills and are forced to accept low-paid, temporary, or part-time jobs. This boosts employment levels but does not bode well for a young person’s ability to progress and increase their earnings quickly.

A further, but linked, cause of the fast recovery of employment rates at the expense of wages has been the long-term decline in union membership – particularly amongst the young – and the UK’s relatively loose employment legislation. Labour market flexibility has weakened the power of workers to negotiate better conditions and higher wages, though the minimum wage (and introduction of the Living Wage) has mitigated this somewhat for the lowest-paid workers.²⁹ Recent employment growth has been driven by increases in self-employment, part-time work, informal employment contracts (the so-called ‘gig economy’) and a larger than usual share of low paid, low-skilled jobs.³⁰ However, as job mobility and training falls, workers are finding themselves increasingly trapped in jobs with little prospect of training and advancement. The result is a vicious cycle of low skills, low pay, low security, low training, low capital investment and low productivity – with young people particularly at risk. Unless these factors are addressed by government, and quickly, the mid- and long-term outlook for the UK economy is worrying.

Demographic challenges are building

Alongside these shorter-term economic trends, the UK’s ageing population represents a further challenge. Despite increases to the State Pension Age, the number of people of State Pension Age and over is projected to increase by 32.7 per cent by mid-2039 as “baby boomers” born in the 1960s retire. Over the same period, the number of people of working age is projected to rise by 11.4 per cent. Hence the “Old Age Dependency Ratio” is set to fall to 284 by 2020 but then rise to 370 by 2039.³¹

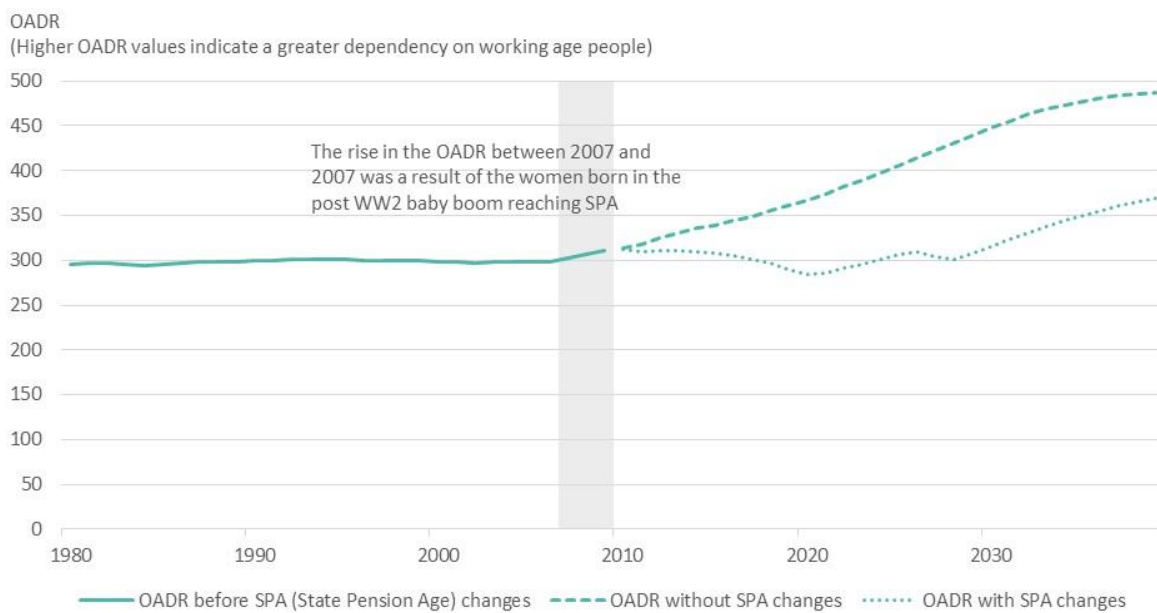
²⁸ ONS, 2017, ‘EARN01: Average Weekly Earnings’.

²⁹ Bryson, A., and Forth, J., 2015, ‘Trade Union Membership and Influence, 1999-2014’; Bondibene, C. R., and Riley, R., 2015, ‘The impact of the National Minimum Wage on UK businesses’, Low Pay Commission.

³⁰ Financial Times, 2017, ‘How wages fell in the UK while the economy grew’, available from: <https://www.ft.com/content/83e7e87e-fe64-11e6-96f8-3700c5664d30>.

³¹ ONS, 2015, ‘National Population Projections: 2014-based Statistical Bulletin’.

Figure 2.6: Old age dependency ratio, UK 1980 to 2039³²



In this environment, younger people will not only have to work much longer than the generations before them, but will also have to be increasingly productive if they are to enjoy a similar standard of living. This is because a larger proportion of their salary will need to be taken not only in tax to fund state pensions, healthcare, and welfare of an increasingly elderly population, but also by their employers to fill gaps in defined benefit schemes funds (from which they will not benefit when they retire).

Demographic fluctuations, combined with a shortage of housebuilding, rising house prices and falling house ownership levels, have also led to stark inequalities in wealth; a large proportion of the country's assets concentrated disproportionately among older generations and the wealthy. The expectation that the young will be better off than the generation before has ceased to be the case in the UK for those born since 1955. A typical 'millennial' born during 1981-85 having only half as much total net wealth at age 30 as a typical adult at the same time five years before them.³³ Access to defined benefit pension schemes for older generations compounds this issue.

For many young people, particularly those who do not benefit from family wealth, achieving productive employment with good wages will be the only way to achieve a decent standard of living across their lifetime. However, not only are younger generations accumulating wealth more slowly than their elders, they are also earning less. The 'millennial' generation are the first that has so far earned less than the one before at every age.³⁴

Political upheaval is creating uncertainty

The impact of Brexit on the British economy is unclear and has become even more so in light of the recent general election result. In the long term, it will depend on the overall deal that is struck on trade and movement of people. The potential impact of a reduction in the number of migrant

³² ONS digital, 2016, 'UK Perspectives 2016: The changing UK population', available from: <http://visual.ons.gov.uk/uk-perspectives-2016-the-changing-uk-population/>.

³³ D'Arcy, C. and Gardiner, L., 2017, 'The Generation of Wealth: Asset accumulation across and within cohorts'.

³⁴ Gardiner, L., 2016, 'Stagnation Generation: The case for renewing the intergenerational contract', Resolution Foundation.

workers coming into the UK from the EU for wages and employment is unclear.³⁵ Currently, EU workers span both ends of the labour market, with the proportions of workers by occupation and sector of the EU 14 and non-EU countries broadly similar to UK workers. However, those from the EU8 and from Bulgaria and Romania (the EU2) are more highly represented in manufacturing and construction respectively.³⁶ International migration is particularly important to the wholesale and retail, hospitality, and public administration and health sectors which employ around 1.5 million non-UK nationals.³⁷ There is some evidence to suggest that migration has been falling since the Brexit referendum, with long term international net migration in the year to March 2017 falling to 246,000, 24 per cent lower than in the previous year. This has mainly been driven by falling net migration from the EU – in particular from the EU8 countries such as Poland which joined in 2004.³⁸

The challenge for UK firms may be to replace migrants with suitably skilled British workers. With employment at record levels, this may create additional pressure on UK firms to replace them via automation – substituting capital for labour – or investing in the skills of their workforces.³⁹ Such a labour market ‘shock’ could therefore affect future growth, employment, and wages – at least in the short term – until the economy and the workforce has time to adjust. The UK education system has traditionally been poor at generating a workforce with intermediate, technical skills.⁴⁰ Withdrawal from the EU could create opportunities for low skilled, low-paid workers to take up jobs either vacated by EU workers leaving or new vacancies which arise through a change in trading arrangements, if they are willing and able to engage in training. However, figures show that these groups are the least likely to engage in learning, and they could face adverse consequences if the changes damage wider investment.⁴¹

Fiscal constraints are placing additional burdens on the young – and their teachers

UK public sector debt levels have doubled since before the crisis and are forecast to peak in 2017-18 at around 90 per cent of GDP and then fall gradually thereafter. Recent Governments have repeatedly failed to meet their fiscal targets. The previous Government aimed to “return the public finances to balance at the earliest possible date in the next Parliament”. Seven years of austerity have returned public spending broadly back to pre-crisis levels as a fraction of national income, due in part to weak economic growth.⁴² The ageing population and cost pressures in health spending imply that further fiscal tightening will be required if a balanced budget is to be achieved by 2025-26.⁴³

³⁵ The Migration Observatory, February 2017, ‘The Labour Market Effects of Immigration’, University of Oxford.

³⁶ The EU14 consists of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and Sweden. The EU8 consists of Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia. The EU2 are

³⁷ ONS, 2017, ‘International immigration and the labour market, UK: 2016’.

³⁸ ONS, 2017, ‘Migration Statistics Quarterly Report: August 2017’.

³⁹ Financial Times, 2017, ‘Net migration falls by a quarter as EU citizens leave UK’, available from: <https://www.ft.com/content/81b25aa0-4129-11e7-9d56-25f963e998b2>.

⁴⁰ Wolf, A., 2016, ‘Remaking Tertiary Education: Can we create a system that is fair and fit for purpose?’, Education Policy Institute.

⁴¹ Institute for Public Policy Research, 2017, ‘Skills 2030: Why the adult skills system is failing to build an economy that works for everyone’.

⁴² Emmerson, C., May 2017, ‘Two parliaments of pain: the UK public finances 2010 to 2017’, IFS Briefing Note BN199, Institute for Fiscal Studies.

⁴³ Office for Budget Responsibility, 2017, ‘Economic and Fiscal Outlook’.

Increases in debt interest as rises in RPI inflation affect payments on index-linked gilts, along with downward pressure on receipts from low growth, mean that earners over the next few decades will still be responsible for paying our way out of debt – facing a high tax burden as a result. It also means that the Government is unlikely to have room to increase discretionary spending for improving working-age benefits and benefits for those who struggle to access employment – for instance due to disability – as much as it might have done in the past.

Fiscal constraints are also affecting education workforces. Analysis by the School Teachers Pay Review Body (STRB) shows that, following several years of pay freezes and then caps at 1 per cent, the relative position of teachers' earnings overall has deteriorated further in 2016 and continues to trail those of other professional occupations in most regions, despite gaps in starting salaries remaining stable over the last three years.⁴⁴ The STRB concluded in 2016 that the decline in relative salaries is contributing to a deterioration in recruitment and retention. Under current education spending and public sector pay plans, the situation is set to worsen still.⁴⁵ Pressure on pay has come at a time when working conditions remain difficult, with workload is consistently cited as one of the key drivers of decisions to leave the teaching profession.⁴⁶ Whilst the Government has recognised the problem and begun a programme of work to engage the sector in school-led efforts to minimise unnecessary workload, recent survey evidence shows that English teachers in both primary and secondary schools are still engaged in high levels of unpaid overtime.⁴⁷

The latest government projections suggest that the school teacher headcount should rise by 3 per cent between 2015-16 and 2019-20,⁴⁸ but there remain difficulties in recruiting new teachers and targets have been missed for the last five years.⁴⁹ Meanwhile, although recent increases in the proportion of teachers leaving have been matched by an increase in teachers joining, the proportion leaving before retirement age increased from 65 per cent in 2011 to 82 per cent in the year to 2016.⁵⁰ In the Further Education sector in particular, the inability to offer competitive salaries, initial training and continuing professional development has produced teacher recruitment challenges, with colleges notably struggling to hire professionals with science, technology, engineering and mathematics (STEM) backgrounds.⁵¹

The impact of technology

While low skills levels, particularly amongst the young, has constrained wage growth, low capital investment has also harmed labour productivity.⁵² The UK has traditionally found it difficult to commercialise research and to deploy existing technologies, historically underinvesting in R&D by

⁴⁴ School Teachers' Review Body, 2016, 'School Teachers' Review Body 26th report: 2016'.

⁴⁵ Education Policy Institute, 2017, 'General election 2017: an analysis of manifesto plans for education'.

⁴⁶ Menzies, L., et al, 2015, 'Why Teach?', LKMco and Pearson.

⁴⁷ Department for Education, 2017, 'Policy Paper: Reducing teacher workload', February 2017; Department for Education, 2017, 'Teacher workload survey 2016'.

⁴⁸ Department for Education, 2017, 'Postgraduate Initial Teacher Training (ITT) places and the Teacher Supply Model (TSM), England 2017/18, SFR 42/2017, May 2017'.

⁴⁹ National Audit Office, 2016, 'Training New Teachers'.

⁵⁰ Department for Education, 2016, 'School workforce in England: November 2015'.

⁵¹ Institute for Learning, 2014, 'What needs to be done to promote teaching in further education as an attractive career option to top graduates and well-qualified industry professionals?'.

⁵² Haldane, A., 2015, 'Labour's Share', Speech given to TUC congress, London, available from: <http://www.bankofengland.co.uk/publications/Pages/speeches/2015/864.aspx>.

comparison with many G20 countries.⁵³ Nevertheless, it is clear that digitalisation and automation are having an increasing impact on the structure of work. In one version of recent events, that of the ‘hourglass’ economy, such developments lead to a ‘hollowing out’ of middle-skill, middle-ranking or intermediate-labour intensive jobs, as these are the most susceptible to being traded or automated/digitalised.⁵⁴ This leads to a polarisation towards non-routine higher- and unskilled lower-paid jobs, making career progression difficult for those without the appropriate skills on entry to the job-market, or without the means to upskill and take advantage of technological advances.⁵⁵

But this characterisation may be overly-simplistic. A recent report for Pearson by Nesta and the Oxford Martin School, *The Future of Skills: Employment in 2030*, finds that only around one in five employees work in an industry that is very likely to experience a fall in workforce share, taking into account environment, political, technological and demographic trends. While some middle-skilled occupations, for instance in manufacturing production, are forecast to become less important, there may be opportunities for ‘job redesign’ and skills upgrading elsewhere. In previous low-skill occupations in food preparation, elementary services and hospitality, these demands could be driven by the increasing role of product differentiation and personalisation, and there may be pockets of opportunity within sectors including agriculture, skilled trades and construction.⁵⁶ The clearest implications of the study are that the future workforce will need to be adaptable, and will need broad-based knowledge – in fields including English language, history and management – in addition to specific occupational competence. This is important both for dealing with movements between jobs and because this knowledge is associated with the occupations that are projected to see growth.⁵⁷

Technology should not be necessarily seen as something to fear. As our previous report states, advances in technology, in particular access to the internet, reduce information costs drastically. They can also increase educational opportunities.⁵⁸ Given the pressing challenges of environmental degradation, climate change and an ageing population, it is imperative that we harness the power of new technology to radically change the nature of production for the benefit of society. The UK can play a leading role here. It still has a good representation among the world’s top universities, in part as a result of their strong research capacities – in the top 20 of the 2016-17 Times Higher Education rankings there are 4 in England (15 in the US and 1 in Switzerland) – and recent initiatives have improved the commercialisation of advanced research here.⁵⁹ As recently noted by the IPPR, alongside an imperative to improve the supply of skilled workers, there is more that UK employers can do to make the most of the highly skilled individuals we already have, and adapt to these changing markets positively.⁶⁰

⁵³ HM Government, 2017, ‘Building our Industrial Strategy’.

⁵⁴ Holmes, C. and Mayhew, K., 2012, ‘The Changing Shape of the UK Job Market and its Implications for the Bottom Half of Earners’, Resolution Foundation.

⁵⁵ UK Commission for Employment and Skills, 2015, ‘Growth Through People: evidence and analysis’.

⁵⁶ Bakhshi, H., Downing, J. M., Osborne, M. A. and Schneider, P., 2017, ‘The Future of Skills. Employment in 2030’, Pearson.

⁵⁷ Bakhshi, H., et al, 2017, ‘The Future of Skills. Employment in 2030’.

⁵⁸ Anderson, R., 2014, ‘Careers 2020: Making Education Work’.

⁵⁹ Times Higher Education, 2017, ‘World University Rankings 2016-2017’; House of Commons Business, Innovation and Skills Committee, 2014, ‘Business-University Collaboration: Seventh Report of Session 2014-15’, House of Commons.

⁶⁰ Dromey, J., et al, 2017, ‘Another Lost Decade? Building a Skills System for the Economy of the 2030s’

3. Delivering effective education pathways

Across the developed world, young people are staying in formal education for longer than ever before. This has been in response to the relative growth in jobs requiring academic expertise, technical knowledge, or strong information-processing and communication skills.⁶¹ Over the long term – if not everywhere since the financial crisis – improvements in employment protection, expectations for working conditions, and the introduction of minimum wage legislation have also made it more difficult for employers to sustain certain low-productivity jobs. These are positive developments, but they have also created a new challenge for education systems: steering young people through myriad forms of training towards rewarding careers and preparing them for the world of work in the face of a decline in opportunities for the inexperienced and less-qualified.⁶²

Different countries have taken different approaches to this challenge in response to their varying historical and labour market contexts. A defining feature of any system is the balance students strike between following a general curriculum to prepare for ongoing study and pursuing training that prepares them for specific jobs or careers. These differences are particularly noticeable around the ages of 14 to 19:

- In **Singapore**, tracking of students into different routes happens early in secondary education, and is strongly related to attainment at that point. However, there are more than two different pathways available, representing different points on the vocational-general spectrum.⁶³
- In **Germany**, there is a clear two-way divide in secondary education, with apprenticeships playing a significant role in secondary education.⁶⁴
- Elsewhere, in countries including **Norway**, some elect to take vocational subjects at the start of upper secondary education (key stage 4) alongside a suite of more general subjects, but after 16 there is a bigger divide between those pursuing a general set of subjects that can lead to university and those pursuing more specialist vocational options leading to work or higher-level technical education in specialist, employer-linked institutions.⁶⁵
- In **Canada**, students can move into a fully vocational route of study only until after secondary education, but many students take some vocational subjects in addition to core topics before this point and there is a significant amount of vocational training at tertiary level.⁶⁶

It is not clear that any one approach is better than the others, and a wide range are taken by highly successful education systems with relatively good youth employment outcomes. On the face of it, England's current system already has much in common with the group formed by Norway and others, with a growing proportion of students taking a mix of vocational and academic subjects

⁶¹ International Labour Office, 2010, 'A Skilled Workforce for Strong, Sustainable and Balanced Growth', p. 21-37.

⁶² Huddleston, P., and Mann, A., 2015, 'How should our schools respond to the demands of the twenty first century labour market? Eight perspectives', Education and Employers Taskforce.

⁶³ Tucker, M. S., 2012, 'The Phoenix: vocational education and training in Singapore'.

⁶⁴ CEDEFOP, 2014, 'Germany, VET in Europe – Country report'.

⁶⁵ OECD, 2015, 'Education Policy Outlook: Norway'.

⁶⁶ OECD, 2015, 'Education Policy Outlook: Canada'.

between 16 and 19. However, as the next sections outline, both academic and vocational education in England differ from international best practice in many ways.

Specialisation in secondary education

Recent research has described our upper secondary education curricula as “uniquely narrow and short” compared to those of successful education systems where the majority of learners study science, mathematics, arts, social sciences, languages, and core skills up to 18, irrespective of whether or not they wish to pursue a career in science, technology, engineering, or medicine.⁶⁷ A levels were ostensibly designed to provide a progression from GCSEs to deeper, more research-orientated learning in a small number of subjects to form the basis for a minority of pupils’ entry into higher education.

As higher education access has expanded, however, concerns have grown that many students – particularly those specialising in traditional groupings of subjects or dropping STEM subjects – are not receiving a broad enough 16 to 18 education, with assessment methods not encouraging the development of the full set of skills required in higher education or for work.⁶⁸ For those who do not subsequently achieve higher qualifications, a 2015 study found that there were no statistically significant benefits for employment rates of achieving A levels compared to leaving school with only GCSEs. Whilst those who achieved a single STEM A-level (possibly amongst others) achieved a wage return of 20.3 per cent from doing so, the return for those achieving at least 2 A levels not including a STEM subject was just 5.3 per cent.⁶⁹

England has been unusual in allowing students to drop mathematics and native language teaching at 16; since 2014 it has only been compulsory here for those who did not achieve a grade C in maths and English at GCSE. This may have contributed to the shortcomings in basic maths and literacy skills covered in more detail in Chapter 5. But, more generally, forcing students to specialise so much in A levels through decisions made at 15 or earlier have contributed to the skills shortages and imbalances we see today. Four times as many boys study physics A levels as girls, and almost twice as many study maths: a huge number of girls are ruling themselves out of a career in science, in many cases before they have had time to understand the opportunities that would have represented and despite a high level of ability in the subjects.⁷⁰ There were only around 27,000 entries for A level modern foreign languages in 2016, a decline of around a third since 1996 and a very small number in relation to a cohort of over 600,000 students.⁷¹

Specialisation in key stage 5 is increasing further. In 2015-16, spending per student in further education was 10 per cent lower in real terms than it was in 1990-91 and was the subject of sharp real funding cuts from 2011-12.⁷² These pressures are reducing the number of subjects taken for

⁶⁷ Hodgson, A. and Spours, K., 2016, ‘Tuition time in upper secondary education (16 to 19): Comparing six national education systems’.

⁶⁸ Ipsos MORI, 2012, ‘Fit for Purpose: The view of the higher education sector, teachers and employers on the suitability of A levels’.

⁶⁹ Conlon, G., and Patrignani, P., 2015, ‘The earnings and employment returns to A levels’, London Economics.

⁷⁰ Department for Education, 2017, ‘A level and other 16 to 18 results: 2015 to 2016 (revised)’, Figure 6.

⁷¹ Board, K., and Tinsley, T., 2017, ‘Language Trends 2016/17’.

⁷² Belfield, C., Crawford, C. and Sibieta, L., 2017, ‘Long-Run Comparisons of Spending per Pupil across Different Stages of Education’.

many students: the number of AS levels taken fell by 14 per cent over just one year to 2016, and the proportion of A level students taking more than 3 fell from 18 per cent in 2013 to 12 per cent 2015.⁷³

In 2004, the Tomlinson Review proposed to replace GCSEs, A-levels and vocational qualifications with a new single diploma for 14-19 year-olds over a 10-year period. It recommended that all qualifications should include a common core of literacy, numeracy and ICT skills, alongside compulsory extended project and career education and optional modules. Most of its proposals were rejected at the time, except for the introduction of Diplomas, which were subsequently removed by the Labour Government.⁷⁴ The Coalition Government retained a focus on meeting the immediate needs of universities in its reforms of A and AS levels, rather than seeking to better meet wider educational needs.⁷⁵ Whilst agreeing that improvements could be made, reflecting some of the arguments put forward by Tomlinson, in recent years universities including the influential Russell Group have tended to view the A-level system as generally fit for purpose. They have prioritised more specific concerns about differentiation among high performing students and falls in the number taking STEM A levels – despite the latter arguably being enabled by the requirement to drop so many subjects at 16.⁷⁶

Making Education Work recommended the government take steps over the long term to move towards a Baccalaureate-style education for the 16-18 stage of education, as well as establishing an independent body to reflect the views of teachers and employers as well as universities in curriculum and assessment design. The Advisory Group believes the case for ensuring specialisation does not happen too quickly, and that the curriculum meets a wide-enough set of interests, remains. If the Conservative Party Manifesto objective of raising take-up of English Baccalaureate subjects at key stage 4 to 90 per cent by 2025 were to be achieved, England may well have a larger group of pupils demanding a broader academic education from 16. If taken forward, such a change would need to be introduced carefully and slowly, to ensure schools are equipped to effectively teach across the range of subjects, and it is likely that the curriculum of prior phases – and higher education – would need to be adjusted to complement it.

⁷³ Nye, P., 2016, 'A-level results day 2016: The key trends in four charts', available from: <https://educationdatalab.org.uk/2016/08/a-level-results-day-2016-the-key-trends-in-four-charts/>; Gill, T., and Williamson, J., 2016, 'Uptake of GCE A level subjects 2015', Cambridge Assessment Statistics Report Series No.109.

⁷⁴ Tomlinson, M., 2004, '14-19 Curriculum and Qualifications Reform'.

⁷⁵ In his letter to the Chair of Ofqual on A level reform in 2012, the then Secretary of State for Education, Michael Gove, stated that "It is my view that the single most important purpose of A level qualifications is to prepare young people for further study at university". Available from: <http://webarchive.nationalarchives.gov.uk/20141031163546/http://ofqual.gov.uk/documents/letter-from-secretary-of-state-on-a-level-reform-march-2012/>.

⁷⁶ Ipsos MORI, 2012, 'Fit for Purpose: The view of the higher education sector, teachers and employers on the suitability of A levels'; Russell Group, 2012, 'Ofqual A-level reform consultation', available from: <http://russellgroup.ac.uk/news/ofqual-a-level-reform-consultation/>; Times Higher Education, 'Owning A levels 'not advisable or feasible'', available from: <https://www.timeshighereducation.com/news/owning-a-levels-not-advisable-or-feasible/421599.article>

Box 3.1. Singapore's approach to specialisation

Singapore is known for streaming its students at a very early stage, just after primary education (age 11/12). Depending on their Primary School Leaving Examination results, pupils will attend different secondary education institutions (ages 12 to 16/17): either an Express School, or to a Normal (Academic) or Normal (Technical) School, although other options are available. This may limit expectations for some students at an early age and could be associated with large attainment gaps. Despite the majority of students performing well compared to international standards, the difference in 2015 PISA science scores between the top and bottom quartiles of pupils in terms of their index of economic, social and cultural status was 113 in Singapore, compared with 86 in England and an OECD average of 88.⁷⁷

However, curriculum in secondary education is kept reasonably wide. These institutions cover three dimensions: (a) content-based subjects, which include language, mathematics and science, and humanities and arts; (b) knowledge skills, which expect to develop students' thinking and communication skills among other, mainly through project work; and (c) life skills, including co-curricular activities, character and citizenship education, national education, programme for active learning, PE, and values in action.⁷⁸

The difference between secondary academic and technical secondary institutions is that students in the former will study a third language (additional to English and mother tongue) while those in the latter will not, and that students in technical institutions will study relatively more mathematics and science subjects whereas those in academic institutions specialise more in humanities and arts. If a student goes to an Express School, they will follow a similar curriculum but with more elective modules.

After secondary education, Express School leavers will normally prepare for university at a junior college, while graduates from Normal Academic or Technical Schools will enrol to either a polytechnic or an Institute of Technology (ITE). At Junior colleges, which prepare students for university, students will encounter a similar curriculum as in primary and lower secondary, based on three dimensions. Those enrolling at an Institute of Technology, which fosters readiness for work or further study among students, will be required to take 'life skills modules', including 'personal and professional development' or 'sports and wellness'.⁷⁹ Students pursuing a qualification at a polytechnic, which provide subject-specific, hands-on training, are required to take "general studies" courses every year. These range from modules to help students plan their career and identify their strengths and witnesses to sports or subjects from other disciplines.⁸⁰

Recommendation: The Government should develop formal mechanisms, for instance appointing an independent panel, to ensure that curriculum and assessment policy decisions for school and further education are made in ways that reflect the full range of society's interests and the need for careful implementation.

⁷⁷ OECD, 2016, 'PISA 2015 Results: Volume I', Table I.6.2a, Table B2.I.66. Values for our comparator countries are: United States (90), Canada (71), Japan (80), Singapore (113), Germany (103), Norway (72), England (86), OECD average (88).

⁷⁸ Ministry of Education, 1997, 'Launch of National Education', available from: <https://www.moe.gov.sg/media/press/1997/pr01797.htm>.

⁷⁹ Institute of Technical Education, 2010, 'Higher Nitec in Engineering and Business'.

⁸⁰ Examples of subjects taught at polytechnics can be found at: Nanyang Polytechnic, 2017, 'Home', available from: <http://www.nyp.edu.sg/>.

Improving technical and professional education

In 2016, Lord Sainsbury's Review of Technical Education identified several problems with vocational training in England which the Government identified as limits to the development of technical skills, effective pathways to work, and, ultimately, productivity growth.⁸¹ These included:

- a confusing array of standards and qualifications that were misaligned with employer needs;
- overlapping and low-value qualifications that do not provide a clear route to work;
- a complex system resulting in a failure to progress to higher levels of education, with an estimated 25 per cent of each cohort showing signs of 'churn' – switching between A/AS levels and vocational education or moving to a lower level of study at 17;⁸²
- a lack of apprenticeship opportunities;
- a financially unsustainable array of training provision; and
- a lack of technical education at higher levels (Regulated Qualifications Framework level 4 and above).

In response, the previous Government announced its Post-16 Skills Plan, a reform of technical (the term preferred to 'vocational') education to be implemented in phases up to 2022. The proposals envisage people making a clearer choice between academic (mainly A levels) and technical education. Modelled on Norway's approach, those opting for the latter would choose between a college-based programme or an apprenticeship in one of 15 routes, grouping occupations together based on shared training requirements. These routes would extend to higher levels of training, with associated qualifications and apprenticeship standards developed jointly with employers in a process overseen by the Institute for Apprenticeships and Technical Education (IfATE) which is to be formed out of the Institute for Apprenticeships in 2018. A focus on co-design with employers is an important feature of many other high-performing systems (see Box 3.2).

⁸¹ HM Government, 2016, 'Report of the independent panel on technical education', HM Government, 2016, 'Post-16 Skills Plan'.

⁸² Department for Business, Innovation and Skills and Department for Education, 2016, 'Technical education reform: the case for change'.

Box 3.2. Employer involvement in Germany

Countries where enrolment to technical education is high tend to involve employers and other social agents in co-decision frameworks, achieving a system that is responsive to the needs of the labour market and the economy. Technical qualification-holders can therefore expect a reasonably immediate progression to employment due to employer recognition.⁸³

In Germany, employers are a central element of vocational education, which operates under a tripartite regime wherein companies, social agents, and the government are represented.⁸⁴ Employers, together with trade unions and other agents, have a crucial role in identifying the occupations for which training would be best delivered through vocational training and setting standards. They also notify the other members of the tripartite framework when training in one given occupations needs to be altered. There are around 350 occupations regulated.⁸⁵ These arrangements are partly responsible for the good employment and activity rates for young people: 9.3 per cent of 20-24 years-old are NEETS compared to 15.6 per cent in the UK and 16.9 per cent in the OECD on average (2015); while 7 per cent of 15-24 year-olds are unemployed, compared with 13 per cent in the OECD and the UK (2016).⁸⁶

Upper-secondary vocational education (at age 16-18) in Germany is delivered in the form of dual degrees, which combine college- and work-based training. Apprenticeships normally span over the last two years of a dual degree, and 90 per cent of large employers and one fifth of all companies in the country employ apprentices.⁸⁷ Vocational degrees are popular among school-leavers, as they provide a curriculum connected to real life scenarios, and because of good job prospects. In addition, there has been an increase of applications from university degree-holders: from 14,000 in 2010 to 22,300 in 2016.⁸⁸

For each occupation, the initial 2-year college option would lead to involve only one approved technical qualification at level 2 or 3. The introduction of these 'T levels' was confirmed in this year's Queen's Speech, and Budget 2017 had already announced an additional £500m per year of revenue funding to support an expansion of annual learning hours to 900 in technical education. Each programme is to include a 'common core' developing English, maths, and digital skills and specialisation towards occupational competencies thereafter. Every student will be entitled to a work placement.⁸⁹ The first T levels were expected to be introduced in September 2019 but they have recently been pushed back to 2020. T levels will be phased in in three successive waves, expecting that all routes will be in place by September 2022.⁹⁰

⁸³ Independent Panel on Technical Education, 2016, 'Report of the Independent Panel on Technical Education'.

⁸⁴ OECD, 2014, 'Education Policy Outlook: Germany'.

⁸⁵ Federal Institute for Vocational Education and Training (BIBB), 2014, 'Germany. VET in Europe – Country report 2014'.

⁸⁶ OECD, 2017, 'Youth not in employment, education or training (NEET) (indicator)', DOI: 10.1787/72d1033a-en (Accessed on 12 July 2017).; OECD, 2017, 'Youth unemployment rate (indicator)', DOI: 10.1787/c3634df7-en (Accessed on 12 July 2017).

⁸⁷ Germany Trade and Invest, 2014, 'Vocational Training Made in Germany'.

⁸⁸ Federal Institute for Vocational Education and Training (BIBB), 2016, 'Press release: Young people with a higher education entrance qualification are increasingly discovering vocational education and training', available from: https://www.bibb.de/en/pressemitteilung_54780.php.

⁸⁹ <https://www.gov.uk/government/speeches/spring-budget-2017-philip-hammonds-speech>

⁹⁰ Department for Education, 2017, 'Post-16 technical education reforms. T level action plan'.

These plans have a credible grounding in evidence on what is not working in our current system and what has worked abroad. Clearly, the new routes will be presented more as a firm pathway to jobs than previous vocational educational courses. To ensure young people – including those who have performed well in school – choose the new routes, they must be therefore be convinced that they will deliver good employment outcomes. This means the additional funding to provide rigorous, challenging and specific curriculum, together with an overt consideration of employer needs, is highly welcome. It is also important that an entitlement to a work placement is effectively delivered. This will depend on whether enough employers take students on. In other countries, like Norway, some students fail to secure a work placement, and in these cases they are entitled to a third college-based year.

To give the new routes the reputation intended, a critical mass of learners progressing through high quality, level 3 provision will be needed. Recent increases in 16-18 year-old education participation have indeed come with increases in the proportion with level 3 vocational qualifications as their highest learning aim (increasing from 9.0 per cent of the cohort in 2005 to 15.6 per cent in 2015).⁹¹ However, research published by the Campaign for Learning and NCFE highlighted that only around 15 per cent of 16-18 year-olds studying at level 3 are undertaking full time technical education designed for entry to occupations (usually Tech levels); there are almost twice as many taking an applied general qualification.⁹² As that report shows, one option for the Government would be to encourage more applied general learners to pursue technical routes instead, rather than continue to combine these qualifications with A levels in the ‘academic’ route. There would be two complications from this:

- It could compromise ambitions to maintain or raise further access to higher education. One in four learners entering university do so with a BTEC, and this route has contributed significantly to increases in higher education access in recent years.⁹³ As Figure 3.1 shows, university acceptance rates for BTEC holders have increased significantly overtime, though these students are overrepresented in low-tariff universities compared to students applying with A-levels and face relatively high drop-out rates once there.⁹⁴
- It could necessitate a significant switch of learners from school sixth forms to further education colleges, who are only just in the process of restructuring through areas-based reviews, in part due to concerns about scale, specialisation and financial viability.⁹⁵

⁹¹ Department for Education, 2016, ‘Participation in Education, Training and Employment: 2015’.

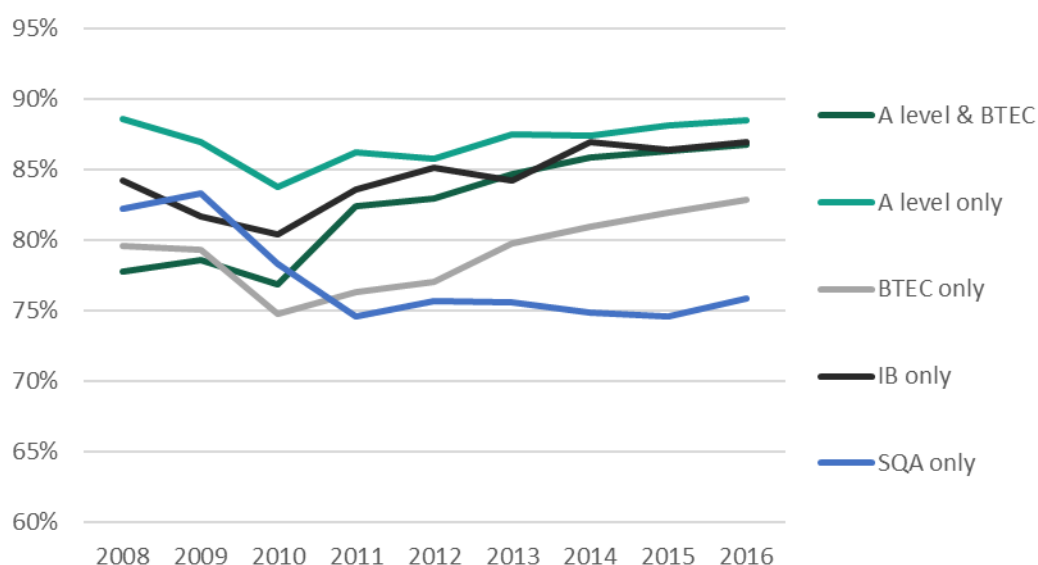
⁹² Fletcher, M., 2017, ‘Reforming technical and professional education: Why should it work this time?’.

⁹³ Richards, B., 2016, ‘Passports to progress: How do vocational qualifications help young people in building their careers?’.

⁹⁴ UCAS, 2016, UCAS End of Cycle Report 2016.; Kelly, S., 2017, ‘Reforming BTECs: Applied General qualifications as a route to higher education’, Higher Education Policy Institute.

⁹⁵ Department for Education, 2016, ‘Reviewing post-16 education and training institutions: area reviews (waves 1 to 5)’.

Figure 3.1. Acceptance rates for UK 18 year olds by type of qualification held, England, 2008-2016⁹⁶



The Skills Plan suggested that applied general qualifications may remain in place, to be delivered alongside A levels. The popularity of applied general qualifications in England shows the value young people place on keeping options to higher education open, even if they are motivated by applied learning related to specific careers. This is reflected by the approach of countries including Norway, whose system of qualification standardisation and recognition ensures that students can effectively move from vocational routes to higher education later. To ensure technical routes are completed successfully, with learners progressing to higher levels of rigour, it is important that students do not worry too much at 16 that they may not ultimately want or be able to find a job in their chosen occupation, or move straight into work without training at all. Another important consideration is that in successful systems like Singapore's, educational institutions receiving students on different pathways are specialist and have differing but clear purposes. It could be argued that many applied general students do not experience this at their A level-focused school sixth forms.

Making better use of apprenticeships

The 2012 Richard Review of Apprenticeships identified weaknesses in the quality of apprenticeships being funded.⁹⁷ The Coalition Government accepted its recommendations to refocus apprenticeships on training and occupations where they can add most value, increase their level of rigour demonstrated, and give employers a stronger role in their design, delivery, and success measures. Short apprenticeships, and those not associated with employment from day one, were ceased, and new employer-designed 'Trailblazer' standards embodying the new approach were piloted in some occupations as a replacement for the previous apprenticeship 'frameworks'. The 'Trailblazer' approach also trialled a new funding model, with employers and Government co-funding off-the-job training negotiated with colleges and other providers instead of education institutions drawing down fixed levels of funding for each learner from the Skills Funding Agency (which was usually intended to cover only half of training costs but in practice was often not topped up with employer funds at all).

⁹⁶ UCAS, 2016, '2016 End of Cycle Report', Figure 69.

⁹⁷ Richard, D., 2012, 'The Richard Review of Apprenticeships'.

The 2015 Conservative Government committed to increase the number of apprenticeship starts to 3 million over the course of the 2015-2020 parliament – implying an annual increase of 20 per cent over 2014-15 levels. Apprenticeships will form an alternative to college-based technical training within each of the proposed 15 occupation-based ‘routes’ for study at ages 16 to 18.

To finance this, the Apprenticeship Levy was introduced in April 2017. Employers contribute 0.5 per cent of their paybill over £3m in excess of this amount: 2 per cent of employers will be affected but it has been estimated that this group accounts for a majority of UK employees.⁹⁸ The Levy is expected to raise £2.8 billion per year by 2019–20, though apprenticeships spending is forecast to increase initially by only £642m on 2016-17’s level to £2.45bn in 2019-20.⁹⁹ The Government plans to require every public sector body with at least 250 employees in England to start an equivalent of 2.3 per cent of their total headcount on apprenticeships per year.¹⁰⁰

A commitment to expand apprenticeships is a welcome step. In 2015, 89 per cent of learners and 86 per cent of employers reported being satisfied or very satisfied with apprenticeship schemes.¹⁰¹ Previous research has found that workers with a level 2 apprenticeship have 15 per cent wage returns (male) or 2 per cent (female) over their lifetime compared with workers who hold lower level or other level 2 qualifications. The wage return is higher for level 3 apprenticeship completers, with male workers obtaining a 19 per cent and women a 5 per cent return, compared with level 2 qualification holders.¹⁰²

As Figure 3.2 shows, recent growth in the number of apprenticeship starts has been steady, especially among younger students. In fact, the growth in the number of older (25+) apprentices is attributable to the end of the Train to Gain program in 2010. However, the biggest growth has been among older apprentices, in contrast to the approach taken in other apprenticeship-focused systems like Germany and Switzerland’s, where the route has been successfully used for initial labour market entry.¹⁰³ Just 6.9 per cent of 16-18 year olds were apprentices at the end of 2016.¹⁰⁴

⁹⁸ Institute for Fiscal Studies, 2017, *The IFS Green Budget: February 2017 - Reforms to apprenticeship funding in England*.

⁹⁹ Department for Education, 2016, ‘Information on apprenticeship Levy: Data broken down by size and sector and the total apprenticeship budget’.

¹⁰⁰ Apprenticeship targets for public sector bodies: Government consultation response, Department for Education, 2017. Employers will have their Levy payments put into a digital account which can be used to pay training providers, only for off-the-job training and account funds need to be spent within two years. Levy-paying employers will have their digital accounts topped up by 10 per cent of their value by the Government; others will pay only 10 per cent of the costs (or none of the costs for those with fewer than 50 employees for a 16- to 18-year old apprentice); and employers and training providers will both be awarded a £1,000 grant for training a 16- to 18-year old apprentice or one aged 19 to 24 and has previously been in care or who has a local authority Education, Health and Care plan (EHCP).

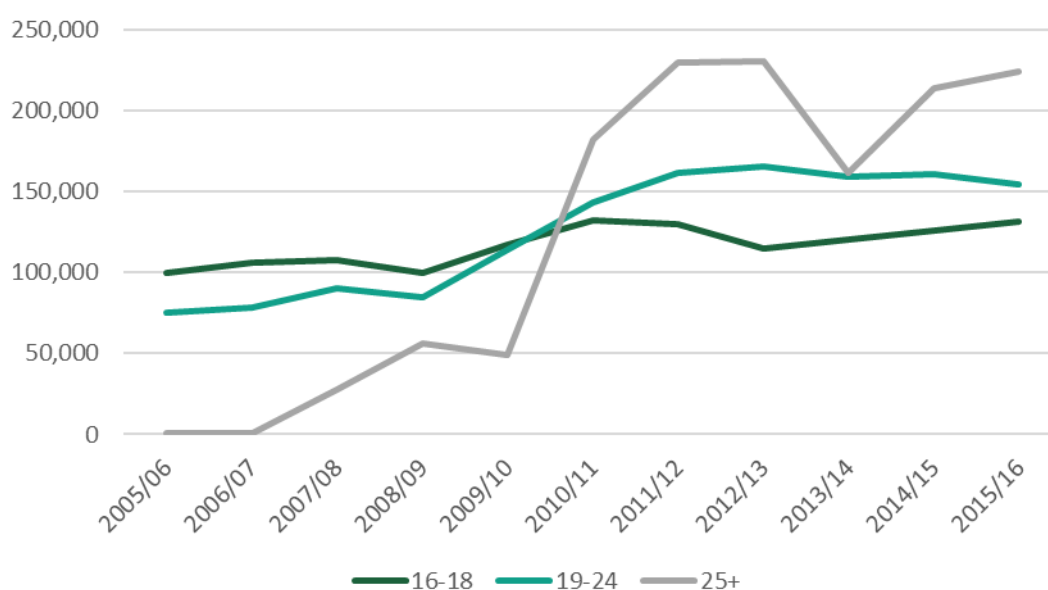
¹⁰¹ Department for Education, 2016, ‘Apprenticeships Evaluation 2015 – Employers’; Department for Education, ‘Apprenticeships Evaluation 2015 – Learners’. Learners included level 2 and 3 apprentices only.

¹⁰² Department for Education, 2014, ‘The economic value of key intermediate, qualifications: estimating the returns and lifetime productivity gains to GCSEs, A-levels and apprenticeships’.

¹⁰³ Steedman, H., 2010, ‘The state of apprenticeship in 2010’.

¹⁰⁴ Department for Education, 2017, ‘Participation in Education, Training and Employment: 2016’ Table 1a.

Figure 3.2: Apprenticeships starts by age group, England, 2005/06-2015/16¹⁰⁵



Expanding apprenticeships for young people would, however, increase risks of exposing them earlier to economic fluctuations that can cause apprenticeships to be ended prematurely. This has led some countries, for instance the Netherlands, to closely coordinate full time educational programmes and apprenticeships to allow smooth transitions between them.¹⁰⁶ Whilst the Post-16 Skills Plan sets out plans to develop bridging provision between technical and academic education, it provides little detail on how movement within the technical route would work. There is some risk that, with mutually recognised qualifications no longer mandatory in apprenticeships standards, learners may find it difficult for prior learning to be recognised if they move between classroom and employment-based learning.¹⁰⁷

International best practice also suggests that strong employer leadership, like that the Institute for Apprenticeships has been set up to oversee, is crucial for the design of effective apprenticeships. The CBI/Pearson Education and Skills Survey 2016 found that a majority of firms were engaged in apprenticeships but wanted a bigger say in the system than they had had previously. 61 per cent said that they needed flexibility in how they spend levy funds, and 71 per cent the avoidance of unnecessary bureaucracy, in order to have confidence that the levy will be a success for business.¹⁰⁸

However, tensions may exist between such flexibility and the functioning of the new apprenticeship system as a whole. Recent literature suggests that some of the standards designed by employer-led Trailblazer groups so far compromise quality. An analysis by Policy Exchange of approved standards concluded that some were too broad and generic, while others were too specific or did not address a specific skill shortage. Similarly, the fact that a training plan is not required may undermine the consistency of the off-the-job training element, which is crucial to apprenticeships as it sets them

¹⁰⁵ Department for Education, 2017, 'Apprenticeships by framework, level and age: starts 2002/3 to Q1 2016/17', FE data library: apprenticeships.

¹⁰⁶ Evans, L., 2014, 'Avoiding the same old mistakes: Lessons for reform of 14–19 education in England'.

¹⁰⁷ Institute for Apprenticeships, 2017, 'Apprenticeship Standards'.

¹⁰⁸ Confederation of British Industry and Pearson, 2016, 'The right combination: CBI/Pearson education and skills survey 2016', Exhibit 28.

apart from actual employment.¹⁰⁹ Likewise, a recent report by the IPPR suggested that standards risk turning out unconnected and therefore hamper progression to higher levels of skills, recommending the Government to tighten up standards by strengthening the role of the Institute for Apprenticeships.¹¹⁰

Finding the right balance will be crucial if the Government is to ensure that training is relevant to students and the labour market. Apprenticeships will need to equip students with knowledge and skills that help them obtain a job in the future while keeping the scope wide enough for them to move up and laterally. This aligns with Fuller and Unwin's (2013) defence of expansive learning and apprenticeships, which allows apprentices to get involved in a wider set of tasks and to acquire a broader range of skills, allowing for both deep and broad learning. The expansive learning framework considers the off-the-job part of apprenticeships crucial, as it allows students to obtain additional skills and engage with other communities.¹¹¹

It is also unclear whether the changes will achieve a significant increase in training provision. In the 2017 CBI/Pearson survey, 27 per cent of employers said that they expected a decrease in the level of investment in non-apprenticeship training with the introduction of the levy.¹¹² Many firms believe there will be some negative impacts for other forms of training, and the Institute for Fiscal Studies have highlighted a range of ways in which different forms of training might make way for apprentices in response to funding incentives, and the risks of distorting public sector training provision with new targets.¹¹³ The new funding system may change the distribution of funding for training across different parts of the country and across different occupations, and there could be perverse incentives for firms to break up to avoid the levy. With smaller firms being required to directly co-fund off-the-job training under the new system, some will see a significant change in incentives; in 2015 only 27 per cent of employers paid fees to a training provider for their apprentices' training.¹¹⁴

¹⁰⁹ Policy Exchange, 2016, 'The skills we need, and why we don't have them. How apprenticeships should be reformed to make the UK compete on the global stage'.

¹¹⁰ Institute for Public Policy Research, 2016, 'England's apprenticeship. Assessing the new system'.

¹¹¹ Fuller, A., Unwin, L., 2013, 'Learning as Apprentices in the Contemporary UK Workplace: creating and managing expansive and restrictive participation', *Journal of Education and Work*.

¹¹² Confederation of British Industry and Pearson, 2017, 'Helping the UK thrive: CBI/Pearson education and skills survey 2017', Exhibit 5.6.

¹¹³ Institute for Fiscal Studies, 2017, 'The IFS Green Budget: February 2017 - Reforms to apprenticeship funding in England'.

¹¹⁴ Department for Education, 2016, 'Apprenticeships Evaluation 2015 – Employers'.

Box 3.3. Dual qualifications with an apprenticeship are the choice of almost half of Norway's young people

As in Germany, apprenticeships in Norway are not standalone qualifications. They are embedded in wider vocational programmes that combine college-based and on-the-job training. At the age of 16, Norwegian students are required to decide between an academic or a vocational route, with 53 per cent of students opting for a vocational program, compared to 44 per cent in the OECD.

Qualifications normally come in a two-plus-two format, which consists of two classroom-based years in college and work-based training as an apprentice in the last two years. Students who fail to secure an apprenticeship after the first two-year cycle are entitled to a third college-based year.¹¹⁵

Vocational qualifications are divided into nine technical routes set at the national level: (a) technical and industrial production; (b) electricity and electronics; (c) building and construction; (d) restaurant and food processing; (e) health and social care; (f) media and communication; (g) agriculture, fishing, and forestry, (h) service and transport; (i) design, arts, and crafts. Three general routes are available too.¹¹⁶

Employers are deeply involved in vocational education. Together with other agents such as unions, they set standards, take on apprentices, and participate in assessment.¹¹⁷ Therefore, apprenticeships and dual vocational qualifications have become very popular and a common route into employment in Norway.¹¹⁸ This, combined with the possibility to progress to higher education with a vocational upper-secondary qualification, has resulted in 51 per cent of upper-secondary students pursuing vocational qualifications, compared to the OECD average of 44 per cent.

Partly due to labour market regulations in the country, salaries do not vary by educational attainment as much as in most other countries: the OECD has reported a 28 per cent wage gap between degree-holders and those with an upper-secondary qualification in Norway, compared to 57 per cent in the OECD in average.¹¹⁹ Although this is also one of the factors behind high dropout, it has given apprenticeships a comparative advantage over university education.¹²⁰ Yet many of them will go to university later on to do a short-cycle tertiary degree, which is the highest qualification for 14 per cent of all 25-34 Norwegians, compared to 8 per cent in the UK or in the OECD on average.¹²¹

¹¹⁵ OECD, 2013, 'Education Policy Outlook: Norway'.

¹¹⁶ Nordisk Handverksforum, 2015, 'Feasibility study of the introduction of the Hamburg Model into Norwegian vocational education system'.

¹¹⁷ UNESCO and UNEVOC, 2013, 'World TVET Database: Norway'.

¹¹⁸ Nordisk Handverksforum, 2015, 'Feasibility study of the introduction of the Hamburg Model into Norwegian vocational education system'.

¹¹⁹ OECD, 2013, 'Education Policy Outlook: Norway'.

¹²⁰ European Centre for the Development of Vocational Training, 2012, 'Spotlight on VET: Norway'.

¹²¹ OECD, 2016, 'Education at a Glance 2016 Country Note: Norway'.

Recommendation: A cross-party consensus for expanding apprenticeships is a welcome development. However, given the risks of not achieving effective delivery, the Government should avoid focusing on narrow numerical targets and develop broader measures of success that consider the quality of training and its value to employers and learners. Being able to assert with evidence that these routes are beneficial will be a vital part of improving their reputation with learners and their parents. Given the dependence of apprentices on the sustainability of their employer's business for their programme of training, it should consider how to ensure learners can move between apprenticeships and classroom-based technical routes, and whether transparent and portable qualifications should play a role in apprenticeship standards to enable them to market their knowledge more widely.

Addressing the balance between university degrees and other outcomes

Successive governments over recent decades have prioritised the expansion of higher education, and specifically traditional, university-based undergraduate degrees, in a range of policy decisions. The proportion of adults who participate in higher education by the age of 30 has increased from around a fifth in 1990/91 to almost half today.¹²² This has been enabled by the implementation of a unified and well-understood funding system, with substantial grants (until recently) and income contingent loans to reduce financial constraints and risk for students, and the encouragement of new institutions – alternative providers – to enter the higher education market. In 2015/16, caps on undergraduate student numbers were lifted by the Government, and there remains no statutory entry requirements for university education.¹²³

These policies have created some positive outcomes: together with the use of specific interventions as part of university access agreements, they have helped the proportion of pupils in receipt of free school meals at 15 entering higher education growing from 13 per cent in 2005/06 to 22 per cent in 2013/14, with the gap in access to other students shrinking in the process.¹²⁴ However, this has come at the expense of intermediate tertiary education and technical training at levels 4 and above, creating skills shortages in a range of industries: just over 14,000 awards of level 4 and above were recorded for all adult skills budget learners in 2015/16 (including classroom and workplace-based training), compared to almost 400,000 English bachelor's degree awards.¹²⁵ Foundation degrees and non-degree provision in universities have declined and is now dominated by business courses. As a result, England is unusual in lacking dedicated institutions for, and well-recognised qualifications in,

¹²² House of Commons Library, 2017, 'Participation in higher education in England and the UK', SN/SG/2630.

¹²³ Hillman, N., 2014, 'A guide to the removal of student number controls'.

¹²⁴ Department for Education, 2016, 'Widening Participation in Higher Education, England, 2013/14 age cohort'.

¹²⁵ Skills Funding Agency, 2017, 'Statistical first release: further education and skills'. HESA, 2017, 'Statistical First Release 242'.

sub-degree tertiary and intermediate technical education, which provides strong wage returns in other countries with better developed systems.¹²⁶

Graduate employment premiums – relative to other workers – provide an imperfect indication of the economic benefits of a degree, but recent data on undergraduate earnings show how variable outcomes are: the median earnings for 2008/9 Creative Arts and Design graduates 5 years later was £20,000, compared with £27,000 for computer science and £47,000 for Medicine and Dentistry.¹²⁷ England has one of the highest proportions of people in jobs that do not require the level of qualification that they have: at 30 per cent compared to an average of 22 per cent in the OECD's Survey of Adult Skills.¹²⁸

The financial implications for the Government are significant. The majority of graduates will not finish repaying their loans before their debts are cleared (after 30 years), and it has been forecast that student loans will contribute to public debt worth around 10 per cent of GDP in the long term.¹²⁹ Due to the way the loans system works, having the majority of students take 3 year degrees instead of shorter tertiary provision (which is more usual in other countries with strong vocational systems) is especially expensive to government. Recent estimates suggest a 3 year degree costs roughly £6,000 more than a 2 year course for the average student according to recent estimates.¹³⁰ The changes introduced by the Government in 2017, which include freezing the repayment threshold until 2021, had been expected to reduce long-term government pending per cohort from £7.6bn to £5.9bn.¹³¹ However, the government has since proposed to raise the threshold and freeze fees from 2018/19, with the subsidy cost of loans expected to rise from 31 per cent to 45 per cent.¹³²

The need for a coherent vision for education pathways

There are signs that the current Government is keen to redress some of these imbalances. The recent Industrial Strategy consultation announced £170m of capital funding for new Institutes of Technology in each major city, to provide courses at degree level and above, specialising in technical disciplines whilst providing higher-level apprenticeships and courses for employers.¹³³ The launch of National Colleges is intended to provide centres of high-tech training in specific industries: High Speed Rail, Nuclear, Onshore Oil and Gas, Digital Skills, and Creative and Cultural Industries. The Post-16 Skills Plan has acknowledged the importance of providing technical students with a pathway to higher education, enabled by new provision. This is a positive development in the narrative of public policy, but there still is not a coherent picture of how such developments dovetail with ambitions to widen access to university, changes occurring in apprenticeships and wider post-16

¹²⁶ Wolf, A., 2016, 'Remaking Tertiary Education: Can we create a system that is fair and fit for purpose?', Education Policy Institute. OECD, 2014, 'Skills beyond schools: synthesis report'.

¹²⁷ Department for Education, 2017, 'Employment and earnings outcomes of higher education graduates by subject and institution: experimental statistics using the Longitudinal Education Outcomes (LEO) data', Figure 2.

¹²⁸ OECD, 2016, 'Skills Matter: Further Results from the Survey of Adult Skills'.

¹²⁹ Office for Budget Responsibility, 2016, 'Fiscal sustainability analytical paper: Student loans update', Chart 3.1.

¹³⁰ Wolf, A., 2016, 'Remaking Tertiary Education: Can we create a system that is fair and fit for purpose?', Education Policy Institute, Chapter 5.

¹³¹ IFS, 2017, 'Higher Education funding in England: past, present, and the options for the future.'

¹³² Institute for Fiscal Studies, 2017, 'Higher Education finance reform: Raising the repayment threshold to £25,000 and freezing the fee cap at £9,250'

¹³³ HM Government, 2017, 'Building our Industrial Strategy'.

education, and how they will be supported in practical terms by financial support for adult learning (see Chapter 7).

Recommendation: The Post-16 Skills Plan offers the prospect of clearer, improved pathways for 16-year-olds seeking a route to skilled employment, via T levels or apprenticeships. However, with the alternative A level pathway providing a focused curriculum designed mainly for entry to undergraduate degrees, there is a risk that the new landscape represents a bifurcation into two narrow paths that fail to appeal to those motivated by a more ‘career-based’ education, developing knowledge of particular industries whilst leaving a range of options open for technical training or academic study later. Meeting such demand effectively could provide more logical routes to level 4 and 5 training, and help broaden the range of provision in higher education to include more professional, technical and shorter courses. Combined with its promised review of tertiary education, the Government should develop a coherent vision for post-16 education that takes into account the full range of pathways sought by young people, avoids undue focus on access to three-year undergraduate degrees at the expense of other qualifications, and links effectively with the key stage 4 curriculum. T levels should be designed to fit with this wider vision.

Taking a pragmatic approach to progression

There has been significant recent progress in reducing NEET rates and increasing educational participation, driven in part by Raising the Participation Age to 18, interventions coordinated by local authorities, and national schemes.¹³⁴ The proportion of 16 year olds in education and work-based learning increased from 86.8 per cent at the end of 2005 to 94.3 per cent in 2016, with participation of 17 year olds increasing by 10.6 percentage points to 88.0 per cent. This increasing trend is shown in Figure 3.3, which plots participation rates for 16 year olds and, for each of these cohorts (lagging the data by one year), their subsequent rate of participation at 17.

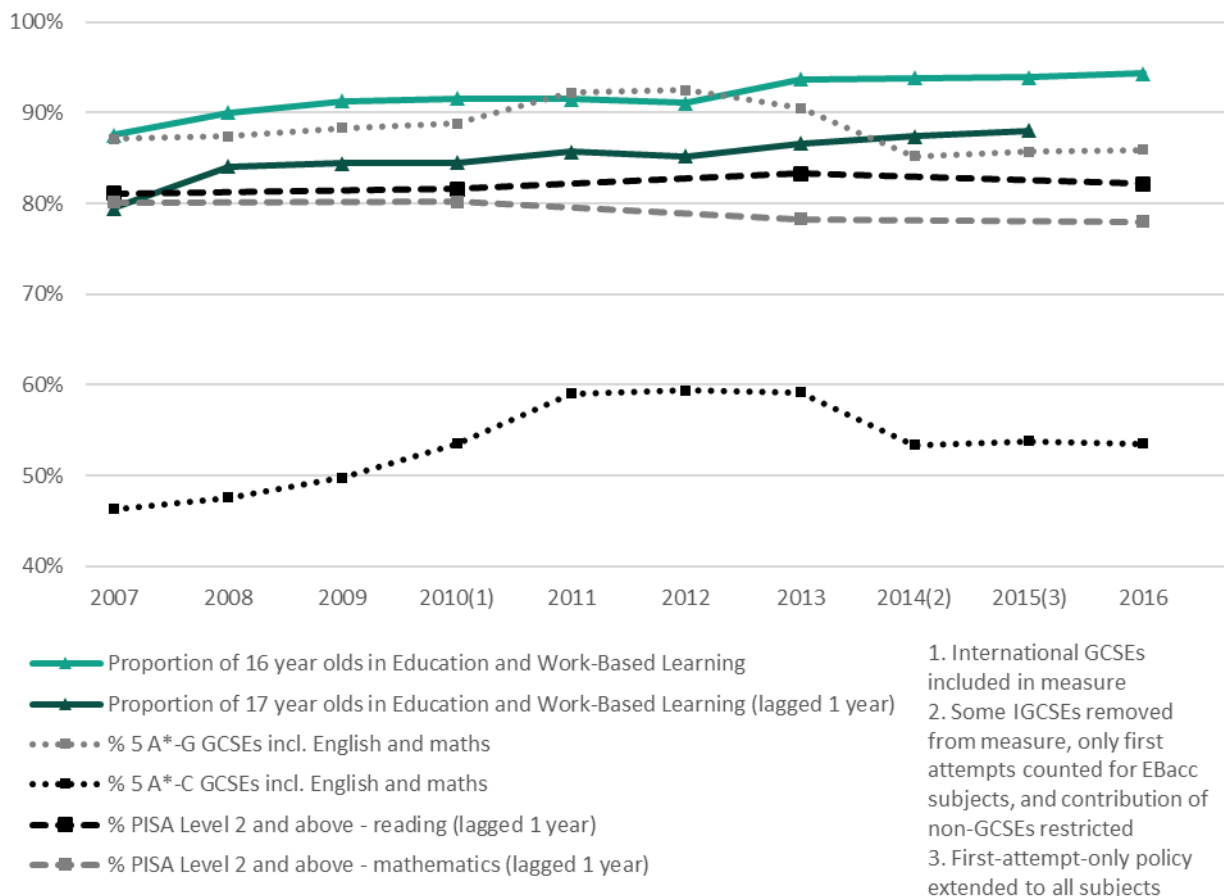
Those who face disengagement from education and who have low attainment are more likely to be NEET.¹³⁵ Pre-16 attainment trends will affect both educational participation rates from 16 and the characteristics of those in education in the 16 to 19 phase. Each cohort’s relevant key stage 4 GCSE results are also shown in Figure 3.3. The time series is affected by reforms to school performance measures following the Wolf Review of Vocational Qualifications of 2011, but the proportion achieving 5 A*-Cs including English and maths by the end of key stage 4 increased by 7.2 percentage points between 2006/7 and 2015/16.¹³⁶

¹³⁴ Department for Education, 2016, ‘Participation of young people in education, employment or training: statutory guidance for local authorities’.

¹³⁵ Based on longitudinal surveys, in 2010 79 per cent of 19 year olds who had achieved 5A*-C including English and Mathematics at year 11 had no spells NEET between 16 and 19, compared to 51 per cent of those who had not (Department for Education, 2011, ‘Youth Cohort Study & Longitudinal Study of Young People in England: The Activities and Experiences of 19 year olds: England 2010’).

¹³⁶ Wolf, A., 2011, ‘Review of Vocational Education: The Wolf report’, Department for Business, Innovation and Skills and Department for Education.

Figure 3.3: Participation in education and work based learning for 16-year-olds, subsequent participation at 17, and GCSE & PISA attainment pertaining to each cohort¹³⁷



However, considering a lower threshold – more relevant to those at the margins of participation – the proportion achieving 5 A*-Gs actually fell by 1.2 percentage points. In the PISA assessments relevant to each cohort of participating 16 year-olds (repeated every three years, and in a manner unaffected by reforms to assessments and performance tables), the proportion reaching the basic level 2 proficiency has hardly increased for reading and has decreased slightly for mathematics. Increasingly, then, post-16 institutions – mainly colleges – are providing education for people who, at 16, constituted England’s long tail of low attainment, who previously would not have been in education at all, and who disproportionately will have suffered from disengagement with education. They are doing so with lower funding levels than they had previously.

Whilst there have been improvements in progression, only 60 per cent of 19 year olds in 2016 were qualified to Level 3, and 17.3 per cent of 17 year-olds were in full time education or an apprenticeship at level 2 (equivalent to GCSEs at A*-C) or lower at the end of 2015.¹³⁸ With another 4.6 per cent not in education, employment, or training, assuming participation continues to increase,

¹³⁷ Department for Education, 2017, ‘Participation in education, training and employment: 2016’. Participation for academic age 16-year-olds recorded at the end of the calendar year. Chart plots the subsequent participation at 17 for each of these cohorts (e.g 2014 shows the participation rate for 17 year olds in 2015), and the relevant GCSE results for each cohort of participants at 16 (e.g. 2015 plots the 2014/15 results). PISA is carried out in the autumn term every 3 years for 15 year olds in year 11, so the 2012 results (for example) are plotted for the relevant cohort in 2013.

¹³⁸ Department for Education, 2017, Level 2 and 3 attainment in England: Attainment by age 19 in 2016’.

colleges' challenge in generating higher level skills and progression to work for their learners may continue to grow.¹³⁹

The Skills Plan aims to reduce 'churn' and smooth progression by reducing the number of qualifications available and providing a clearer line of sight to skilled employment. This could help by making options clearer and preventing false starts. However, some of the churn between smaller qualifications below level 3 has been a consequence of colleges supporting students on the margins of educational engagement, often with difficult personal circumstances, who have not developed clear career ambitions. For some of these students, it will not be credible to promise skilled work at the end of a two-year route as the sole means of supporting engagement: educational outcomes are to a great extent at the mercy of local labour markets, and in 2015/16 only 68 per cent of intermediate (level 2) apprentices under 19 achieved their qualification.¹⁴⁰

The Post-16 Skills Plan proposes a transition year to support students not ready to enter an educational route at 16, which may involve traineeships.¹⁴¹ In the year 2014/15, 19,400 young people under the age of 25 started a traineeship, up from 10,400 the year before; 17.8 per cent had learning difficulties or a disability.¹⁴² A recent qualitative assessment suggested that 82 per cent of participants were "satisfied" with provision, with 47 per cent of all respondents saying that they were "very satisfied". A large majority felt that the traineeship had helped them develop skills relevant to the world of work (84 per cent) and that it had improved their chances of getting a job (83 per cent). However, there were not wide differences in destinations between those who had completed the traineeship and those who left before completion (30 per cent had dropped out): 66 per cent of trainees were either in employment, and apprenticeship, or further education or training.¹⁴³

However, it is important to consider provision and support (pre- and post-16) for low achieving students, those with special educational needs, and those at risk of disengagement in a wider context. Some of the recent reduction in NEET rates have come about through local interventions, which are in flux due to changes in the national policies that have previously supported them: the effective Youth Contract for 16 and 17-year olds was wound up in 2016, European Social Fund interventions may cease after we leave the European Union, overall local authority funding will continue to be reduced under current government plans, and the real value of the 16 to 19 Bursary Fund is waning over time.¹⁴⁴ Meanwhile, the recent introduction of education, health, and care (EHC) plans for young people aged up to 25 with special educational needs may support the design

¹³⁹ Department for Education, 2017, 'Participation in Education, Training and Employment by 16-18 year olds', Table 1, Table 14a.

¹⁴⁰ Keep, E., 2016, 'The long-term implications of devolution and localism for FE in England'; Department for Education, 2017, 'Further education and skills: January 2017'.

¹⁴¹ Traineeships are a tailored pre-apprenticeship programme of up to 6 months including work experience, English and maths provision.

¹⁴² Skills Funding Agency, Department for Business, Innovation, and Skills, 2015, 'Traineeships – Completions and Progressions':

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416516/traineeships-completions-and-progressions-note-march15.pdf

¹⁴³ Department for Education, 2017, 'Traineeship: year two process evaluation'.

¹⁴⁴ Bickerstaffe, T., et al, 2014, 'The Youth Contract for 16-17 year olds not in education, employment or training evaluation'.

of better-tailored support for students, learning from experience of the supported internships programme.¹⁴⁵

Box 3.4. Targeting schools with high proportions of disadvantaged students to tackle early dropout in Ireland

Building transitions that work is crucial to social mobility and economic prosperity. The likelihood of dropping out early is largely dependent on socio-economic factors, such as living in low income households or being from a minority ethnic group. In addition, adults who left education early are more likely to be unemployed and low-earners, holding back a country's economic potential.¹⁴⁶

In Ireland, the DEIS (Delivering Equality of Opportunity in Schools) is a programme targeted to schools with concentrated level of disadvantage, where early dropout rates are higher than average. All participating schools receive additional resources ranging from extra staff to access to programmes aimed at improving literacy and numeracy levels among pupils.¹⁴⁷

The DEIS programme has been praised for its positive outcomes, especially among younger pupils and in the lowest levels of achievement. Literacy and numeracy in participating schools have increased, and improvement has been found to be statistically significant in a study. In addition, student retention at the senior cycle level (ages 15-18) in participating schools increased by 5 per cent from 68.2 per cent to 73.2 per cent between the 2001 to 2004 entry cohorts, while in non-DEIS schools it increased by 2.4 per cent from 85 per cent to 87.4 per cent.¹⁴⁸ A later study reported a decrease from 22 to 10.5 per cent in drop out at senior cycle between the 1995 and the 2008 cohorts.¹⁴⁹ The same study suggests that the reduction of class sizes, which constitutes a central element of DEIS programmes, explains much of the performance change over the period.

The community sector also delivers programmes to reduce NEETs rates and improve life chances among young people. The Prince's Trust Team Programme is a 12-week course for unemployed 16-25 year olds, during which young people are provided with support to develop confidence, motivation, communication and life skills as part of a team. The team gets involved in a community project with social impact potential involving job experience and developing English, maths and interview and CV skills. The objective of the programme is to improve young people's employability skills.¹⁵⁰ The programme involved 9,224 young people between April 2015 and March 2016, of which 31 per cent had mental health needs, 28 per cent had a disability, 16 per cent had a history of offending, and 10 per cent were care leavers. The report suggests that 77 per cent of participants had positive outcomes after six months of completion: 45 per cent were in employment, 33 per cent in education or training, and 14 per cent were volunteering. However, success rates decrease as participants' age goes up, and it is reliant on public funding.¹⁵¹

¹⁴⁵ Department for Education, 2013, 'Supported internship trial for 16 to 24 year old learners with learning difficulties and/or disabilities: An evaluation'.

¹⁴⁶ Education, Audiovisual and Culture Executive Agency, 2014, 'Tackling Early Leaving from Education and Training in Europe: Strategies, Policies and Measures', European Commission.

¹⁴⁷ Department of Education and Science, 2017, 'DEIS. Delivering Equality of Opportunity in Schools. Plan 2017'.

¹⁴⁸ OECD and Department of Education and Science, 2011, 'OECD Project Overcoming School Failure: Policies that Work. National Report Ireland'.

¹⁴⁹ Economic and Social Research Institute, 2015, 'Learning from the Evaluation of DEIS'.

¹⁵⁰ <https://www.princes-trust.org.uk/help-for-young-people/get-job/boost-your-confidence>

¹⁵¹ The Prince's Trust, 2016, 'The Prince's Trust Team programme and 'The Transition Year'.

Another community initiative to reduce NEETs and that has been led by employers is the Movement to Work, a network of currently more than 240 companies that in 2016 provided around 20,000 work placements, 54 per cent of which turned into jobs.¹⁵² Employers joining the organisation, which has charitable status, must commit to offering work experience or vocational training placements to unemployed people aged 16 to 24, with special focus on those who have been out of work for some time. Placements need to be not less than 2 weeks long and support the development of employability skills such as time management or communication.¹⁵³

Recommendation: The Government should review the current approach to supporting low-achieving, disengaged students, and those with special educational needs to ensure it takes into account wider changes in local and national policy and the increasingly limited resources of local authorities responsible for education participation. It should consider the large body of experience and evidence generated by recent interventions including the Youth Contract and the introduction of Traineeships. The transition year proposed as part of the Post-16 Skills Plan should be designed as part of a fully-formed three-year journey, to ensure young people are equipped with the right skills to progress into further education and to re-engage with English and maths over a sustained period.

Careers education needs to improve

In order to understand the options available to them, the implications of educational choices, and the skills and qualifications they need for work or further study, young people need high quality careers education, information, advice, and guidance.¹⁵⁴ Countries with highly specialised routes of technical training for young people, including Norway and Germany, invest heavily in high-quality and professional careers education, so that the very distinct choices offered to them can be navigated confidently and based on a good understanding of the different options. Apart from helping students make their way through the education system, careers education and advice is also expected to equip students with skills to make independent choices regarding their education. Box 3.5 gives an overview of careers education in Finland.¹⁵⁵

¹⁵² Movement to Work, 2016, '2015/16 impact report'.

¹⁵³ <http://www.movementtowork.com/about-us/>

¹⁵⁴ Holman, J., 2014, 'Good Career Guidance'.

¹⁵⁵ Gatsby, 2014, 'Good Career Guidance'; CEDEFOP, 2014, 'Germany, VET in Europe – Country report'; Department for Education and Department for Business, Innovation and Skills, 2016, 'Technical education reform: the case for change'.

Box 3.5. Compulsory careers education throughout education and adult guidance provision in Finland

Pupils in Finland benefit from a consolidated and world-renowned career education system that spans all educational stages and is also available during a worker's lifetime. Counsellors are required to be fully-trained teachers and obtain a guidance and counselling qualification.

In primary and secondary education, school career services provide students with 76 hours of counselling, both in one-to-one and group sessions, where they cover study skills, life at school, further education options and information around occupations. These activities can take place in the classroom or in employers' facilities.¹⁵⁶ Schools are required to have links with employers, as pupils between the age 13 and 16 are entitled to work experience.¹⁵⁷

At the upper-secondary level, the focus is on further study and careers, but careers counsellors still have a duty to preserve and promote students' wellbeing. Careers education is available in most institutions offering education at this stage, including vocational institutions, adult education centres, music schools, and sports education centres. Workshops about employability skills and sessions with businesses are common. Students can expect to receive sixty hours of careers education during their initial vocational education. In higher education, students will find services that provide financial advice and help them succeed in their job search and the development of necessary skills. Apart from the general, university-wide services, provision is also available by field of study. In adult learning, support focuses on giving students tools to balance study and other duties.¹⁵⁸

If the Post-16 Skills Plan is successful in creating more fixed pathways, it will be even more important for careers education to play a complementary role. A simplified system of technical routes could make careers guidance easier to provide, and the UCAS-style portal for technical education promised by the Conservative Manifesto presents an opportunity to better signpost pupils to different options. This is especially important following reforms to school accountability instigated by the Wolf Review of Vocational Education in 2011.¹⁵⁹ The removal of some vocational qualifications and down-weighting of others in school performance measures have led to reductions in the vocational options available for young people in most schools.¹⁶⁰ Whilst that is likely to have improved the rigour of key stage 4 education for many students, it could also affect their willingness to choose more vocational options later and their understanding of some aspects of the labour market.¹⁶¹

In response to longstanding failings in this area, the Coalition Government ended central funding for the Connexions service, established a National Careers Service (NCS), and introduced a statutory

¹⁵⁶ Euroguidance, 2012, 'Lifelong guidance in Finland'.

¹⁵⁷ Gatsby Foundation, 2014, 'Good Career Guidance'.

¹⁵⁸ Euroguidance, 2012, 'Lifelong guidance in Finland'.

¹⁵⁹ Wolf, A., 2011, 'Review of Vocational Education: The Wolf report', Department for Business, Innovation and Skills and Department for Education.

¹⁶⁰ Muir, R., 2013, 'The impact of league table reform on vocational education in schools'.; Parameshwaran, M. and Thomson, D., 2015, 'The impact of accountability reforms on the Key Stage 4 curriculum: How have changes to school and college Performance Tables affected pupil access to qualifications and subjects in secondary schools in England?', *London Review of Education*, 13(2), pp. 157-173.

¹⁶¹ Rodeiro, C. L. V., 2007, 'A Level Subject Choice in England: Patterns of Uptake and Factors Affecting Subject Choice', Cambridge Assessment.

duty for most schools to provide impartial careers guidance to pupils in years 8 to 13.¹⁶² In 2015, the Government announced a new Jobcentre plus employment advisor role, working with local educational institutions to help improve young people's ability to find work. However, a recent joint report of the Business, Innovation and Skills, and Education Committees drew a highly negative picture of the new landscape for careers advice in England, describing it as patchy, complex, and often unsatisfactory. Many school leavers were found to have had no advice at all on how to navigate the education system and lack information on the occupations available in the labour market.¹⁶³ It has also been suggested that, even where substantial guidance is provided, a narrow focus on immediate employability has taken away from a curriculum-based career education, which should provide tools to guide individuals through education and careers throughout their lives.¹⁶⁴

Of course, it will take schools and colleges time to develop their provision of careers guidance and education following recent changes, though the situation has not been helped by their taking on of extra responsibility in this area without additional resources. A 2015 survey showed schools have developed a wide range of provision, often involving level-6 qualified professional advisers from within or outside the school. However, this provision tended to be heavily focused on years 10 and 11 and frequently relied on staff combining the work with other duties.¹⁶⁵

There is also a fundamental challenge in relying on teachers who tend to have followed academic routes to university education, and schools with sixth forms keen to maintain rolls, to provide independent information about vocational education and apprenticeships. In response to criticism of school practices from the college sector, the Technical and Further Education Act 2017 gave the Government power to force schools to give rival educational institutions access to their pupils for these purposes.¹⁶⁶ The same concern would be relevant again if, as proposed in the last Government's *Schools that Work for Everyone* consultation and repeated in the Conservative Manifesto, universities are asked to sponsor academies and fund free schools as a condition of raising tuition fees.¹⁶⁷ Such a step could further jeopardise provision of unbiased guidance about technical education options and, without any evidence that universities are capable or indeed willing to lead school improvement, should be considered with caution.

Careers education needs to build an understanding in young people of jobs, how they differ, and how to think about the educational choices that lead to them. One study found that young people who had school-mediated employer engagement activities and thought they were helpful for getting a job went on later earn up to 16 per cent more than others, and research has shown that the number of instances of contact with employers in school is an important factor in reducing the

¹⁶² Hubble, S., and Long, R., 2017, 'Careers guidance in schools, colleges and universities', House of Commons Briefing paper SN 07236.

¹⁶³ House of Commons Business, Innovation and Skills, and Education Committees, 2016, 'Careers Education, Information, Advice and Guidance: First Joint Report of the Business, Innovation and Skills and Education Committees of Session 2016-17', HC 205.

¹⁶⁴ Roberts, K., 2013, 'Career guidance in England today: reform, accidental injury or attempted murder?', *British Journal of Guidance and Counselling*, 41(3), pp. 240-253.

¹⁶⁵ Dennison, M., Gibson, S., and Oliver, L., 2015, 'Mapping careers provision in schools and colleges in England'.

¹⁶⁶ Association of Colleges, 2017, 'Association of Colleges membership survey of careers advice and guidance'.; Further and Technical Education Act 2017, Explanatory Notes.

¹⁶⁷ Department for Education, 2016, 'Schools that work for everyone'.

incidence of being NEET.¹⁶⁸ Such opportunities are concentrated among more advantaged students, although good careers provision can provide protection for those at higher risk of being NEET due to social factors.¹⁶⁹

The Coalition Government made work experience non-mandatory before 16, but introduced work placements as part of post-16 study programmes. As such, a 2014 survey of Year 11 pupils suggested that less than half had received work experience as part of careers education, and, in 2014, it was found that just 44 per cent of employers offered work experience.¹⁷⁰ There is little evidence on whether provision post-16 has improved, but the task of giving young people more exposure to the world of work is made more difficult by the fact that fewer learners have a chance to gain skills through work while studying than previously – the proportion of 16 to 17-year old full-time students in employment fell from a peak of 42 per cent in 1997 to 22 per cent in 2017.¹⁷¹

In 2015, the Careers and Enterprise Company (CEC) was set up as an independent body to increase engagement between businesses, Local Economic Partnerships, and schools via an Enterprise Adviser Network to support schools, a Careers and Enterprise Fund to support existing local initiatives, and a mentoring scheme.¹⁷² There are signs that the situation could be improving: in the 2017 CBI/Pearson Education and Skills survey, 81 per cent of employers had links with schools and/or colleges, and of those working with FE colleges, 45 per cent reported having increased their engagement over the past year (42 per cent for secondary/sixth-form colleges and 37 per cent for primary schools).¹⁷³ The previous Government had committed to publishing a “comprehensive careers strategy for all ages” in 2017.¹⁷⁴

Recommendation: The Government should publish a comprehensive careers strategy. It should commit to ensuring the new educational landscape is complemented with objective careers advice from earlier than key stage 4, alongside more fairly-distributed employer engagement in schools, building on the progress of the new Careers and Enterprise Company. It should carefully review the implications for careers education of efforts to increase the involvement of universities in running schools and examine a broader range of options to trigger improvements.

¹⁶⁸ Mann, A. and Percy, C., 2013, ‘Employer engagement in British secondary education: wage earning outcomes experienced by young adults’, *Journal of Education and Work*, 27(5), pp. 496-523.; Mann, A., and Percy, C., 2014, ‘School-mediated employer engagement and labour market outcomes for young adults: wage premia, NEET outcomes and career confidence’, In Mann. A. et al. *Understanding Employer Engagement in Education: Theories and Evidence*. London: Routledge.

¹⁶⁹ Duckworth, K., and Schoon, I., 2012, ‘Beating the odds: Exploring the aspects of social risk on young people’s school-to-work transitions during recession in the UK’, *National Institute Economic Review*, 222, pp. 38-51.

¹⁷⁰ Archer, L., and Moote, J., 2016, ‘ASPIRES 2 Project Spotlight: Year 11 Students’ Views of Careers Education and Work Experience’.; Shury, J., et al, 2014, ‘UKCES Employer Perspectives Survey’.

¹⁷¹ Q1 figures. ONS, 2017, ‘UK labour market: June 2017’, Table AO6; UK Commission for Employment and Skills, 2012, ‘The youth employment challenge’.

¹⁷² Careers and Enterprise Company, 2017, ‘What we do’, available from: <https://www.careersandenterprise.co.uk/who-we-are/what-we-do>.

¹⁷³ Confederation of British Industry and Pearson, 2017, ‘Helping the UK thrive: CBI/Pearson education and skills survey 2017’.

¹⁷⁴ Halfon, R., 2017, *Careers Speech at Westminster Academy*, available from: <https://www.gov.uk/government/speeches/robert-halfon-careers-speech-at-westminster-academy>.

4. Improving the literacy and numeracy of school and college leavers

Literacy and numeracy skills have long been important for a wide range of jobs. Better attainment is linked to improved earnings, irrespective of education level, and higher numeracy skills in particular have a consistently positive impact on likelihood of employment.¹⁷⁵ More generally, providing support to those with low levels of numeracy and literacy skills can help protect disadvantaged adults from poverty, ill-health, and marginalisation from political and social life.¹⁷⁶

Changes in the workplace have been driving an increased demand for particular literacy and numeracy skills, including an increased focus on customer service and customer contact, increased report writing at all levels, and the need for better employer-employee communication on complex issues such as pensions. Not only do more employees have to understand how to work with data and digital interfaces, they also increasingly need to be able to make inferences and communicate their findings in accessible ways.¹⁷⁷ There is also growing evidence of the need for a more complex combination of skills than in the past, including maths and ICT skills, reading and writing, and using and manipulating and presenting data using software packages.¹⁷⁸

Low skill levels can be improved through employment, as it provides the opportunity to practice and develop skills, particularly if employers commit to developing the skills of their staff. Indeed, international evidence suggests that in England these skills are rapidly developed upon entering the workplace.¹⁷⁹ However, poor basic skills can also be a barrier to employment in the first place or to progression once in employment.¹⁸⁰ Longitudinal data from the UK shows that periods of unemployment are less likely to result in decay of literacy and numeracy skills if a threshold of learning has been reached. This is particularly important for disadvantaged groups and underlines the importance of closing the attainment gap and ensuring every young person leaves compulsory education with basic literacy and numeracy skills.¹⁸¹

The extent of the problem

In the OECD's Adult Skills Survey, administered in 2012, 23 per cent of England's 16-18 year olds and 17 per cent of 19-24 year olds have low levels of literacy (level 1 or below) and 29 per cent of 16-18

¹⁷⁵ Conlon, G., and Lane, M., 2016, 'The Impact of Literacy, Numeracy and Computer Skills on Earnings and Employment Outcomes', OECD Education Working Papers, No. 129, Paris: OECD Publishing.

¹⁷⁶ Centre for Longitudinal Studies, 2014, 'The impact of adult literacy and numeracy research based on the 1970 British Cohort Study', Research impact case study.

¹⁷⁷ Department for Business, Innovation and Skills, 2016, 'Impact of Poor English and Maths Skills on Employers: Literature Review'.

¹⁷⁸ Department for Business, Innovation and Skills, 2011, 'Review of Research and Evaluation on Improving Adult Literacy and Numeracy Skills', Research Paper No. 61.

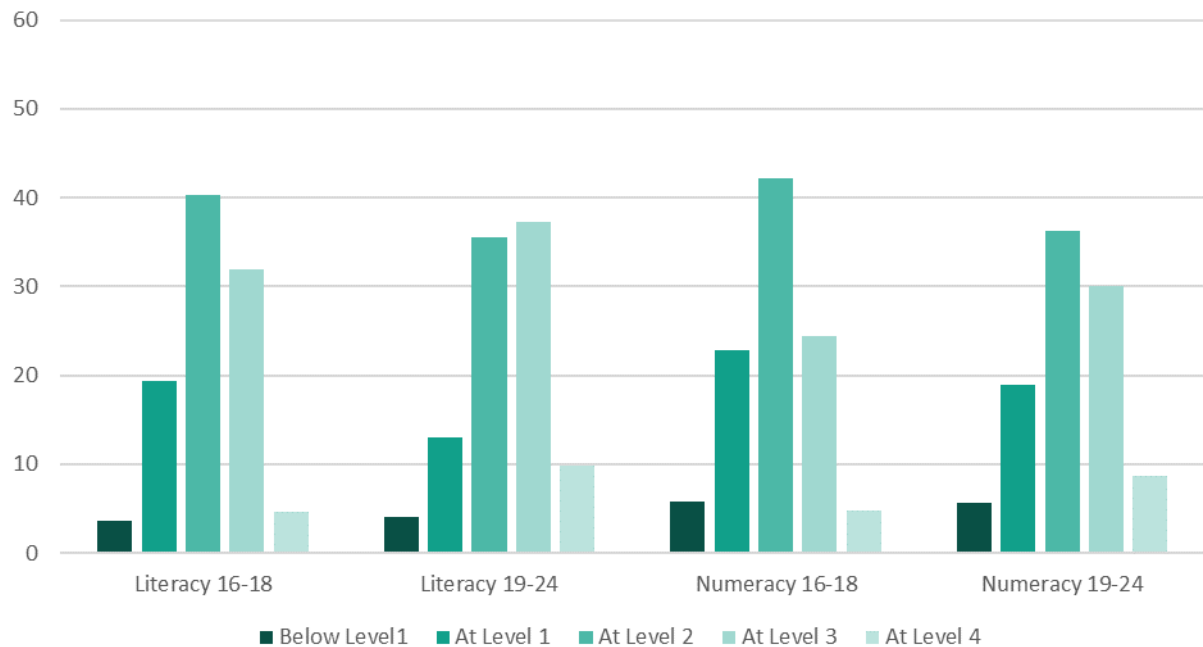
¹⁷⁹ Department for Business, Innovation and Skills, 2014 'Young Adults' Skills Gain in the International Survey of Adult Skills 2012', Research Paper No. 182.

¹⁸⁰ Department for Business, Innovation and Skills, 2016, 'Impact of Poor English and Maths Skills on Employers: Literature Review, Research Paper No. 267.

¹⁸¹ Bynner, J. and Parsons, S., 1998, 'Use It or Lose It? The Impact of Time out of Work on Literacy and Numeracy Skills', Basic Skills Agency, London.

year olds and 25 per cent of 19-24 year olds have low levels of numeracy (level 1 or below).¹⁸² That the UK is unique amongst developed countries to have the same levels of basic literacy and numeracy amongst its youth and those nearing retirement is concerning not only as this will have implications for young people’s immediate access to employment, but because it will also affect their further learning and citizenship into the future.¹⁸³

Figure 4.1: Percentage of adults in England at each level of numeracy and literacy¹⁸⁴



¹⁸² Department for Business Innovation and Skills, 2013, ‘The International Survey of Adult Skills 2012: Adult literacy, numeracy and problem solving in England’.

¹⁸³ Field, S., Kuczera, M., and Windisch, H. C., 2016, ‘Building Skills for All: A Review of England’, OECD.

¹⁸⁴ OECD, 2013, ‘Skills Outlook 2013’.

Box 4.1: Proficiency levels in the Survey of Adult Skills

International Survey of Adult Skills (PIACC) uses proficiency levels to imply an ability to cope with a particular type of task and is based on the shifts in the skills needs to complete items successfully at different points along the underlying proficiency scale.

Those adults at level 1 or below in PIACC levels are operating at below the equivalent national standards for adult literacy and numeracy in England's previous National Qualification Framework regarded by the government to be required to be fully functional in the modern British Economy: Level 1 literacy (equivalent to GCSE D to G) and Entry Level 3 numeracy (standard expected of a 9- to 11-year-old).

At level 1 Literacy, a person would be able to enter personal information in a document or identify a telephone number in a short piece of text, however, they would not be able to search a particular part of a text for more information or identify the most important points in a short article. They are likely to be unable to write anything other than a short letter, note, or form.

At level 1 Numeracy, a person would be able to perform basic mathematical processes with whole numbers or money in common, concrete contexts such as dividing simple prices or identifying large percentage reductions or increases (e.g. 50 per cent) and multiplying and dividing for the full amount. They would not be able to relate a gauge to a quantity, identify departure times and work out durations or time remaining, use simple scales for conversions or interpret relatively simple data and statistics in texts, tables and graphs.

Looking internationally, England has three times more low-skilled young people aged 16-19 than the best performing countries such as Finland, Japan, Korea and the Netherlands, with weak numeracy being a particular problem.¹⁸⁵ Around 30 per cent of young people with GCSE or equivalents and NVQs (UK level 2 and 3) as their highest qualification still have low basic skills – even when these GCSEs include maths and English. Around one in ten university graduates in England have low skills, highlighting both that our entry standards to higher education appear to be relatively low, and that this form of education does not always compensate for failings in basic skills.¹⁸⁶

Re-engaging learners

The raising of the education participation age to 18 and funding requirements introduced in 2014, requiring all young people in post-16 education to be working towards a level 2 maths and English qualification if they have not already achieved this, recognise this challenge.¹⁸⁷ Whilst these changes have been driving attainment in English and maths in the right direction, progression rates show how difficult it is to make up for lost ground post-16. The proportion of young people who failed to achieve GCSE A*-C or another Level 2 qualification in English and maths at age 16 who had achieved this by age 19 is increasing, but over 75 per cent of these young people still fail to achieve level 2 by 19.¹⁸⁸ Progression rates are even poorer at FE colleges, which tend to take students with relatively

¹⁸⁵ Field, S., Kuczera, M., and Windisch, H. C., 2016, 'Building Skills for All: A Review of England', OECD.

¹⁸⁶ Field, S., Kuczera, M., and Windisch, H. C., 2016, 'Building Skills for All: A Review of England', OECD.

¹⁸⁷ Education Funding Agency, 2014, '16 to 19 funding: maths and English condition of funding', available from: <https://www.gov.uk/guidance/16-to-19-funding-maths-and-english-condition-of-funding#history>.

¹⁸⁸ Department for Education, 2017, 'Level 2 and 3 attainment in England: Attainment by age 19 in 2016', SFR 16/2017, 30 March 2017.

lower prior attainment compared to schools. Performance in work based learning is also disappointing.¹⁸⁹

Research has shown that many young people may have become disengaged from and have negative experiences towards learning maths in particular, often through negative prior experiences or peer pressure. Deep-seated beliefs that a young person ‘can’t do maths’, maths anxiety, or low self-esteem can make it difficult for teachers and trainers to engage learners.¹⁹⁰ As such, for those who have fallen behind in English and maths, a significant and sustained input of time is required to achieve positive outcomes. Research evidence suggests that this has to encompass a focus on student welfare, positive teacher-student relationships, relevant course content, a mastery-based approach to learning, and an overarching goal of building students’ confidence in their ability and their self-identity.¹⁹¹ There is little positive evidence for withdrawing students from class in either maths or English, which is consistent with the need to foster the self-identity and confidence of students who may have negative past experiences of being taken out of class for ‘remedial’ interventions. Creating a positive sense of community with other learners is likely to be more productive for those who have previously disengaged.¹⁹²

Integrated, contextualised functional mathematics using real-world examples may be more accessible and engaging to students on technical courses of study who may have struggled in the past with the more traditional academic approach of the GCSE. Similarly, embedding content in practical learning so that contexts are real and not contrived and the student can immediately see the value of learning are useful. As such, Sir Adrian Smith’s recent review of post-16 mathematics recommended that the Government review the GCSE resit policy, considering what curricula and qualifications would be most suitable.¹⁹³ Contextualised maths in the context of the Post-16 Skills Plan’s 15 new technical routes could offer opportunities to increase retention and student engagement with the subject. The launch of revised Functional Skills qualifications in 2019 offers an opportunity to improve provision for disengaged learners, and the increasing number expected to combine a development of basic skills with technical training.¹⁹⁴

Improving teaching for literacy and numeracy across the school system

Over the past few years, schools in England have experienced considerable change in curriculum and qualifications requirements. A new national curriculum for Key Stages 1 to 4 was introduced in September 2014, intended to raise standards, focusing on core knowledge and skills that were

¹⁸⁹ Department for Education, 2017, ‘Level 1 and 2 attainment in England and maths by students aged 16-18: academic year 2014/15’, SFR 15/2016, Main Text.; Department for Education, 2016 ‘Level 1 and 2 English and maths: 16 to 18 students, 2014 to 2015’, SFR 15/2016, National Tables 1 and 3, available from: <https://www.gov.uk/government/statistics/level-1-and-2-english-and-maths-16-to-18-students-2014-to-2015>.

¹⁹⁰ The Education and Training Foundation, 2014, ‘Effective Practices in Post-16 Vocational Maths Final Report’.

¹⁹¹ Mitchell, J., and Murray, S., 2016, ‘Teaching practices that re-engage early school leavers in further education: an Australian study’, *Journal of Further and Higher Education*, 40(3).

¹⁹² Education Endowment Foundation, 2014, ‘Improving Level 2 English and maths outcomes for 16 to 18 year olds Literature review’.

¹⁹³ Smith, A., 2017, ‘Report of Professor Sir Adrian Smith’s review of post-16 mathematics’.

¹⁹⁴ Education and Training Foundation, 2017, ‘Maths and English Functional Skills Reform Programme’, available at: <http://www.et-foundation.co.uk/research/maths-and-english-functional-skills-reform-programme/>

considered to align more closely with the highest performing school systems in the world.¹⁹⁵ These changes will take several years to have impact and feed into outcomes, and a period of stability would benefit teaching quality and the delivery of this curriculum.

There is still considerable scope, nevertheless, to continue to raise the standard of teaching of maths and English in schools. The Government has recently made efforts through, for example, maths hubs to spread good practice.¹⁹⁶ These, along with novel pedagogical approaches such as the early promise of maths mastery, should be evaluated over the medium and longer term and compared with institutional measures for raising standards (e.g. free schools, the creation of academies and adjusting accountability measures) to ensure efforts are focused on those interventions which offer the best prospects for sustained improvement.¹⁹⁷

Teachers and teaching assistants need to be coached in specific, evidence-based strategies that work for those children who are struggling – even where these strategies represent the basics of good teaching and classroom management. To support the development of teachers as highly-trained professionals, it is therefore crucial that maths and English teachers are well remunerated, well qualified, and continually retrained in the profession – particularly in the FE sector where young people have the most ground to cover.¹⁹⁸ However, recent data show that average teacher salaries in the FE sector lag considerably behind those in the school sector and that, on average, FE teachers spend only 15 hours a year on CPD – a majority (60 per cent) report spending no time at all on CPD.¹⁹⁹

Children with special educational needs and disability (SEND) are both more likely to experience poverty than others and also less likely to experience a fulfilling education or leave school with outcomes that reduce the chances of living in poverty as adults.²⁰⁰ Only 24.2 per cent of pupils with an identified SEND achieve an A*-C in Maths and English, compared with 69.7 per cent of others.²⁰¹ Several recent reforms, including the introduction of Education, Health and Care Plans and those embodied in the SEND Code of Practice in 2014, have helped foster new examples of high-quality provision for students with SEND. However, provision for school children in recent times has been described as becoming more fragmented, affected by the changing role of local authorities and wider budget cuts. Increasing school autonomy, which in some cases has fostered innovation and beneficial arrangements for SEND students, have often left support at the school's discretion, relying heavily on head-teacher and teachers' leadership.²⁰² A recent study on support for SEND students in

¹⁹⁵ Department for Education, 2014, 'New curriculum will make education system 'envy of the world'', 4 September 2014, available from: <https://www.gov.uk/government/news/new-curriculum-will-make-education-system-envy-of-theworld>.

¹⁹⁶ MathsHUBS, 2017, available from: <http://www.mathshubs.org.uk/>.

¹⁹⁷ Education Endowment Foundation, 2015, 'Mathematics Mastery Overarching Summary Report'.

¹⁹⁸ Chambers, B., et al, 2011, 'Effective classroom strategies for closing the gap in educational achievement for children and young people living in poverty, including white working-class boys', Centre for Excellence and Outcomes in Children and Young People's Services.

¹⁹⁹ The Education and Training Foundation, 2017, 'Further Education Workforce Data for England: Analysis of the 2015-2016 Staff Individualised Record (SIR) data'.

²⁰⁰ Bernardes, E., et al, 2016, 'Special educational needs and their links to poverty', Joseph Rowntree Foundation.

²⁰¹ Department for Education, 2016, 'Revised GCSE and equivalent results in England: 2015 to 2016', Main SFR 03/2017 M.

²⁰² Driver Youth Trust, 2015, 'Joining the dots: Have recent reforms worked for those with SEND?'.

secondary education highlights efforts to improve provision for some students with special needs and disabilities.²⁰³

The previous Government requested Sir Adrian Smith to lead an independent review on the feasibility of compulsory post-16 mathematics study. His report suggests that we do not yet have the necessary pathways available or the capacity to deliver the required volume and range of teaching, but that these issues should be addressed as part of an ambition for universal maths provision to 18.²⁰⁴ Based on the evidence available, this assessment appears sound.

Recommendation: The Government should retain the ambition for everyone to attain at least a level 2 in English and maths by 19. To support this, it should develop Functional Skills into a high quality, relevant and recognised qualification whose success is measured on progression rates, employment outcomes and equipping young people with basic skills. It should also monitor whether students taking apprenticeships are progressing well enough and review the suitability of this route for those lacking basic literacy and numeracy. The 15 new technical routes could allow for higher contextualisation of maths to help ensure retention and student engagement with the subject.

²⁰³ Blatchford, P., Webster, R., 2017, 'The Special Educational Needs in Secondary Education (SENSE) study Final Report'.

²⁰⁴ Smith, A., 2017, 'Report of Professor Sir Adrian Smith's review of post-16 mathematics'.

5. Employability and ‘soft’ skills

Making Education Work concluded that “education in England has typically emphasised the acquisition of academic skills, resulting in 18-year-olds who are under-prepared for the transition to further study or for entry to the world of work”.²⁰⁵ Whilst the academic knowledge and cognitive skills developed in formal education are of significant value in the labour market, other skills and traits are vital for future participation in the labour market.

Governments and researchers have used a range of taxonomies for these ‘non-academic’ skills. The 2006 European Framework of Key Competencies for Lifelong Learning, for example, defines ‘horizontal skills’ as including learning to learn, social and civic responsibility, initiative and entrepreneurship, cultural awareness, and creativity. The ‘Big Five’ taxonomy defines the ‘OCEAN’ measures of Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.²⁰⁶

The ‘21st Century Skills’ framework is promoted in particular by groups such as the Partnership for 21st Century Learning. In their version, mastery of traditional academic knowledge and ICT literacy are augmented with general skills such as ‘learning and innovation skills’ and ‘life and career skills’.²⁰⁷ Such frameworks are increasingly influencing the development of national education policies, as in recent developments of Singapore’s school curriculum.²⁰⁸ A key rationale for these developments has been a recognition that the skills needed for success in work and life are changing in developed countries, along the lines described in Chapter 2. They are associated with higher-order thinking skills, to meet the requirements of jobs that are less procedure-driven and of careers that will need to be more adaptable.

Correspondingly, there is a growing evidence base showing that non-academic skills can have a comparable impact on life outcomes to that of intellectual or academic outcomes. However, this evidence tends to be derived from the experiences of individuals over the last half-century, suggesting that their importance is not only emerging now.²⁰⁹ For example:

- one study assessed the impact of self-esteem and the locus of control measured for young people in the US at 14 to 21 on labour market outcomes at 30. The difference in wages between the 25th percentile and 75th percentile on these measures amounted to 10 per cent for males and over 30 per cent for females, compared to impacts of 20 and 30 per cent respectively for differences in cognitive skills;²¹⁰

²⁰⁵ Anderson, R., 2014, ‘Careers 2020: Making Education Work’.

²⁰⁶ Nyus, E. and Pons, E., 2005, ‘The effect of personality on earnings’, *Journal of Economic Psychology*, 26, pp. 363-384.; Diris, R., et al, 2014, ‘Fostering and measuring skills: improving cognitive and non-cognitive skills to promote lifetime success’, OECD.

²⁰⁷ Partnership for 21st Century Learning, 2017, *Framework for 21st Century Learning*, available from: <http://www.p21.org/about-us/p21-framework>.

²⁰⁸ OECD, 2010, ‘Strong Performers and Successful Reformers in Education: Lessons from PISA for the United States’.

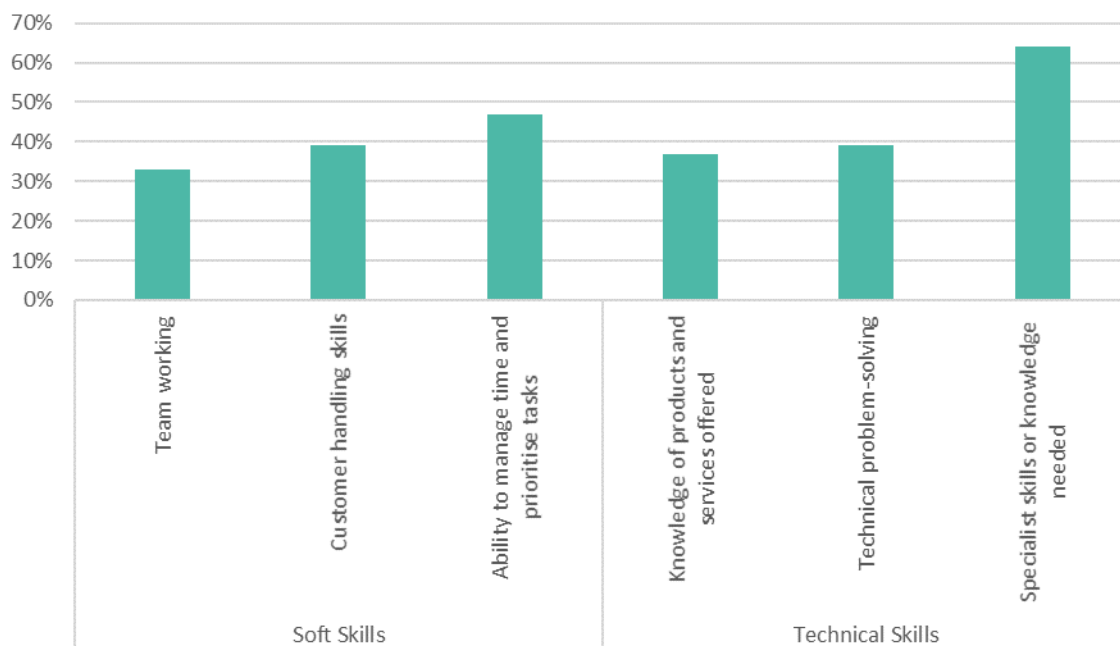
²⁰⁹ For overviews of developments in this evidence base, see Heckman, J. and Kautz, T., 2012, ‘Hard evidence on soft skills’, *Labour Economics*, Elsevier, 19(4), pp. 451-464.

²¹⁰ Heckman, J., Stixrud, N. and Urzua, S., 2006, ‘The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior’, *Journal of Labor Economics*, 24(30), pp. 411-482.

- Carneiro, Crawford, and Goodman (2007) found that social adjustment measured in the British National Child Development Survey at age 11 had a significant impact on employment and wages at age 42, after controlling for educational attainment;²¹¹ and
- using surveys of US high school students, another study found that the demonstration of leadership qualities in school was associated with 2 to 24 per cent higher earnings 10 years hence, with some of this effect seemingly attributable to higher levels of 'sociability'.²¹²

Unsurprisingly, then, the importance of general 'employability' skills is routinely reflected in the views of employers. The UK Commission for Employment and Skill's 2015 Employer Skills Survey highlights that businesses are struggling to find people with the right skills to fill the vacancies they advertise (Figure 5.1). The survey found out that the 'soft skills' most in shortage were the ability to manage time and prioritise tasks (47 per cent), customer handling skills (39 per cent), and team working (33 per cent). However, a greater proportion (64 per cent) answered that they were struggling to find candidates with the right specialist skills or knowledge needed to perform the role.²¹³

Figure 5.1. Soft and technical skills most difficult to obtain from applicants (all skill-shortage vacancy base), UKCES 2015 Employer Skills Survey



Some of these skills can also be vitally important for participation in civic life and, ultimately, have an enormous bearing on wellbeing. Analysing the results from numerous studies, Roberts et al. (2007) found that 'Big Five' traits, and Conscientiousness especially, tended to have similar or greater

²¹¹ Carneiro, P., Crawford, C. and Goodman, A., 2007, 'The impact of early cognitive and non-cognitive skills on later outcomes, CEE Discussion Paper 0092.

²¹² Kuhn, P. and Weinberger, C., 2002, 'Leadership skills and wages', IZA Discussion Paper No. 482.

²¹³ UKCES, 2016, 'Employer Skills Survey 2015: UK Results'.

influences on mortality than IQ or socioeconomic status.²¹⁴ Several studies have found links between these characteristics and reductions in the risks of anti-social behaviour and criminality.²¹⁵

However, it is also clear that a variety of characteristics or skills captured under this banner are also important for cognitive development and support the acquisition of academic knowledge. In fact, there is more statistical evidence available linking non-cognitive skills to academic outcomes than to labour market performance.²¹⁶ For example, the Carneiro et al. (2007) study highlighted earlier found that those showing greater social adjustment at 11 were more likely to stay in school after 16 (when that was the compulsory school age) and also to obtain a degree, even when accounting for cognitive ability and background factors. They found that cognitive ability and social skills were complementary in predicting outcomes – those with greater social skills saw a bigger benefit from having higher cognitive skills.²¹⁷ Another study suggested that noncognitive traits played a role in the decline in intergenerational mobility between people born in 1958 and 1970, but that this was only through their impact on educational attainment.²¹⁸ These skills are important, but they drive economic outcomes in combination with and in support of academic or technical knowledge.

Character and resilience

Recent reviews have specifically linked development of character and resilience (often referred to as ‘grit’) skills to educational equality and social mobility. These are often seen more as individual attributes that help people prosper and develop through and beyond education in the face of challenges (with some overlap with concepts of mental health) than being purely about specific behaviours valued in the workplace. Building on Demos’s influential Character Inquiry of 2011, in 2012 the All-Party Parliamentary Group on Social Mobility asserted that personal resilience and emotional wellbeing were vital but often overlooked factors underpinning the challenge of improving social mobility in this country.²¹⁹ Its subsequent ‘Character and Resilience Manifesto’ reviewed the relevant evidence and suggested that closing socio-economic opportunity gaps would require “inspiring people from all backgrounds to change their perception of themselves, what they can achieve and their relationship to society at large”.²²⁰

As those reports assert, the importance of such characteristics for young people’s education and life outcomes are well evidenced. There are two key mechanisms driving their importance in social

²¹⁴ Roberts, B. W. et al., 2007, ‘The power of personality: The comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes’, *Perspectives in psychological science*, 2 (4), pp. 313–345.

²¹⁵ Heckman, J. and Rubinstein, 2001, ‘The Importance of Non-cognitive Skills: Lessons from the GED Testing Program’, *American Economic Review*.; Caspi, A., et al, 1994, ‘The “Little Five”: Exploring the Nomological Network of the Five-Factor Model of Personality in Adolescent Boys’, *Child Development*.

²¹⁶ Brunello, G. and Schlotter, M., 2011, ‘Non cognitive skills and personality traits: labour market relevance and their development in education and training systems’, IZA Discussion Paper No. 5743.

²¹⁷ Carneiro, P., Crawford, C. and Goodman, A., 2007, ‘The impact of early cognitive and non-cognitive skills on later outcomes’, CEE Discussion Paper 0092.

²¹⁸ Blanden, J., Gregg, P. and Macmillan, L., 2006, ‘Accounting for intergenerational income persistence: non-cognitive skills, ability and education’.

²¹⁹ Lexmond, J. and Grist, M. (eds.), 2011, ‘The Character Inquiry’, Demos.; All-Party Parliamentary Group on Social Mobility, 2012, ‘Seven Key Truths about Social Mobility’, Interim report.

²²⁰ Lexmond, J., Paterson, C., and Tyler, C., 2014, ‘Character and Resilience Manifesto’, All-Party Parliamentary Group on Social Mobility.

mobility: First, those from less affluent backgrounds are less likely to develop these skills.²²¹ Secondly, these skills help people prosper despite setbacks, and the setbacks associated with difficult family lives or a lack of access to educational opportunity are more prevalent for those from less privileged backgrounds. As such, interventions aimed at these skills have often been targeted at disadvantaged pupils or schools in deprived areas.

Can these skills be developed?

Whilst the evidence on their importance is clear, the benefit of explicit government action to develop these skills in children should not be simply assumed. Kautz et al. (2014) argue that although many of these skills are 'stable' at a given age (e.g. one's traits in a given respect are reflected in behaviour across different situations) and have a genetic basis, they are strongly shaped over time by environments and relationships. They suggest that the early years are crucial for developing these attributes and laying the foundations for development of cognitive skills later, and that non-cognitive skills are more malleable in adolescence than cognitive skills.²²² It is also clear that educators and their approaches *do* play a role in developing a range of character traits in their students. In one study of ninth-grade maths and English students in the US, a bigger effect of teachers was found for non-cognitive skills than for cognitive skills.²²³

There is, however, more limited evidence on the effectiveness of *deliberate* strategies for enhancing non-cognitive skills. In part, this arises from difficulties of, and inconsistencies in, classifying and measuring the wide range of relevant skills across different studies, and there is certainly no single 'silver-bullet' skill to target. Many studies are hampered by a reliance, in many cases, on self-reported measures of personal characteristics.²²⁴

Figure 5.2 gives Gutman and Schoon's (2013) summary of the state of evidence on the malleability and wider impacts found for various skills. That suggests that several skills, particularly self-efficacy, goal-orientation, metacognitive strategies, and social skills are relatively amenable to active development, with positive effects on behaviours and attainment. For low-achieving students, developing expectations that improve motivation also appears to be important.

²²¹ Dixon, M., et al., 2006, 'Freedom's Orphans: Raising Youth in a Changing World', Institute for Public Policy Research.

²²² Diris, R., et al, 2014, 'Fostering and measuring skills: improving cognitive and non-cognitive skills to promote lifetime success', OECD, p. 7.

²²³ Jackson, C. K., 2013, 'Non-cognitive ability, test scores, and teacher quality: Evidence from 9th grade teachers in North Carolina', Working Paper 18624, NBER.

²²⁴ Hanson, J., and Lucas, B., 2016, 'Learning to be employable: Practical lessons from research into developing character'.

Figure 5.2: Summary of evidence base on non-cognitive skills²²⁵

Skill	Quality of measurement	Malleability	Effect on other outcomes	Strength of evidence
Self-concept of ability	High	Medium	Not available	Medium
Self-efficacy	High	High	High	Medium
Achievement goal theory	High	Medium	Low to medium	Medium
Intrinsic motivation	High	Medium	Low to medium	High
Expectancy-value theory	Medium	Not available	Medium to high	Medium
Engagement	Medium	Not available	Not available	Low
Grit	Medium	No evidence	No evidence	Low
Self-control	Medium	Low to medium	Low	Medium
Meta-cognition	Medium	Medium to high	Medium to high	High
Leadership skills	Low	Not available	No evidence	Low
Social skills	Medium	Medium to high	Low to medium	High
Resilience and coping	Medium	High	Low	Medium
Creativity	Medium	Not available	No evidence	Low

On the other hand, whilst interventions have been found to develop coping skills, helping students face specific challenges and avoid anxiety, there is less evidence that this can be done in a way that directly improves other outcomes. There is little experimental evidence that grit (or perseverance) can be developed in young people by specific interventions, though the authors of that review assert that it is important to take a ‘broad view’ and consider these skills in combination.²²⁶

What have recent governments done to better develop these skills among our young people?

A range of specific interventions by recent governments have been aimed at developing character and resilience through broadening the experiences of young people:

- Three rounds of funding for ‘military ethos’ alternative provision projects in schools run by ex-service personnel have taken place since 2012 (£5m in the 2014/15 round), involving mentoring and team-building to instil teamwork, discipline and leadership.²²⁷
- Since 2015, schools and other organisations have been invited by the Department for Education to enter the annual Character Awards, to recognise and celebrate efforts to support young people to develop “traits that support academic attainment, are valued by employers, and enable them to make a positive contribution to society”.²²⁸

²²⁵ Recreated from Gutman, L. M., and Schoon, I., 2013, ‘The impact of non-cognitive skills on outcomes for young people’: literature review’, Table 1, p. 40.

²²⁶ Gutman, L. M., and Schoon, I., 2013, ‘The impact of non-cognitive skills on outcomes for young people’: literature review’.

²²⁷ Department for Education, 2013, ‘New funding for military ethos projects’, available from: <https://www.gov.uk/government/news/new-funding-for-military-ethos-projects>.; Department for Education, 2014, ‘Measures to help schools instil character in pupils announced’, available from: <https://www.gov.uk/government/news/measures-to-help-schools-instil-character-in-pupils-announced>.

²²⁸ Department for Education, 2016, ‘Awards launched for schools best at instilling character’, available from: <https://www.gov.uk/government/news/awards-launched-for-schools-best-at-instilling-character>.

- From 2015, character grants (worth £6m in 2016) have funded organisations, including schools, who “use activities such as sports, debating or music to provide a rounded learning experience for children”.²²⁹
- The National Citizen Service (NCS), first piloted in 2011 and established by the Office for Civil Society (OCS) has been promoted by the Government. NCS aims to improve cohesion by mixing young people from different backgrounds, support the transition into adulthood and development of employment skills. The two- to four-week programme involves groups of up to 15 young people completing a series of activities including an outdoor residential week aimed at building team work, a residential for participants to learn ‘life skills’ and a community-based social project.²³⁰

The previous government also announced in March 2017 its intention to make Personal, Social, Health and Economic (PSHE) Education mandatory in schools from 2019, with provisions in the Children and Social Work Act 2017, as well as reviewing the subject’s recommended content.²³¹ Non-statutory guidance released by the Department in 2016 encourages schools to adopt various strategies, including PSHE lessons, to develop social skills and resilience.²³²

Should more be done to build non-cognitive skills in schools and colleges?

This recognition of the importance of character and resilience is supported by evidence. However, encouraging schools to allocate more dedicated curriculum time to the issues may not be the solution, unless more hard evidence is available to help ensure the time is used effectively. Tricot and Sweller (2014) suggest that, according to educational psychology theories proposed by Geary (2008), ‘domain-general’ knowledge (underpinning generic skills that can be applied in different contexts) can be described as ‘biologically primary’.²³³ This sort of knowledge is developed over time unconsciously, through experience and without explicit tuition and may therefore be unteachable in a general setting with explicit instruction, even if it can be useful to understand which ones are relevant for and practice them in gaining secondary, domain-specific, knowledge.²³⁴ Intrinsic motivation and engagement in particular appears to be context-specific, suggesting that it is easier for a history teacher to work on ensuring their pupils understand the importance of their subject and experience the rewards of knowing it better than for that teacher to rely on the work done in separate sessions to improve attitudes towards learning.²³⁵

²²⁹ Department for Education, 2016, ‘Funding boost for schools helping pupils develop character’, available from: <https://www.gov.uk/government/news/funding-boost-for-schools-helping-pupils-develop-character> .

²³⁰ National Citizen Service, 2017, available from: <http://www.ncsyes.co.uk/>; National Audit Office, 2017, ‘National Citizen Service’.

²³¹ Department for Education, 2017, ‘Policy Statement: Relationships Education, Relationships and Sex Education, and Personal, Social, Health and Economic Education’.

²³² Department for Education, 2016, ‘Mental health and behaviour in schools: Departmental advice for school staff’.

²³³ Geary, D. C., 2008, ‘An evolutionarily informed education science’, *Educational Psychologist*, 43, pp. 179-195.

²³⁴ Sweller, J., and Tricot, A., 2014, ‘Domain-Specific Knowledge and Why Teaching Generic Skills Does Not Work’, *Educational Psychology Review*, 26(2), pp. 265-283.

²³⁵ Gutman, L. M., and Schoon, I., 2013, ‘The impact of non-cognitive skills on outcomes for young people’: literature review’; Allensworth E., et al, 2012, ‘Teaching adolescents to become learners. The role of noncognitive factors in shaping school performance: a critical literature review, Chicago: University of Chicago Consortium on Chicago School Research.

Evidence from educational trials also demonstrates that non-cognitive skills are not easily acquired in a general context.²³⁶ An example is that of recent social and emotional learning (SEL) programmes. These ‘positive psychology’ programmes aim to instil well-being and resilience, and recent examples have included the UK Resilience Programme, the Positive Alternative Thinking Strategies (PATHS) programme, and the Social and Emotional Aspects of Learning Strategy for Schools (SEAL) programme.²³⁷ Whilst small scale evaluations of some of these programmes have shown encouraging signs, quantitative studies have given mixed results for behaviour and academic results.²³⁸ A recent Education Endowment Fund (EEF) evaluation of a large trial of the PATHS programme reported no impact on attainment in primary schools.²³⁹ The EEF suggest that, whilst that particular programme was not particularly successful, and trials of a ‘growth mindset workshop’ intervention in primary schools did not show statistically significant impacts, SEL approaches are more likely to be effective when they are “embedded into routine educational practices, and supported by professional development and training for staff”.²⁴⁰

This points towards encouraging schools to ensure the subtleties of their day-to-day environment support non-cognitive skills in the round, rather than augmenting the timetable or pursuing ‘one-off’ interventions. A lack of evidence on how to develop resilience in children does not, though, undermine the importance of providing effective support for mental health, and targeting provision where it is most needed. Public Health England advocate a ‘whole school approach’, with staff development and the overall school ethos and environment developed to support all children.²⁴¹

Other skills associated with the world of work, for instance team-work, planning, and leadership, can be practised and promoted in the course of studying particular subjects. But there are risks in any approach that pushes teachers to adopt certain teaching methods – for instance increasing the use of project work, independent inquiry, staged problem-solving, and group tasks in lessons – for motivations other than learning the content of the curriculum. Evidence from the latest round of PISA suggests a positive association between direct instruction and performance at 15, and there is strong evidence that efforts to get pupils to learn new material through problem-solving can fail to engrain the subject knowledge.²⁴²

²³⁶ Didau, D., 2017, ‘Is resilience even a thing?’, available from: <http://www.learningspy.co.uk/featured/resilience-even-thing/>

²³⁷ Hanson, J., and Lucas, B., 2016, ‘Learning to be employable: Practical lessons from research into developing character’.

²³⁸ Hanson, J., and Lucas, B., 2016, ‘Learning to be employable: Practical lessons from research into developing character’.; Barry, M. M., et al, 2015, ‘What works in enhancing social and emotional skills development during childhood and adolescence? A review of the evidence on the effectiveness of school-based and out-of-school programmes in the UK.’ World Health Organization Collaborating Centre for Health Promotion Research, National University of Ireland Galway.

²³⁹ Education Endowment Foundation, 2015, ‘Promoting Alternative Thinking Strategies (PATHS): Evaluation report and Executive summary’.

²⁴⁰ Education Endowment Foundation, 2015, ‘Changing Mindsets: Evaluation report and executive summary’.; Education Endowment Foundation, 2017, ‘Toolkit – Social and emotional learning’.

²⁴¹ Public Health England, 2015, ‘Promoting children and young people’s emotional health and wellbeing: A whole school and college approach’.

²⁴² OECD, 2016, ‘PISA 2015 Results (Volume II): Policies and Practices for Successful Schools’, Figure II.2.13.; Clark, R. E., Kirschner, P. A., and Sweller, J., 2006, ‘Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching’, *Educational Psychologist*, 41(2), pp. 75-86.

There is also little evidence that teachers in England use such approaches less than those elsewhere to start with, at least in secondary schools. In the OECD's 2013 TALIS survey of lower secondary (key stage 3) teachers, 38 per cent reported having students work on projects that require at least one week to complete frequently or in all/nearly all lessons, compared with an average of 27 per cent; while 58 per cent in England had students work in small groups to come up with a joint solution to a problem or task with this frequency, compared with an average of 47 per cent.²⁴³ In PISA 2015, England's pupils had a similar exposure to enquiry-based instruction in science to the OECD average, and it tended to be associated with lower science scores.²⁴⁴ For most teachers in England, giving their students a range of activities through which to develop wider skills and maintain engagement comes naturally.

This suggests that any approach to better developing non-cognitive skills in schools and colleges should be built on a firm understanding among teachers and leaders of how to practice them without compromising the acquisition of subject knowledge. In fact, given these two sets of traits appear important in combination, and it is not clear how to develop them separately, it would appear that arbitrary distinctions between activities, programmes or educational routes intended to boost knowledge and those intended to build wider skills are unhelpful.

Do schools and colleges have the right incentives?

Given the preceding discussion, a pragmatic approach to develop young people into well-rounded adults would be to ensure that education providers are incentivised to offer a balanced and rich curriculum. Intrinsic motivations are undoubtedly important: most teachers will know that it is important for young people to develop a range of experiences and attributes and work hard to support this. If school leaders understand the implications for attainment, then the pressures of accountability and exam performance will further support these efforts – provided they take a long-term perspective. However, a recent report by the All Party Parliamentary group for Education suggested that in fact the high stakes accountability system is causing schools to focus excessively on narrow exam performance.²⁴⁵ An ongoing review of school curricula by Ofsted has produced similar observations.²⁴⁶

Ofsted's Common Inspection Framework (CIF) allows inspectors to make judgements on whether provision promotes learners' employability skills, though the relevant criteria and grade descriptors are confined to the guidance for the further education, excluding schools.²⁴⁷ It might be possible for Ofsted's approach to better incentivise schools to develop employability skills, but with an approach of infrequent and limited inspections, it may be difficult for this to be done without creating a pernicious 'box-ticking' exercise. A good first step for ensuring that a wide range of skills and assessment methods are used in schools would be to ensure that pupils receive a broad curriculum, not overly specialising too early in subjects that practice similar sets of skills, and not teaching in a

²⁴³ OECD, 2014, 'TALIS 2013 Results: An International Perspective on Teaching and Learning', Table 6.1.

²⁴⁴ OECD, 2016, 'PISA 2015 Results (Volume II): Policies and Practices for Successful Schools', Figure II.2.19.

²⁴⁵ All Party Parliamentary group for Education, 2017, 'How well do schools prepare children for their future?'

²⁴⁶ Ofsted, 2017, 'HMCI's commentary: October 2017', available from:

<https://www.gov.uk/government/speeches/hmcis-commentary-october-2017>

²⁴⁷ Hanson, J., and Lucas, B. 2016, 'Learning to be employable: Practical lessons from research into developing character'.

way that is driven by concerns about exam performance over mastery of knowledge and its varied applications.

A broader incentive may be provided by the introduction of destinations data, to the extent to which institutions see a link between skills development and educational transitions (as the evidence suggests they should). Since 2013 the Department for Education have published statistics showing what proportion of students in every school and college progressed to further or higher education, or went into employment or training.²⁴⁸ However, with many of these outcomes heavily reliant on local factors beyond skill development, for instance the availability of courses, local economic conditions, and wider public service provision, it could be argued that schools may not see a clear relationship between their actions and the measures on which they are held to account.²⁴⁹

Recommendation: The Department for Education should promote the consideration of transferable skills to support career development, but it should ensure this is integrated sensibly in teacher training as part of evidence-based, subject-specific approaches. Working with Ofsted, it should prioritise ensuring that the school and college accountability system supports provision of a sufficiently broad curriculum that offers children a range of experiences, before advocating specific interventions to affect non-cognitive traits or the use of scarce curriculum time for the teaching of generic skills.

Developing skills through extra-curricular experiences

Supporting pupils to build wider experiences and engage with adults beyond school and college can also help build skills relevant to employment. As noted in Chapter 2, contact with employers can be valuable for informing career decisions, but work experience placements are often seen as a way of building employability too. Recent survey research suggests that this is more often a focus of work experience programmes for colleges, where teaching staff have a greater involvement in planning placements, than for schools.²⁵⁰ Satisfaction tends to be high among providers and students – for instance 97 per cent of coordinators cited improved communication and interpersonal skills as a benefit of placements – but more evidence is needed on the impact of placements on employability, to identify whether there are further opportunities to exploit.²⁵¹

With an education system subject to increasingly constrained resources, and employer participation a frequently-cited constraint on work experience provision, there are other opportunities for these to take place with some contribution from parents and without impinging on the teaching timetable. Whilst the evidence on past interventions is again mixed, Gutman and Schoon (2013) find that service learning (e.g. carrying out community projects to develop skills) and outdoor activities can be effective in developing non-cognitive schemes.²⁵²

²⁴⁸ Department for Education, 2013, 'Education and employment destination data published', available from: <https://www.gov.uk/government/news/education-and-employment-destination-data-published>.

²⁴⁹ See Keep, E., 2016, 'The long-term implications of devolution and localism for FE in England' on the limits of skills policies in local contexts.

²⁵⁰ Natcen Social Research and SQW, 2017, 'Work experience and related activities in schools and colleges'.

²⁵¹ Natcen Social Research and SQW, 2017, 'Work experience and related activities in schools and colleges'.

²⁵² Gutman, L. M., and Schoon, I., 2013, 'The impact of non-cognitive skills on outcomes for young people': literature review'.

Starting under the Coalition Government, there has been considerable progress in expanding the National Citizen Service (NCS). The schemes were piloted in a small number of areas over 2011 and 2012 with 34,000 participants. Since then, 300,000 young people have participated, with 93,000 doing so in 2016.²⁵³ Evaluations of the pilots, using control groups established at the time, have shown positive outcomes, including for self-expressed communication, teamwork, and leadership skills.²⁵⁴ A follow up study 2 years on from the 2013 programme showed that some of the range of impacts had faded, but effects for these three skills remained along with impacts for personal resilience, well-being and life skills.²⁵⁵ In terms of more objective outcomes, a recent study found that entry rates into higher education were on average 12 per cent higher for graduates of the NCS than others, with impacts particularly great for those living in areas characterised by low entry.²⁵⁶

The NCS therefore demonstrates the possibilities of extra-curricular activities for building skills and confidence in young people. However, despite the programme attracting £4 million of parent/guardian and £7 million of corporate contributions in 2016/17, the National Audit Office has reported that the unit cost (£1,863 in 2016) exceeded expectations by 19 per cent. They estimate that the 300,000 places hoped for in 2019/20 will cost government £560 million – 32 per cent more than the allocated funding – and have warned that achieving the desired expansion will be difficult without undermining the quality of provision.²⁵⁷

In response to recommendations to introduce enterprise passports to support the development of entrepreneurship and other skills in young people, the Careers and Enterprise Company is currently developing a 'Passport for Life'.²⁵⁸ This is intended to become a digital record of individuals' academic and other achievements, a method of signposting young people to relevant opportunities, and an enabler of more targeted recruitment activity for employers.²⁵⁹ As well as supporting the provision of careers information to young people (the importance of which is discussed in Chapter 3), this could help them reflect on the skills they need to acquire and the locally available opportunities for them to do so. Whilst the benefits of this scheme are yet to be tested, if it were successful, then the need to rely so heavily on a single national programme to widen opportunities may be lessened. However, with quality of provision – and impact – potentially more difficult to scrutinise in the case of a large array of small schemes, it may be important for these mechanisms to incorporate ways of enabling the provision of feedback and transparency in outcomes.

²⁵³ National Audit Office, 2017, 'National Citizen Service'.

²⁵⁴ NatCen Social Research, Office for Public Management and New Philanthropy Capital, 2013, 'Evaluation of National Citizen Service: Findings from the evaluations of the 2012 summer and autumn NCS programmes'.

²⁵⁵ Ipsos MORI, 2017, 'National Citizen Service 2013 Evaluation – Two Years On'.

²⁵⁶ Jump Simetrica, 2017, 'If you could bottle it...A wellbeing and human capital analysis of the NCS 2015 programme'.

²⁵⁷ National Audit Office, 2017, 'National Citizen Service'.

²⁵⁸ Young, D., 2014, 'Enterprise for All: the relevance of enterprise in education'.

²⁵⁹ The Careers and Enterprise Company, 2017, 'Can you help us to create a Passport for Life?', available from : <https://www.careersandenterprise.co.uk/news/can-you-help-us-create-passport-life>.

Recommendation: The recent expansion of the National Citizen Service has broadened the experience of many young people and appears to have been well-received. The government should heed the NAO's recent warnings to ensure further expansion does not compromise effectiveness. It should consider how the introduction of a Passport for Life might support development of a wider set of locally-tailored interventions – linked with school and local authority approaches – with more scope for innovation, subject to safeguards for the quality of provision.

6. Developing skills for the modern economy

Digital Skills

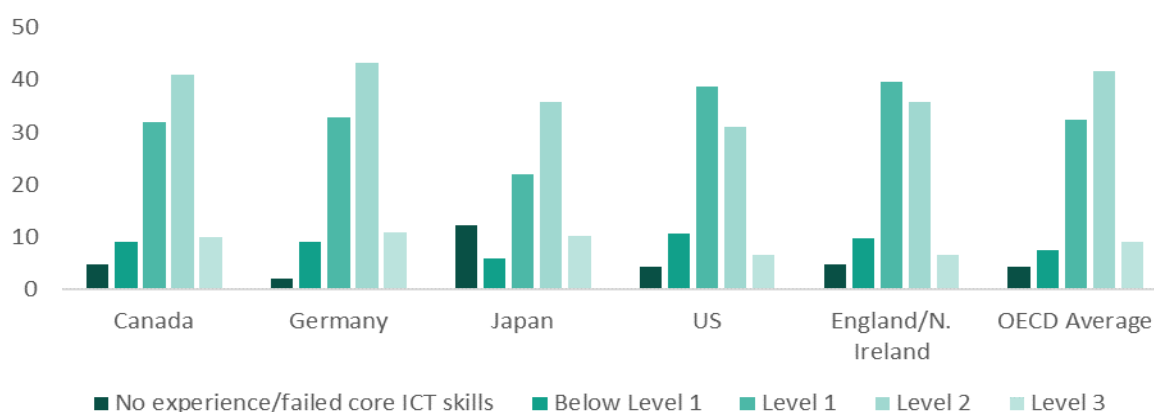
In OECD countries, almost all workers in large and medium-sized businesses (95 per cent and 85 per cent) and most workers in small businesses (65%) will have access to and use the internet as part of their jobs.²⁶⁰ Digitalisation is accelerating the pace of globalisation, which in turn is changing the distribution of jobs. Technological transformation is one of the five powerful trends driving change in the 2020s - transforming social and economic life.²⁶¹

Shortfalls in basic ICT skills

However, not all workers are prepared for the digital economy – nearly half (49 per cent) of the adult population in England are categorized as Level 1 or below in ICT proficiency in a recent OECD assessment. This means they have “no ICT skills at all or can only carry out the simplest of tasks such as writing an email or browsing the web” (see Box 6.1). This was higher than the OECD average of 43 per cent.²⁶²

Whilst younger generations generally have better ICT skills than older workers, many still have low levels of proficiency - particularly for those with low educational attainment - exacerbating existing skills inequalities. We cannot assume that young people who are from a ‘digitally-enriched generation’ (so-called ‘digital natives’) all have the skills to use digital technologies effectively. It is easy to mistake an immersion in social media and digital technology as ‘digital literacy’ and risks leaving young people without even the basic skills required in work, e.g. using office collaboration software, knowledge management, the importance of cyber security and responsible internet use. There can be a difference between lifestyle and workplace skills, but increasingly workplace digital skills are applicable at home in, for example, managing finances or organising diary commitments.²⁶³ Figure 6.1 shows that a larger proportion of our young people have an ICT skills level of level 1 and below compared to say, Germany or Canada, though we are on a par with the US.

Figure 6.1: Percentage of 16-25 year olds by country and ICT proficiency level²⁶⁴



²⁶⁰ OECD, 2016, ‘Skills for a Digital World: Policy Brief on the Future of Work’.

²⁶¹ Institute for Public Policy Research, 2016, ‘Future Proof: Britain in the 2020s’.

²⁶² OECD, 2015, ‘Survey of Adult Skills (PIACC)’.

²⁶³ ECDL Foundation, 2014, ‘The Fallacy of the ‘Digital Native’: Why Young People Need to Develop Their Digital Skills’.

²⁶⁴ OECD, 2013 ‘Skills Outlook’.

Box 6.1: Proficiency levels in the Survey of Adult Skills

The OECD International Survey of Adult Skills (PIACC) uses proficiency levels to imply an ability to cope with a particular type of task. Adults in the first category (no skills) either reported not having any prior computer experience or did not have basic ICT skills needed to take a computer-based assessment. Those "Below Level 1" could only perform tasks that had well-defined problems needing only one function within a generic interface. These tasks did not require any categorical or inferential reasoning or transforming information. This would involve simple web browsing or sending an email.

At Level 1, adults could perform tasks that used widely available and familiar technology applications and that did not require navigation to access information or commands needed to solve the problem. Examples included locating a specific piece of information in a database or assigning emails to relevant folders.

At Level 2, adults could perform tasks that also used more specific technology applications and that required some navigation across pages and applications. The tasks could have multiple steps, unexpected outcomes or impasses and higher monitoring demands. Examples include using and completing online forms or setting up folders for email.

At Level 3, in addition to all of the above, tasks use both generic and specific technology applications including the use of tools (e.g. sort function) and navigation across pages and applications to solve the problem. Examples include integrating online calendars with email and other information to create a work schedule and sorting data to allow evaluation by category.

This is particularly important in England, where the benefits of digital skills are relatively high - workers performing at Level 2 or 3 earning over 50 per cent more on average than workers at or below level 1, whereas the OECD average is 27 per cent. Indeed, the returns to ICT are so great that those with high levels of ICT skills and low levels of formal education can earn more than those with higher levels of formal qualification but poor ICT skills.²⁶⁵

Developing the basic skills for digital competence

Jobs requiring more intensive ICT use tend to involve a range of other skills in order to ensure it is used effectively to solve real-world, and often complex, problems. These skills include higher order thinking, social skills, the ability to collaborate, problem-solving skills, numeracy skills and data handling abilities.²⁶⁶ There are two related challenges for education systems. First, skills of the future are hard to identify given the speed of technological change at present and its continual acceleration. Second, once a new technology is identified entering our work lives, appropriate training takes time to implement.²⁶⁷ This makes the conclusions of Chapter 5 pertinent to the issue of digital skills. It is vitally important to equip individuals who leave initial education with strong foundation skills, higher-order thinking competencies, problem solving skills as well as the emotional

²⁶⁵ OECD, 2016, 'The Impact of Literacy, Numeracy and Computer Skills on Earnings and Employment Outcomes'.

²⁶⁶ OECD, 2015, 'OECD Science, Technology and Industry Scoreboard', available from: http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/oecd-science-technology-and-industry-scoreboard-2015_sti_scoreboard-2015-en#page116.

²⁶⁷ OECD, 2016, 'Working Party on Measurement and Analysis of the Digital Economy'.

capability to respond to greater levels of uncertainty and proactively keep skills up to date. On the other hand, employers will often be well placed to facilitate the more job-specific training required.

Given the ever-changing nature of the digital landscape, it is important that digital skills training starts early and includes digital safety. It was welcome that a new computing curriculum was introduced in schools in England in September 2014, with England becoming a front-runner in mandate coding at primary and secondary level. However, a survey carried out shortly after implementation found that 60 per cent of teachers did not feel confident delivering the new curriculum – it is important that teacher knowledge and classroom practice is developed quickly in response to these developments.²⁶⁸

The teaching of more specialist advanced skills, which tend to be delivered through further and higher education, needs to reflect a flexible approach. That should build on a core of basic skills which allow students to rapidly up-skill to meet the specific needs of their eventual employer – whether this be a large financial service company, a start-up or an SME. In the short term, though, it is the IT skills of existing employees which are of particular concern to employers. Although weaknesses in these skills have been reducing, close to half of businesses (46 per cent) are aware of problems to at least some extent in their current workforce. No major sector is unaffected; retail & hospitality, transport & distribution (53 per cent), manufacturing (54 per cent), construction (46 per cent) and professional services (47 per cent) report that their current workforce has weaknesses in IT skills. Even a third of engineering, science and hi-tech firms (30 per cent) report that some employees have shortfalls in IT skills. As a consequence, 40 per cent of employers provide some form of remedial training in basic IT skills for adult employees (10 per cent for recent graduates and 13 per cent for recent school/college leavers).²⁶⁹

Recommendation: Computer use is embedded in school life already, but beyond introducing the computing curriculum and teaching how to develop programmes and coding – which has been a positive step – the Government should continue to seek to raise standards for digital skills in schools, colleges and universities. Familiarity with modern software should be augmented with more workplace-focused skills.

Deploying higher level digital skills to benefit industry

A recent government review identified a shortage and mismatch in higher level digital skills in the UK labour market, with employers facing digital skills gaps and experiencing difficulties filling vacancies. Currently, 72 per cent of large companies and 49 per cent of SMEs are suffering tech skill gaps. 85 per cent of hard-to-fill positions within surveyed employers' workforce were in the tech sector, signifying a lack of technical specialist skills.²⁷⁰ 61 per cent of businesses involved in a CBI survey in 2014 reported weaknesses in employee IT skill competencies, showing a 4 per cent increase since 2009. The top two industries reporting the highest IT skills gap were construction and manufacturing (72 per cent and 62 per cent).²⁷¹

²⁶⁸ UK Data Service, 2014, 'Digital Skills for Tomorrow's World: The independent report of the UK Digital Skills Taskforce'.

²⁶⁹ Confederation of British Industry and Pearson, 2015, 'Inspiring Growth: Education and Skills Survey 2015'.

²⁷⁰ Department for Business, Innovation and Skills and Department for Culture Media and Sport, 2016, 'Digital Skills for the UK Economy'.

²⁷¹ CBI/Pearson, 2014, Gateway to Growth.

Use of digital technology in the workplace is directly linked to market competitiveness, but many companies do not appear to take advantage of new technologies or the digital skills of their employees, partly due to the insufficient provision and knowledge of business support services. Career opportunities in the digital sector are not always made clear, partly due to skill and gender stereotypes around the types of roles within it. Significant barriers exist for women in STEM in both higher education and industry as a whole.²⁷²

The development of digital skill requirements as part of new employer-developed apprenticeship standards could provide an opportunity to ensure a better feedback between the world of work and education provision for specific digital skills development across a wide range of industries, benefitting firms who are not currently making the most of the opportunities. Developing a more responsive adult learning system, as discussed in Chapter 7, would help England's business make better use of technology in future to improve productivity.

Recommendation: The Government needs to develop plans, alongside industry and commerce, to address the changes to employment caused by developments in robotics and automation. Through the development of apprenticeship standards, employers should collaborate at national level to identify gaps in digital skills levels and help establish appropriate minimum standards. Education providers at all levels should ensure their offers are aligned to identify needs, that their workforces can deliver these programmes, and that they appeal to young people.

Using technology to improve teaching and learning

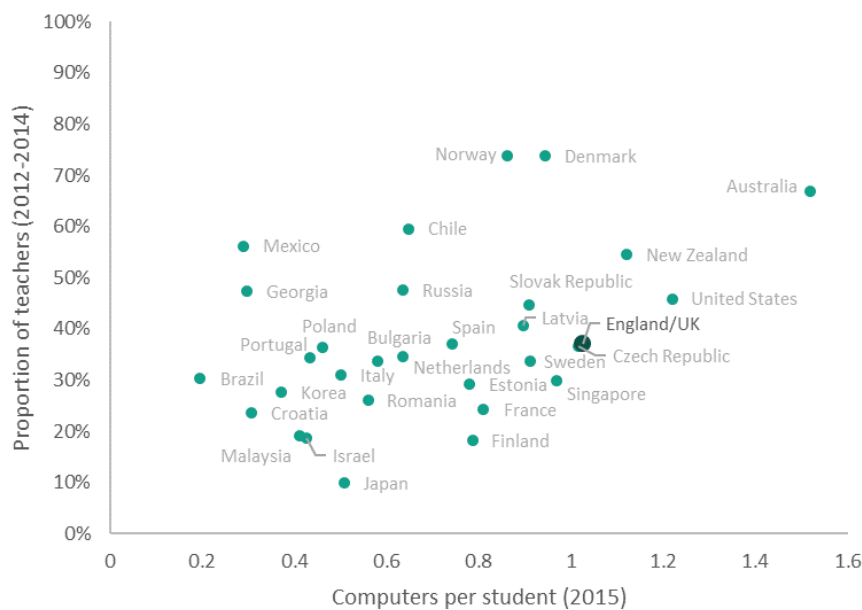
As well as altering the skills that schools and colleges need to develop in learners, developments in digital technology offer opportunities to improve teaching of the wider curriculum. These developments have led to new programmes for independent or remote learning, often delivered via laptops or tablets; new mechanisms for monitoring in-class work and giving feedback; enhancements to teachers' use of digital materials in lessons; and for streamlined assessment. In a scenario of constrained staffing in schools and colleges (see Chapter 2), an area of particular promise is the ability of adaptive learning software to enable personalised learning within large groups of pupils with varying ability – a frequent scenario in England's schools. Sometimes enhanced by machine learning, these methods tailor the tasks set for pupils based on previous answers and the patterns seen in those of others. Such approaches have been found to be more cost effective than many traditionally popular interventions.²⁷³ There is little doubt that the 'digital' resources available will grow rapidly in the coming decade and the key issue is how best to use them within schools and colleges.

²⁷² Institute for Public Policy Research, 2015, 'Technology, globalisation and the future of work in Europe: Essays on Employment in a Digitised Economy'.

²⁷³ Centre for Education Economics, 2017, 'Annual research digest 2016-17', citing Muralidharan, K., Abhijeet, S. and Ganimian, A. J., 2016, 'Disrupting Education? Experimental Evidence on Technology-Aided Instruction in India'. The Economist, 2017, 'Technology is transforming what happens when a child goes to school', available from: <https://www.economist.com/news/briefing/21725285-reformers-are-using-new-software-personalise-learning-technology-transforming-what-happens> .

The UK has been described as pioneering in its use of technology in schools in recent years.²⁷⁴ As an example of this, based on the responses of head teachers surveyed as part of the OECD's 2015 PISA study, secondary schools here had 1.03 computers available for every pupil in their school, compared with an OECD average of 0.77.²⁷⁵ As Figure 6.2 shows, though, such investment is not always reflected in a high use of ICT for learning among teachers: in England, 29 per cent of key stage 3 teachers surveyed in TALIS (2013) said that their pupils used ICT frequently or more often for schoolwork, in line with an average of 30 per cent.

Figure 6.2: Average number of computers per student in secondary schools (PISA 2015) and the proportion of lower secondary school teachers who have students use ICT for project or class work "frequently" or "in all/nearly all lessons" (TALIS 2012-2014)²⁷⁶



Use of computers in particular is also not directly associated with outcomes in literacy and numeracy skills: high PISA-performers Korea and Japan had on average just 0.37 and 0.51 computers per pupil, while Australia had the most, with 1.51. Overall, the OECD have concluded that “while PISA results suggest that limited use of computers at school may be better than not using computers at all, using them more intensively than the current OECD average tends to be associated with significantly poorer student performance.”²⁷⁷

Overall, the evidence base on the effectiveness of digital technologies for education has consistently lagged behind their development and adoption. New approaches can deliver improvements in learning, but the gains of any broadly-defined intervention appear to be highly variable across

²⁷⁴ Centre for the Study of Market Reform of Education, 2015, 'Annual Research Digest 2015'; Higgins, S., Xiou, Z., and Katsipataki, M., 2012, 'The Impact of Digital Technology on Learning: A Summary for the Education Endowment Foundation'.

²⁷⁵ OECD, 2016, 'PISA 2015 Results (Volume II)' - based on school principals' reports of their schools' facilities (average for UK), Table, I.6.4.

²⁷⁶ OECD, 2016, Teaching and Learning International Survey public use files (figure for England only), classroom teachers were asked whether their students used ICT for projects or class work 'never or almost never', 'occasionally', 'frequently', or 'in all or nearly all lessons'; OECD, 2016, 'PISA 2015 Results (Volume II)', Table, I.6.4, based on school principals' reports of their schools' facilities (average for UK).

²⁷⁷ OECD, 2015, 'Students, Computers and Learning: Making the Connection'.

context, intervention, and target pupils.²⁷⁸ The costs of investing in new equipment can be high, whilst the benefits depend on whether its purpose is aligned with learning and teaching goals and complements existing pedagogy. When using the same technologies, students with teachers who had professional development with computers have been found to see greater benefits than those whose teachers had not had such training.²⁷⁹ A teacher's experiences with technology in training, particularly observing others using information technology to teach, has been shown to be an important motivator in new teachers' adoption of education technologies in their own practices.²⁸⁰ As such, the Education Endowment Foundation warn against the use of technology for its own sake and recommend ensuring teachers are given sufficient training to make good use of it.²⁸¹

In the past, governments have intervened to encourage the use of particular technologies in schools. For example, the use of now-commonplace interactive whiteboards was promoted by the National Strategies in England during the early 2000s, and their installation in schools was funded via programmes including the Schools interactive Whiteboard Expansion Project and the Primary Schools Whiteboard Project.²⁸² However, research showed that whilst a positive impact on classroom engagement was often perceived immediately by teachers and pupils, the measurable impact on attainment can be small unless teachers have time and support to learn how to effectively adapt their teaching in order to get the best out of the new possibilities.²⁸³ Governments since 2010 have been much more reluctant to intervene in this way. The British Educational Communications and Technology Agency (Becta) – previously tasked with advancing the use of technology in national policy and schools – was closed in 2011, and it has been left to schools to determine how and when to invest in digital technology.

However, after the 2014 Workload Challenge consultation exercise identified planning, marking, and the use of data as sources of unnecessary workload, the 2017 Conservative Manifesto promised “greater support for teachers in the preparation of lessons and marking, including through the use of technology”.²⁸⁴ One recent study highlighted the potential for comparative judgement (using simple, repeated pairwise judgements of the quality of written work to form a ranking among many students) to provide a reliable method of assessing conceptual understanding. The approach saves time for teachers by replacing detailed, rubric-based evaluation of each piece of work with an aggregation of simple judgements, but the validity of the approach is improved with the involvement of more than one expert assessor, and digital communication tends to be required to facilitate

²⁷⁸ Schacter, J., 1999 'The Impact of Education Technology on Student Achievement', Milken Exchange on Education Technology; Centre for Education Economics, 2017, 'Annual research digest 2016-17'.

²⁷⁹ Schacter, 1999, 'The impact of Education Technology', citing Weglinsky, H., 1998, 'Does it compute?'

²⁸⁰ Tondeur, J., Braak, J., Sang, G., et al., 2011, 'Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative evidence', *Computers and Education* 59, pp. 134-144

²⁸¹ Education Endowment Foundation, 2017, 'Digital Technology', available from:

<https://educationendowmentfoundation.org.uk/resources/teaching-learning-toolkit/digital-technology/>

²⁸² Becta, 2007, 'Evaluation of the Primary Schools Whiteboard Expansion Project - summary report';

Department for Education, 2007, 'The Interactive Whiteboards, Pedagogy and Pupil Performance Evaluation: An Evaluation of the Schools Whiteboard Expansion (SWE) Project: London Challenge'.

²⁸³ Higgins, S., Beauchamp, G. and Miller, D., 2007, 'Reviewing the literature on interactive whiteboards', *Learning, Media and Technology*, 32(3), pp. 213 – 225.

²⁸⁴ Gibson, S., Oliver, L. and Dennison, M., 2015, 'Workload Challenge: Analysis of teacher consultation responses'; Conservative and unionist Party, 2017, 'Forward together: Our plan for a stronger Britain and a prosperous future'.

this.²⁸⁵ Meanwhile, teachers in England surveyed in the OECD's TALIS study who used ICT for class projects in all or nearly all lessons worked on average 4.6 hours less than those who at most occasionally took this approach.²⁸⁶

There appears, therefore, to be some logic behind seeking to use technology to improve teacher working conditions. Experience from previous interventions suggests that the effects of technology on pupil outcomes are stronger if teachers have dedicated time to developing their use of it in conjunction with their wider pedagogy; if they see an immediate benefit for their workload then this investment of time may be more likely to take place. However, the evidence base on the relationship between different digital methods and workload is not comprehensive, and schools need to consider all aspects of any new approach – including teacher training and software choices – if they choose to invest more in technology.

Recommendation: Better use of digital technology could improve pupil outcomes and reduce teacher workload. Following the closure of Becta, the Government should monitor whether schools and multi-academy trusts have adequate support in making cost-effective use of the likely expansion in digital resources, and ensure that teacher training establishes the right core digital capabilities. However, it should continue to work with the Education Endowment Foundation to focus on trialling new approaches and disseminating evidence to schools before encouraging the adoption of any particular technological solutions.

Financial literacy

In the context of a rapidly changing financial system, with regular innovations in products and services available and evolving expectations of citizens for their participation in civic life, financial literacy has been recognised by world leaders as a key condition for well-functioning societies and stable financial systems.²⁸⁷

An ability to make sound financial decisions, and plan for the future effectively, can make an important difference to individuals' lifetime wealth, consumption, and wellbeing.²⁸⁸ It is clear that many people in the UK struggle with the demands of modern life in this respect: recent estimates suggest one in six people are over-indebted. This may have knock on effects for children, with the rate rising to one in five of those with children and a quarter of those with at least three children.²⁸⁹ Individual financial capabilities also affect economic production decisions: around 15 per cent of workers in the UK are self-employed, following several years of growth.²⁹⁰

Young adults face particular difficulty, both because of their relative inexperience in financial matters, and because they are likely to be making complicated decisions as they begin careers, families and households. 25- to 34 year-olds are four times as likely to be over-indebted than those

²⁸⁵ Bisson, M., Gilmore, C., Inglis, M. and Jones, I., 2016, 'Measuring conceptual understanding using comparative judgement', *International Journal of Research in Undergraduate Mathematics Education*, 2(2), pp. 141-164, cited in Centre for Education Economics, 2017, 'Annual Research Digest 2016-17'.

²⁸⁶ Sellen, P., 2016, 'Teacher workload and professional development in England's secondary schools: insights from TALIS', Education Policy Institute.

²⁸⁷ OECD/INFE, 2015, 'National Strategies for Financial Education'.

²⁸⁸ Europe Economics, 2016, 'The Economic Impact of Improved Financial Capability'.

²⁸⁹ CACI and The Money Advice Service, 2016, 'A Picture of Over-Indebtedness'.

²⁹⁰ ONS, 2016, 'Trends in self-employment in the UK: 2001 to 2015'.

aged 65 and over, although, as explained in Chapter 2, that may well be associated with a deterioration of financial prospects for today's young people compared to previous cohorts.²⁹¹

How strong is the UK population's financial literacy?

Financial literacy can be described in terms of three distinct attributes:

- **Financial knowledge** – having an awareness of the differences between financial products and an understanding of how to evaluate different options;
- **Financial behaviour** – undertaking the actions associated with responsible financial management, such as paying bills on time, planning for the future and shopping around when looking for financial services; and
- **Financial attitudes** – the extent to which individuals consider the long-term implications of their decisions and take responsibility for financial outcomes.²⁹²

30 countries, including 17 OECD jurisdictions, took part in an assessment of adults' financial competencies in these three areas in 2015, including adults aged 18 to 79. As Figure 6.2 shows, though the differences across OECD countries were not large, and all have room for improvement, the UK had the fifth lowest score amongst this group. It had the lowest score on financial knowledge in particular. As an example of what this means for people's ability to understand basic concepts, one question of the survey asked the following:

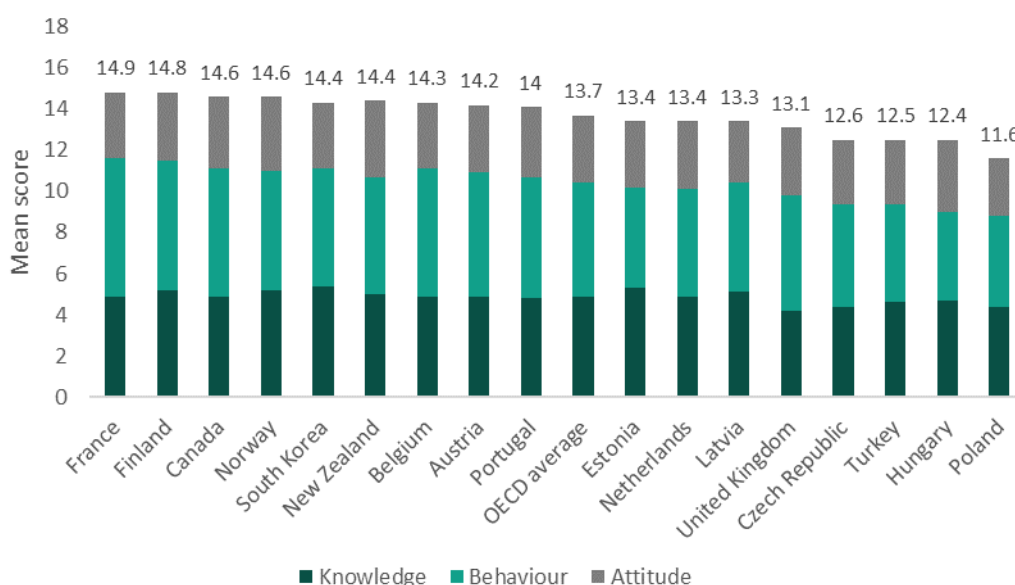
“Suppose you put \$100 into a <no fee, tax free> savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made?”

43 per cent of UK respondents failed to calculate this correctly, compared to an OECD average of 35 per cent, and just 20 per cent in Norway.

²⁹¹ CACI and The Money Advice Service, 2016, 'A Picture of Over-Indebtedness'.

²⁹² OECD, 2016, 'OECD/INFE International Survey of Adult Financial Literacy Competencies'.

Figure 6.3: Mean score for financial knowledge, attitudes and behaviour (maximum possible score 21)²⁹³



Improving financial literacy in schools and colleges

Evidence from the 2012’s PISA assessment highlights that one of the most important things education systems can do to secure good levels of financial capability in its young people is provide them with a firm grounding in mathematics and other core subjects. An assessment of financial literacy was conducted in some countries (not England). This showed high levels of variability in financial knowledge and skills within all countries, but a strong link between this and competence in other subjects. Financial literacy scores had correlations of 0.74, 0.75 and 0.78 with mathematics, reading and science performance respectively.²⁹⁴ However, this still leaves a substantial proportion of variation unexplained. Even controlling for performance in mathematics and reading the study showed that socio-economically disadvantaged students were twice as likely as advantaged students to be low performers in financial literacy.²⁹⁵

In response to such challenges, many countries have developed national strategies for financial education, including introducing teaching in schools via national curricula. In jurisdictions including the Flemish Community of Belgium and Canada, this is based on integration of relevant topics in existing topics in secondary schools. Elsewhere, for instance Australia, China and the Netherlands requirements have been introduced for primary schools too.²⁹⁶ This reflects evidence suggesting that children are able to learn financial skills from a young age but will find it more difficult to retain new knowledge in this area later on.²⁹⁷

In England, the new national curriculum announced in 2013 brought in specific requirements for secondary schools only: teaching mathematics using financial contexts, and developing financial skills as part of citizenship. Academies do not have to follow the national curriculum, though many

²⁹³ OECD, 2016, ‘OECD/INFE International Survey of Adult Financial Literacy Competencies’, Table 26.

²⁹⁴ OECD, 2017, ‘PISA 2015 Results (Volume IV): Students’ Financial Literacy’.

²⁹⁵ OECD, 2017, ‘PISA 2015 Results (Volume IV): Students’ Financial Literacy’, Figure IV.4.12.

²⁹⁶ OECD, 2017, ‘PISA 2015 Results (Volume IV): Students’ Financial Literacy’.

²⁹⁷ Financial Capability Strategy for the UK, 2014, ‘Children and young people’.; Money Advice Service, 2013, ‘Habit formation and learning in young children’.

will have reflected it in practice. This is a welcome step if we expect young people to have some understanding of financial issues – in a recent survey only 40 per cent of 7- to 17-year-olds said that they had learnt about managing money at school or college.²⁹⁸

A literature review by Fernandes et al. (2013) has suggested that it may be extremely difficult to alter financial *behaviours* using specific interventions of the scale normally tested. More general skills like propensity to plan, self-confidence may be key determinants alongside any specific effect associated with financial literacy.²⁹⁹ In terms of building the understanding of financial *knowledge*, there is not a rich evidence base on the effectiveness of teaching methods, or what determines it. Given the variation in exposure to relevant teaching, it is difficult to interpret the Education Endowment Foundation's finding that, whilst around a quarter of questions in maths GCSE exams consider financial concepts, most students achieve only E and F grades in them.³⁰⁰ However, it could be related to a lack of coverage in school curricula: 90 per cent of children in the survey mentioned above who recalled learning about money management said they found it useful (27 per cent very useful, 63 per cent fairly useful) and those from low-income households were more likely than those in medium-income households to say it was very useful.³⁰¹ The EEF are funding a series of programmes aimed at teaching the use of maths in 'real-life contexts' with an aim of establishing how teaching methods can be improved.

If schools are to provide pupils with balanced and informative careers advice, it will be important for them to ensure young people understand England's complex student loan system. Approaching half of our young people will currently expect to leave education with student debt, and for many more the financial implications of studying, and the impact on future earnings for up to 30 years hence, will be an important consideration in decisions over training. An NUS survey of the first cohort to graduate under the new student loan system with £9,000 fees found that 77 per cent were 'worried' or 'very worried' about their student debt.³⁰²

Recommendation: The Government should assess the extent to which children are being introduced to financial concepts and knowledge in key stage 2, and monitor how national curriculum requirements in secondary schools are being implemented in practice. It should reflect on EEF's emerging evidence on the support given to schools in delivering the national curriculum requirements for financial literacy. Schools should be expected to cover the current student loan system, and the financial aspects of the apprenticeship system in England, as part of the citizenship curriculum or careers education.

²⁹⁸ Money Advice Service, 2016, 'Financial Capability of Children, Young People and their Parents in the UK 2016'.

²⁹⁹ Fernandes, D., Lynch, J. G., and Netemeyer, R. G., 2013, 'The Effect of Financial Literacy and Financial Education on Downstream Financial Behaviors'.

³⁰⁰ Education Endowment Foundation, 2016, 'Real-world maths: Education charity launches project to improve financial literacy', available from: <https://educationendowmentfoundation.org.uk/news/real-world-maths-education-charity-launches-project-to-improve-financial-li/>.

³⁰¹ Money Advice Service, 2016, 'Financial Capability of Children, Young People and their Parents in the UK 2016'.

³⁰² National Union of Students, 2015, 'Debt in the first degree: Attitudes and behaviours of the first £9k fee paying graduates'.

Improving financial literacy in other contexts

The PISA financial literacy study found a strong relationship between financial skills and family environment – including the extent to which financial matters are discussed at home – and students use of financial products.³⁰³ Previous research has shown that talking about money with parents can have a 1.5 times greater association with financial capability than exposure to financial education or peer effects.³⁰⁴

A great proportion of the socio-demographic gaps observed in financial literacy are a result of differences in activities young people participate in which are related to family background: the receipt of regular pocket money, access to regular paid work, and the use of financial products including bank accounts. One explanation offered by Fernandes et al. (2013) for the lack of a significant impact for some financial literacy interventions is that they are often not followed with application of the acquired knowledge in practical contexts; especially relevant for young people without access to financial resources or products.³⁰⁵

This suggests that another benefit of expanding access to out-of-school activities is that – where they include enterprise activities involving budgeting – they may give disadvantaged young people opportunities to practise the skills relevant to financial literacy. As recommended in Chapter 5, that might suggest allowing for development of a broad set of interventions that could include such activities.

³⁰³ OECD, 2017, 'PISA 2015 Results (Volume IV): Students' Financial Literacy'.

³⁰⁴ Serido, J., and Shim, S., 'Young Adults' Financial Capability: APLUS Wave 2'.

³⁰⁵ Fernandes, D., Lynch, J. G., and Netemeyer, R. G., 2013, 'The Effect of Financial Literacy and Financial Education on Downstream Financial Behaviors'.

7. Embedding lifelong learning

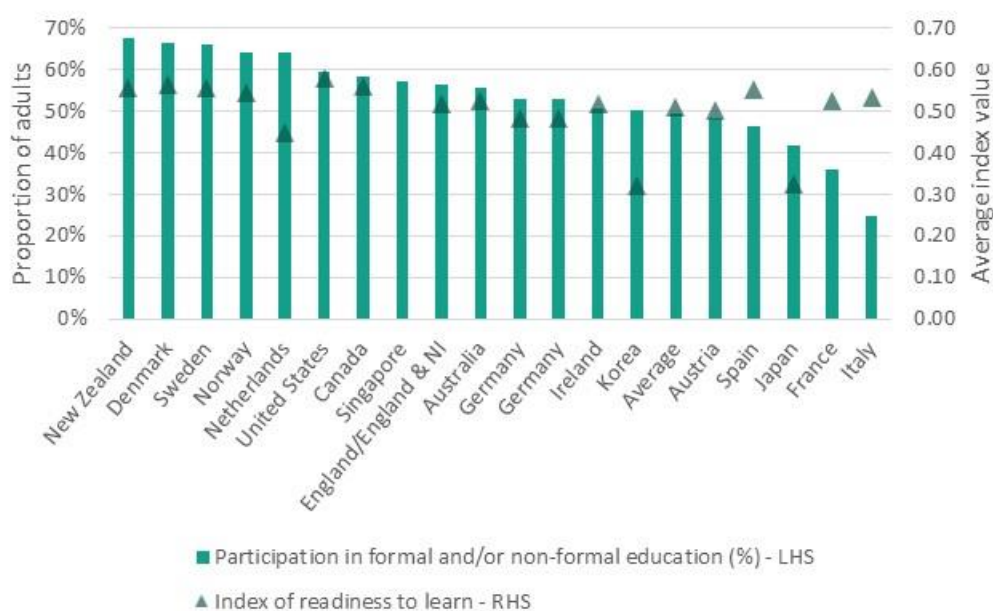
As outlined in Chapter 2, with longer life expectancy and an ageing population, people can expect to have longer and more diverse careers. Technological change means individuals will need to be better able to adapt to change in their current and future jobs.

Lifelong learning is essential for a productive economy but underprovided in employment

More immediately, a range of studies suggest a clear link between lifelong learning and national prosperity, business success, reduced inequality, and societal cohesion. Attending adult education courses can improve individuals' knowledge and employability, but can also give them confidence in dealing with new situations and playing a more active role in civic life.³⁰⁶ It has also been found to enhance racial tolerance, political interest and health outcomes.³⁰⁷

On broad measures that include those in and out of work, England does not fare too badly on comparisons of participation in education. As Figure 7.1 shows, England rated slightly above average for overall (including informal) adult education rates in the OECD's Survey of Adult Skills whilst, for example, Norway's entitlements for all adults over 25 to funded upper-secondary education supports a higher level of participation. Both have significantly higher levels than Korea and Japan. Norway's workers, as for those in North America, also have particularly high levels of self-reported responsiveness to learning and using new ideas in their jobs. Again, the UK has a higher than average score on this measure.

Figure 7.1: Participation in formal or non-formal education and readiness to learn index for 25- to 64 year-olds - 2012 (2015 for Singapore)³⁰⁸



³⁰⁶ Institute for Employment Research, 2016, 'Adult Education: Too important to be left to chance', A report commissioned by the All Party Parliamentary group for Adult Education.

³⁰⁷ Janmaat, J.G. and Green, A., 2012, 'Skills inequality, adult learning and social cohesion in the United Kingdom' citing Feinstein et al., 2003 using British National Child Development Study (NCDS).

³⁰⁸ OECD, 2016, Participation in adult learning, in 'Education at a Glance 2016', Figure C6.1 (figure reported is for England only).; OECD, 2017, Readiness to learn index, in 'Skills Outlook 2017: Skills and Global Value

However, on measures related more closely with work-based training, the UK has low participation in adult learning, a fact which has been linked to disappointing productivity levels.³⁰⁹ According to a European comparison study of 2010, 31 per cent of UK employees attended vocational training courses at work, compared with a European Union average of 38, and 46 per cent in Norway.³¹⁰

This can be traced to several factors including the functioning of our labour market, our tax system, and our industrial make-up. The UK has some of the least strict employment protection legislation among developed countries (see Figure 7.2).³¹¹ It also has relatively low trade union membership, at 23.5 percent of employees in 2016 – the lowest rate recorded since 1995.³¹² One of the consequences of our ‘Anglo-Saxon’ approach to employment, and our relatively competitive product markets, is that we have a relatively high level of movement between employers and job creation and destruction.³¹³ One study found that “In the UK just over a quarter (28.0 per cent) of all jobs in the private sector were either destroyed or created over a typical 12 month period between 1998 and 2010 – a remarkable level of turbulence in the UK.”³¹⁴ Such dynamic labour markets bring advantages, particularly for keeping unemployment levels low, but can also lead to underinvestment in general training, with firms worried about training workers only to find them leaving for better employment elsewhere.³¹⁵

Chains', Figure 3.3 (figure reported includes England and Northern Ireland). The readiness to learn indicator was derived statistically for workers based on answers to questions on how far workers 'relate new ideas into real life' or 'like learning new things'.

³⁰⁹ Learning and Working Institute, 2017, 'Building Britain's Future: Prosperity and opportunity for all', General Election Manifesto 2017.

³¹⁰ Eurostat, 2016, 'Continuous Vocational Training Survey'.

³¹¹ OECD, 2017, 'Employment protection database'.

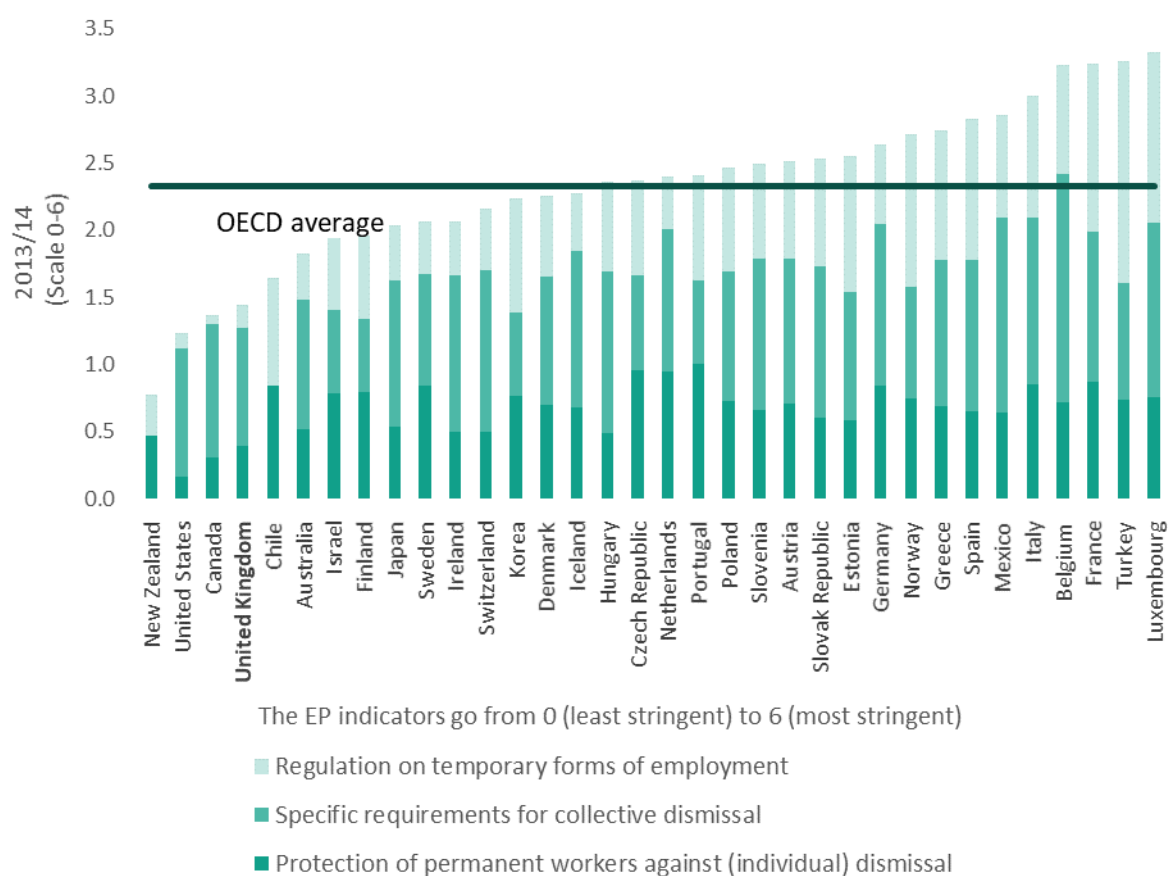
³¹² Department for Business, Energy and Industrial Strategy, 2017, 'Trade union membership 2016: statistical bulletin'.

³¹³ Martin, J. P. and Scarpetta, S., 2011, 'Setting It Right: Employment Protection, Labour Reallocation and productivity'.

³¹⁴ Anyadike-Danes, M., Hart, M. and Du, J., 2013, 'Firm dynamics and job creation in the UK'.

³¹⁵ Brunello, G. and De Paola, M., 2004, 'Market failures and the under-provision of training'.

Figure 7.2: Strictness of employment protection³¹⁶



The present tax system tilts the economy in favour of self-employment over employee status and towards investing in buildings and machines over staff.³¹⁷ While for some, the increased flexibility that self-employment brings will be welcome, for those in sectors which tend to be low paid, such as retail and health and social care, this can mean being on a zero-hour contract with increased insecurity and reduced rights. By challenging the traditional relationship between the employer and employee, the emergence of the ‘gig economy’ may therefore further erode employers’ incentives to invest in their workers’ skills – short-term workers are unlikely to receive much on-the-job training. The LSE’s Growth Commission have also called for a general tax break for ‘skills investment’ in the same way as there is for plant and machinery and R&D.

The UK is also, principally, a service sector economy (representing around 77 per cent of firms and 80 per cent of employment and value added) with relatively larger levels of employment in low skill, low productivity sectors such as wholesale and retail trade, hotels and food and administrative services. There, levels of training are low. The relatively large number of small or micro-businesses in the UK – which tend to invest less in training – also has an impact.³¹⁸ Many employers simply do not see the need to train their staff – 68 per cent think their staff are fully proficient.³¹⁹

³¹⁶ OECD, 2013, ‘OECD Employment Outlook 2013’.

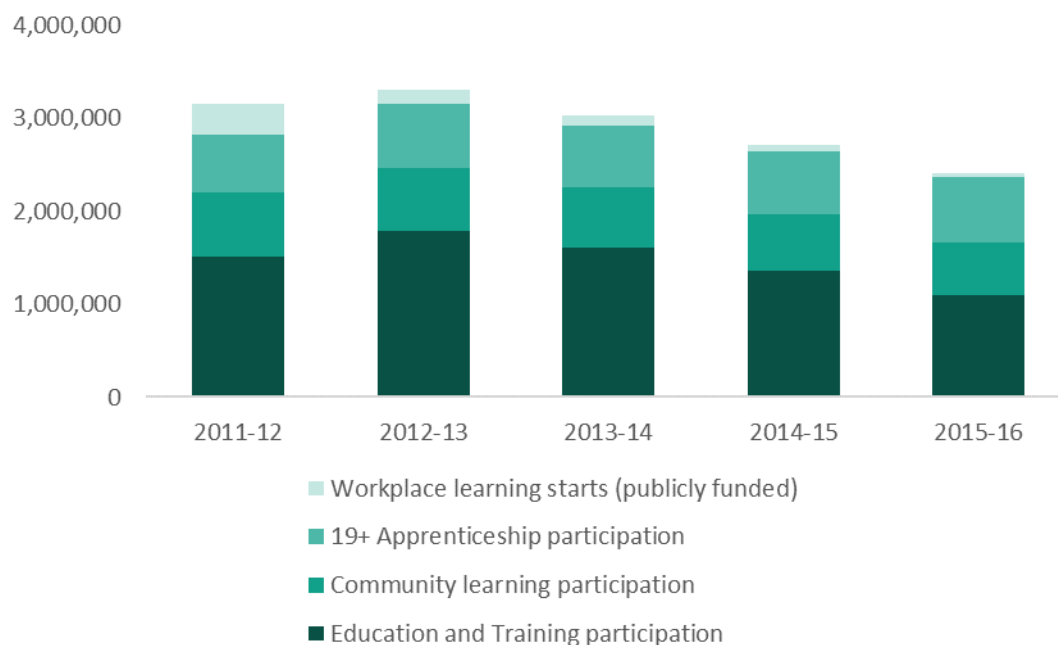
³¹⁷ LSE Growth Commission, 2017, ‘UK Growth, a new chapter’.

³¹⁸ LSE Growth Commission, 2017, ‘UK Growth, a new chapter’, using BIS data (2016).; UK Commission for Employment and Skills, 2016, ‘Employer Skills Survey 2015: UK report’.

³¹⁹ UK Commission for Employment and Skills, 2016, ‘Employer Skills Survey 2015: UK report’.

There are also signs that participation is declining. In Britain, the average amount of training received by workers almost halved between 1997 and 2009, to just 0.69 hours a week.³²⁰ An assessment of publicly-funded training also suggests an overall decline (see Figure 7.3).³²¹

Figure 7.3: Publicly-funded adults (19+) education and skills participation (excluding university) 2011-12 to 2015-16³²²



In 2015/16, 55 per cent fewer students started a part-time undergraduate degree at a UK higher education institution than in 2007/08, while the number of first-year undergraduate students in full-time programmes had increased by 14 per cent. A similar trend applied to postgraduate education, where the number of part-time students began to fall in 2010/11, recovering slightly from 2013/14 to a 2015/16 level 19% below that of 2008/09.³²³ This decrease in part-time students is concomitant with a fall in the number of mature students, who are most likely to combine their degree with other personal and professional commitments.³²⁴ This decline has been partly linked to changes in funding conditions for part-time students.³²⁵

Individuals face varying barriers to upskilling and those most likely to benefit are least likely to engage in it

For adult education to successfully tackle skills inequality in Britain and promote social cohesion, poor participation rates amongst the low-educated and unemployed need to be addressed.³²⁶ According to the 2010 National Adult Learner Survey, cost was the most commonly cited factor

³²⁰ The Economist, 2017, 'Special Report on Lifelong learning', January 2017.

³²¹ Resolution Foundation, 2017, 'Apprenticeship participation reaches a record high – but wider education and training continues to decline', Blog Post, 26 June 2017.

³²² Department for Education and Education and Skills Funding Agency, 2017, 'Further Education and skills: March 2017', SFR13/2017.

³²³ HESA data, different academic years

³²⁴ Education Policy Institute, 2017, 'Latest UCAS data signals the post-Brexit challenger for higher education'.

³²⁵ Universities UK, 2013, 'The Power of Part-time. Review of Part-time and Mature Higher Education'.

³²⁶ Janmaat, J.G. and Green, A., 2012, 'Skills inequality, adult learning and social cohesion in the United Kingdom'.

preventing people from participating in adult learning. Those who already have a degree level qualification were more than three times as likely to participate in learning than those without any qualifications.³²⁷ More recent survey data confirmed the importance of financial reasons and low confidence or self-esteem as a barrier.³²⁸

Lack of time and inability to fit learning around job or family life are also commonly cited reasons for non-participation. This ties into general misconceptions about adult learning – such as stereotypes regarding age – or doubts that increased learning would have direct benefits. A general belief that ‘learning isn’t for me’ may be a significant barrier – a feeling concentrated in older and younger learners, those who left education early and who struggled when they were there.³²⁹ These attitudes persist despite consensus in reports on lifelong learning that its benefits include significant monetary and, more particularly, non-monetary returns for both individuals and businesses.³³⁰ Businesses often lack an awareness of the importance of shifting demographics, the importance of adult learning and the availability of publicly-funded skills and employment programmes. Increasing funding for lifelong learning will not solve these problems without better promotion of what is available and its potential benefits.³³¹

Adult learners tend to:

- Be younger rather than older
- Be from higher socio-economic groups
- Be in employment
- Work in professional occupations
- Have stayed in full-time education until at least 21
- Be currently participating or recently participated in learning³³²

Hence those who could most benefit from training are the least likely to engage in it. The UK’s vast inequalities in wealth (see Chapter 2) exacerbates gaps in access to education, making it difficult for those who need to finance training even if it would pay off financially later on.

Recommendation: The Government should launch a high-profile national campaign to promote its funding for free training and tuition for any adult wanting to study English and maths up to and including GCSE level, and should proactively help adults in finding the most appropriate and nearest help.

Financial barriers must be overcome, but this must come with a change in culture

As highlighted in Chapter 3, there has been a decline in the number and availability of tertiary qualifications at the sub-degree level in England.³³³ A structural change in tertiary education will be

³²⁷ Learning and Working Institute, 2016, ‘Power to the People: The case for Personal Learning Accounts’.

³²⁸ Institute for Employment Research, 2016, ‘Adult Education: Too important to be left to chance’, A report commissioned by the All Party Parliamentary group for Adult Education.

³²⁹ Institute for Public Policy Research, 2017, ‘Skills 2030: Why the adult skills system is failing to build an economy that works for everyone’.

³³⁰ Fujiwara, D., 2012, ‘Valuing the Impact of Adult Learning: An analysis of the effect of adult learning on different domains in life’, NIACE.

³³¹ Policy Connect, 2017, ‘Spotlight on Lifelong Learning for an Ageing Workforce’.

³³² National Institute for Adult Continuing Education, 2015, ‘Adult Participation in Learning Survey’.

³³³ Wolf, A., 2016, ‘Remaking Tertiary Education: Can we create a system that is fair and fit for the purpose?’, Education Policy Institute.

needed to address these problems. However, providing recognisable and valued qualifications for adult learners will not be sufficient on its own. Given the barriers highlighted above, it will need to become easier for individuals to finance investments in their skills.

In the face of more than a 50 per cent real terms cuts to the non-apprenticeship adult skills budget from £2.50bn in 2010-11 to £1.14bn in 2015-16, the government has sought to leverage greater co-investment from employers and individuals through the expansion of Advanced Learner Loans (ALL) to those under 24 studying for a qualification at level 3 or above, and the introduction of the Apprenticeship Levy.³³⁴

As the UK leaves the EU, there may be further risks – the EU’s latest European Social Fund has invested around £2.4 billion in England alone to support those facing obstacles in getting jobs such as in young people, those at risk of poverty, or the socially excluded.³³⁵ We therefore welcome the Government’s manifesto commitment to create a new UK Shared Prosperity Fund to replace such initiatives. There is an opportunity to make this more innovative and better tailored to the UK context than its predecessors.

Budget 2017 announced that maintenance loans – like those provided as standard to higher education entrants – will be provided for students at Institutes of Technology and National Colleges. There may be benefits from developing such specialist institutions to serve large parts of the country, rather than spreading higher technical provision more thinly across local colleges, but currently only 50 per cent of further education learners travel more than 6km to their provider.³³⁶ It has been argued that without equivalent maintenance support for other technical education learners not supported by an employer, it will be difficult for technical education to expand significantly.³³⁷

In a recent review of adult education policy, the IPPR have argued that a historic focus on ‘jobs first’ over and above addressing underlying skills needs, which can lead to low-paid work, may also have exacerbated skills gaps.³³⁸ As young generations are expected to have changing careers, possibly involving jobs they were not trained for or do not exist yet, the Taylor Review of Modern Working Practices recommends that training is made available to people with a working record but who need retraining. It also suggests extending support to those in receipt of Universal Credit for social mobility reasons, and adjusting delivery so that the self-employed do not miss out on training and upskilling opportunities.³³⁹ Improving the interaction between the benefits and education systems will be an important step to overcoming the financial barriers to training.

In any system of funding for adult education, the incentives and distortions it creates are crucial. As outlined in Chapter 3, the Government has chosen the Apprenticeship Levy as its main way of

³³⁴ Foster, D., 2017, ‘Adult further education funding in England since 2010’, House of Commons Briefing Paper No. 7708 (2015-16 prices).; Institute for Public Policy Research, 2017, ‘Skills 2030: Why the adult skills system is failing to build an economy that works for everyone’.

³³⁵ Learning and Working Institute, 2017, ‘Building Britain’s Future: Prosperity and opportunity for all’, General Election Manifesto 2017.

³³⁶ Department for Business, Innovation and Skills, 2016, ‘Understanding the Further Education Market in England’.

³³⁷ Fletcher, M., 2017, ‘Reforming technical and professional education: Why should it work this time?’.

³³⁸ Institute for Public Policy Research, 2017, ‘Skills 2030: Why the adult skills system is failing to build an economy that works for everyone’.

³³⁹ Taylor, M., Marsh, G., Nicol, D., Broadbent, P., 2017, ‘Good Work. The Taylor Review of Modern Working Practices’.

furthering the uptake of adult training. According to the IPPR, the risk in the current approach is that it concentrates the incentives to increase training too much in large firms, is skewed towards one type of training, and does little to change practice among the many employers seeking only to meet short term, low level needs. They advocate moving towards a wider skills levy, with more flexibility over use for employers, but diverted to investment as part of local strategies.³⁴⁰

Given (increasingly) that not all who would benefit from training will have a long-term relationship with an employer, another way of changing skills funding would be to put more control in *individuals'* hands. In one approach, personal learning accounts like those found in Singapore, provide an allowance of subsidy to be used flexibly over the course of adult lives for a wide range of training. That is in contrast to the current, complex, system where the generosity of funding (including for maintenance) depends on a range of factors, including the nature and location of training, which will not always be associated with the value of different options. As outlined in a recent review by Alison Wolf, an advantage of such a system might be to reduce the bias towards taking three-year degrees upon leaving school or college, at the expense of the means to train later on when career plans might be better formed.³⁴¹ This year's Industrial Strategy consultation committed to trialling new approaches to funding lifelong learning – this is an important step to be welcomed, and the Government should approach it with an open mind, but it is important that any new approach balances the need to be responsive to learner needs whilst protecting the use of public money.³⁴² If a personal learning accounts scheme were implemented, lessons would need to be learned from the previous Individual Learning Accounts scheme through introducing tighter controls on providers and types of courses eligible to prevent abuses.³⁴³

There are further changes required, which need to start at school. Young people need to understand, and not be fearful of, the fact that they may need to change careers a number of times as society and job opportunities evolve in the UK economy. They need the confidence to plan for this, recognising it will require the acquisition of new skills, and navigate their options. This represents a cultural shift as well as a financial decision. As discussed in Chapter 3, careers education from school-age will therefore need to play a role in reducing inequalities in adult learning later on.

With labour cost pressures rising, and the prospect of leaving the EU restricting labour supply, upskilling the workforce will be key to ensuring that unemployment does not rise and productivity does not continue to stagnate.

Recommendation: The Government should explore the development of personal learning accounts or other ways to give people better access to training to upskill or change careers in later life, including the provision of maintenance support for a wider range of technical courses beyond those delivered through Institutes of Technology.

³⁴⁰ Institute for Public Policy Research, 2017, 'Skills 2030: Why the adult skills system is failing to build an economy that works for everyone'.

³⁴¹ Wolf, A., 2016, 'Remaking Tertiary Education: Can we create a system that is fair and fit for purpose?', Education Policy Institute.

³⁴² Taylor, M., Marsh, G., Nicol, D., Broadbent, P., 2017, 'Good Work. The Taylor Review of Modern Working Practices'.

³⁴³ For a description of Singapore's current adult learning strategy, see: SkillsFuture, 2017, 'Home', available from: <http://www.skillsfuture.sg/>.

8. Conclusions and recommendations

Conclusions

England's education system still falls short in delivering a wide range of vital competencies needed to prepare young people for future work and study. Too many are leaving schools and colleges without the basic literacy and numeracy capabilities required and many of those who have them are failing to acquire the specialist knowledge and employability skills demanded by employers. This has implications for social mobility and the fabric of our society, as well as representing a cost to future productivity. The effect of this is set to grow in the future with demographic and economic change, compounded by the many uncertainties surrounding the countries' economic prospects post-Brexit. Advances in science and technology mean that different sorts of skills are moving into sharper focus, and there needs to be a renewed focus on ensuring people access education to respond to continuing and ever-more-rapid technological change throughout their working lives.

There have been positive developments since the publication of *Making Education Works*. Having reformed large aspects of the school system, a period of relative stability could help teaching professionals focus on the day-to-day improvements that make the biggest difference to learning. A political consensus has formed around the benefits of expanding apprenticeships and a greater emphasis on English language and mathematical skills, and the Government's plans to reform technical education show signs of promise. It will be vitally important for consensus to strengthen around a bigger portion of education policy, and for the system to move towards a more rational, long-term and considered approach to implementing well-intentioned reforms. There are also areas, for instance the balance between the funding of undergraduate degrees and other forms of education, where the Government should ensure it is prioritising the full range of societal interests in education.

Based on the Advisory Group's assessment of the varying issues covered in this report, recommendations of this report are divided into two groups below. The first concerns issues requiring urgent action or which relate to the current reform programme of the Government. The second reflects areas where change is desirable but where options need to be considered over a longer period of debate, to inform the consensus-supported, carefully-implemented strategy that education policy needs. A consistent thread running through all of the areas considered is the need for a well-trained education workforce in healthy supply to deliver educational outcomes, across all phases of education.

Recommendations for urgent action

Recommendation 1: The Post-16 Skills Plan offers the prospect of clearer, improved pathways for 16-year-olds seeking a route to skilled employment, via T levels or apprenticeships. However, with the alternative A level pathway providing a focused curriculum designed mainly for entry to undergraduate degrees, there is a risk that the new landscape represents a bifurcation into two narrow paths that fail to appeal to those motivated by a more 'career-based' education, developing knowledge of particular industries whilst leaving a range of options open for technical training or academic study later. Meeting such demand effectively could provide more logical routes to level 4 and 5 training, and help broaden the range of provision in higher education to include more

professional, technical and shorter courses. Combined with its promised review of tertiary education, the Government should develop a coherent vision for post-16 education that takes into account the full range of pathways sought by young people, avoids undue focus on access to three-year undergraduate degrees at the expense of other qualifications, and links effectively with the key stage 4 curriculum. T levels should be designed to fit with this wider vision.

Recommendation 2: A cross-party consensus for expanding apprenticeships is a welcome development. However, given the risks of not achieving effective delivery, the Government should avoid focusing on narrow numerical targets and develop broader measures of success that consider the quality of training and its value to employers and learners. Being able to assert with evidence that these routes are beneficial will be a vital part of improving their reputation with learners and their parents. Given the dependence of apprentices on the sustainability of their employer's business for their programme of training, it should consider how to ensure learners can move between apprenticeships and classroom-based technical routes, and whether transparent and portable qualifications should play a role in apprenticeship standards to enable them to market their knowledge more widely.

Recommendation 3: The Government should review the current approach to supporting low-achieving, disengaged students, and those with special educational needs to ensure it takes into account wider changes in local and national policy and the increasingly limited resources of local authorities responsible for education participation. It should consider the large body of experience and evidence generated by recent interventions including the Youth Contract and the introduction of Traineeships. The transition year proposed as part of the Post-16 Skills Plan should be designed as part of a fully-formed three-year journey, to ensure young people are equipped with the right skills to progress into further education and to re-engage with English and maths over a sustained period.

Recommendation 4: The Government should publish a comprehensive careers strategy. It should commit to ensuring the new educational landscape is complemented with objective careers advice from earlier than key stage 4, alongside more fairly-distributed employer engagement in schools, building on the progress of the new Careers and Enterprise Company. It should carefully review the implications for careers education of efforts to increase the involvement of universities in running schools and examine a broader range of options to trigger improvements.

Recommendation 5: The Government should retain the ambition for everyone to attain at least a level 2 in English and maths by 19. To support this, it should develop Functional Skills into a high quality, relevant and recognised qualification whose success is measured on progression rates, employment outcomes and equipping young people with basic skills. It should also monitor whether students taking apprenticeships are progressing well enough and review the suitability of this route for those lacking basic literacy and numeracy. The 15 new technical routes could allow for higher contextualisation of maths to help ensure retention and student engagement with the subject.

Recommendation 6: The Government should launch a high-profile national campaign to promote its funding for free training and tuition for any adult wanting to study English and maths up to and including GCSE level, and should proactively help adults in finding the most appropriate and nearest help.

Recommendation 7: The Department for Education should promote the consideration of transferable skills to support career development, but it should ensure this is integrated sensibly in teacher training as part of evidence-based, subject-specific approaches. Working with Ofsted, it should prioritise ensuring that the school and college accountability system supports provision of a

sufficiently broad curriculum that offers children a range of experiences, before advocating specific interventions to affect non-cognitive traits or the use of scarce curriculum time for the teaching of generic skills.

Recommendation 8: The Government should develop a fresh and comprehensive strategy, considering early years, school, further and higher education settings, to improve the working conditions, development, professionalism, recruitment and particularly the retention of teachers and other education staff.

Recommendation 9: The Government should assess the extent to which children are being introduced to financial concepts and knowledge in key stage 2, and monitor how national curriculum requirements in secondary schools are being implemented in practice. It should reflect on EEF's emerging evidence on the support given to schools in delivering the national curriculum requirements for financial literacy. Schools should be expected to cover the current student loan system, and the financial aspects of the apprenticeship system in England, as part of the citizenship curriculum or careers education.

Recommendations for longer term policy development

Recommendation 10. The Government should develop formal mechanisms, for instance appointing an independent panel, to ensure that curriculum and assessment policy decisions for school and further education are made in ways that reflect the full range of society's interests and the need for careful implementation.

Recommendation 11: The Government should explore the development of personal learning accounts or other ways to give people better access to training to upskill or change careers in later life, including the provision of maintenance support for a wider range of technical courses beyond those delivered through Institutes of Technology.

Recommendation 12: The recent expansion of the National Citizen Service has broadened the experience of many young people and appears to have been well-received. The government should heed the NAO's recent warnings to ensure further expansion does not compromise effectiveness. It should consider how the introduction of a Passport for Life might support development of a wider set of locally-tailored interventions – linked with school, college and local authority approaches – with more scope for innovation, subject to safeguards for the quality of provision.

Recommendation 13: Computer use is embedded in school life already, but beyond introducing the computing curriculum and teaching how to develop programmes and coding – which has been a positive step – the Government should continue to seek to raise standards for digital skills in schools, colleges and universities. Familiarity with modern software should be augmented with more workplace-focused skills.

Recommendation 14: The Government needs to develop plans, alongside industry and commerce, to address the changes to employment caused by developments in robotics and automation. Through the development of apprenticeship standards, employers should collaborate at national level to identify gaps in digital skills levels and help establish appropriate minimum standards. Education providers at all levels should ensure their offers are aligned to identified needs, that their workforces can deliver these programmes, and that they appeal to young people.

Recommendation 15: Better use of digital technology could improve pupil outcomes and reduce teacher workload. Following the closure of Becta, the Government should monitor whether schools and multi-academy trusts have adequate support in making cost-effective use of the likely expansion in digital resources, and ensure that teacher training establishes the right core digital capabilities. However, it should continue to work with the Education Endowment Foundation to focus on trialling new approaches and disseminating evidence to schools before encouraging the adoption of any particular technological solutions.

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