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The Skills Imperative 2035:

Creating a system of lifelong learning to provide the essential skills for tomorrow's workforce

Luke Bocock, Michael Scott and Jude Hillary,
National Foundation for Educational Research

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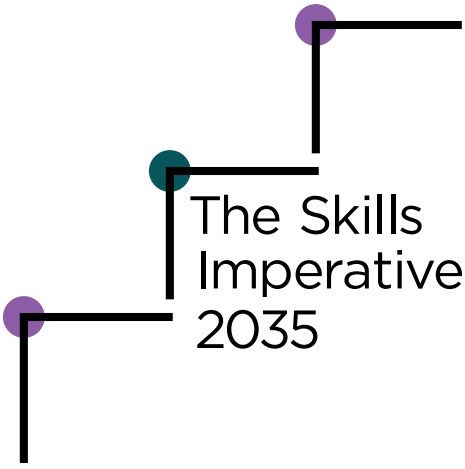

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Foreword

This National Foundation for Educational Research (NFER) report is the culmination of a five-year programme funded by the Nuffield Foundation – our most significant investment ever in education research. Its premise is that changes in the labour market, not least from the ever increasing use of technology in the workplace, will impact on both the jobs available in the future and the skills and qualifications needed to do them. The study has focussed specifically on the skills that will be most needed by employers and what the implications of this might be for different stakeholders. These include Government, employers, the education system, and workers, both those already in the labour market and those joining in the next ten to 15 years.

This report could not be better timed. The education system has many purposes, one of which is to help prepare young people for the world of work. However, concerns about the skills needed by those entering the workforce have long been a high priority for policymakers. These include a perception that the education system inadequately prepares students for the demands of work, that technical pathways often lack the necessary quality or status, and that the persistent academic-vocational divide harms students on both sides. These issues have come to a head with the contraction of the youth labour market and the rising number of young people classified as NEET (Not in Education, Employment or Training), now nearly one million, disproportionately from backgrounds with various forms of disadvantage.

Over the past 18 months, the Westminster government has sought to tackle these challenges with a series of new policies and significant funding announcements. It has established Skills England to lead the forecasting, planning, and coordination of training to align with economic priorities. Responsibility for apprenticeships and adult skills has been moved to the Department for Work and Pensions. The Department for Education retains oversight of higher education and training for under-19s and has recently responded to the report of the Curriculum and Assessment Review led by Professor Becky Francis.

New measures have been introduced, including foundation apprenticeships, reforms to level 7 apprenticeship funding, and a Growth and Skills Levy. The government also plans for young people to have access to new V Levels in addition to existing T Levels and Higher Technical Qualifications, all supported by a Youth Guarantee and a Lifelong Learning Entitlement. The government's 2025 industrial strategy prioritises technical excellence and workforce development in key sectors such as technology, engineering, and defence. All these policies aim to address the long-standing mismatch between the skills employers will need and the skills available in the future workforce.

The Nuffield Foundation's work is well-positioned to contribute to this effort by supporting rigorous research to inform policy development and implementation. Over the past decade, the Foundation has intentionally shifted its focus to address what was a relatively weak evidence base surrounding vocational education pathways. This has allowed us to build a substantial and authoritative body of work on key issues within the skills agenda, with reports too numerous to list here. This flagship project, *The Skills Imperative 2035: Essential skills for tomorrow's workforce*, has been led by the NFER and involves a multi-disciplinary team of research experts from leading university departments and research institutes.

The focus of the work has been on what are now increasingly recognised as 'essential employment skills'. These are the transferable skills that accompany more occupationally-specific technical skills and qualifications, which will complement the technology in use in the workplace. They underpin employability and are in high demand in the labour market. Employers across all sectors want to recruit young people who are creative problem-solvers, confident and effective communicators, able to work cooperatively, and show initiative. These skills are of course also important for people's wider lives. Previously, they were often categorised as 'soft' and were incorrectly seen as innate rather than skills that could be developed.

The Skills Imperative 2035 makes a major contribution to our understanding of these essential employment skills and how to better value, develop, and support them. Through a carefully planned and sequenced data-driven research programme, it has projected future skills demand from a labour market being transformed by technological development; codified the skills most likely to be critical; assessed the supply of - and shortfalls in - these skills across the population and among specific groups; and analysed the determinants of young people's skill development and the implications for the formal education and training system, lifelong learning, and beyond. An important strand of the work explored high-performing countries and the lessons that can be learned from them.

This programme complements other large-scale research projects funded by Nuffield through its Strategic Fund. These include the Pissarides Review into the Future of Work and Well-being, led by The Institute for the Future of Work, the Resolution Foundation's Economy 2030 Inquiry, and the Deaton Review of Inequalities conducted by the Institute for Fiscal Studies.

The Skills Imperative 2035 marks a significant moment in the Foundation's commitment to research and policy development for post-14 education and training. This interest remains central in the light of the priority themes of our recently published Strategic Review. Skills policy is a cornerstone of a fair, prosperous and inclusive society. Essential skills such as information literacy and creative thinking are increasingly vital for young people navigating the rapid deployment of new technologies reshaping the nature of work, especially the opportunities and risks posed by AI.

The various reports from *The Skills Imperative 2035*, including this one, inspire a range of questions for future research. What might be practical, scalable, and evidence-based ways of supporting the development of essential skills across the different life stages, and in different contexts, whether through the curriculum, employment, or other activities? What role might lifelong learning play to ensure that people can continue to develop essential employment skills and adapt and apply them in a changing labour market? What are the respective roles of the education system, employers and others in the development of essential skills, what is the scope for locally-led solutions, and how might this be best coordinated at a national level?

This final report, and all the various papers that have preceded and underpinned it, will be essential reading for policymakers, education and training providers, employers, and researchers. I am grateful to the team at the NFER that led the programme of work; the experts at the universities of Sheffield, Warwick, and Roehampton; the research agencies Verian, Cambridge Econometrics, and the Learning and Work Institute whose research forms the backbone of the analysis; the Strategic Advisory Board chaired by Mary Curnock Cook; Emily Tanner from the Nuffield Foundation who managed the grant; and the thousands of providers, employers, and other stakeholders who were involved in the programme at various stages. It was a collective endeavour, brilliantly synthesised in this landmark comprehensive report. I hope it informs decision-making, shapes practice across the education system, and sets the direction for the research agenda in the years ahead.

Josh Hillman, Director of Education, Nuffield Foundation

The Six Essential Employment Skills

The Skills Imperative 2035 has identified the skills workers across the UK economy will need to thrive in their jobs in a technology dominated world. We refer to these skills as 'Essential Employment Skills' (EES). These skills, which will complement the technology in the labour market and which are co-dependent, are:

Communication:

This is the ability to express ideas clearly and interpret the meaning of others with accuracy. It involves speaking, listening, writing and presenting in ways that avoid misunderstanding. At higher levels, it means tailoring messages to different audiences, balancing precision with persuasion, and ensuring nuance is not lost in digital or cross-cultural settings. As routine tasks are automated, the value of human interaction will increase. By 2035, communication will remain indispensable: it is the channel through which knowledge is shared, trust is built, and complex work is coordinated.

Collaboration:

This refers to working with others in ways that create enduring relationships and achieve shared goals. It is not just dividing tasks, but weaving together diverse perspectives, skills and motivations into a common endeavour which is better than can be achieved working alone or in silos. Effective collaborators build trust, sustain commitment over time, and resolve conflict without damaging relationships. As work becomes increasingly networked and multidisciplinary, the ability to forge strong partnerships will be central to progress. By 2035, collaboration will be a defining skill: those who can nurture long-term cooperation will enable innovation, resilience and shared success.

Information literacy:

This is the ability to find, evaluate and use information to make sound decisions. It requires weighing evidence, testing arguments, and judging credibility in a world where data and opinions are abundant but not always reliable. At higher levels, it means not just locating facts but discerning their quality, spotting flaws in reasoning, and defending conclusions with confidence. As artificial intelligence generates ever more information, the capacity to question, filter and validate will be crucial. By 2035, information literacy will distinguish those who can navigate complexity from those overwhelmed by it.

Organising, planning and prioritising:

This is about turning intention into action. It involves setting clear goals, designing workable plans, and sequencing tasks so that objectives are met on time and within constraints. It is also about coordinating the efforts of others and ensuring that resources are aligned and momentum is maintained. At advanced levels, it means balancing competing priorities, anticipating obstacles, and adapting plans without losing sight of the bigger picture. By 2035, when work is likely to be more fluid, fast-paced and project-based, those who can organise, plan and prioritise effectively will provide the structure that enables progress.

Problem solving and decision making:

This involves identifying and understanding challenges, generating options, and selecting the best course of action under conditions that are often uncertain. It requires logic and creativity, evidence and judgement, and the ability to balance short-term needs with long-term goals. At higher levels, it means tackling complex, ambiguous problems in an ethical and empathic manner, when there may be no single right answer, and being accountable for the choices made. In the workplaces of 2035, the human capacity to diagnose and decide will remain indispensable.

Creative thinking:

This is the capacity to generate fresh ideas and apply them in ways that add value. It involves looking at challenges from new angles, experimenting with different approaches, and combining perspectives to create something original. At its strongest, it means moving beyond familiar solutions, challenging assumptions, and finding innovative paths forward in collaborative settings. As information multiplies and problems grow more complex, creativity will be even more vital, not just for novelty but for progress. In 2035, those who can think differently will drive innovation, adapt to change, and unlock opportunities that others may overlook.

Executive Summary

The Challenge Now and Ahead

Over the past five years, NFER has been leading a consortium to explore *The Skills Imperative 2035: Essential skills for tomorrow's workforce*, generously funded by the Nuffield Foundation. This research programme has involved a comprehensive analysis of both quantitative and qualitative data to examine how job and skill requirements are likely to change in future, and how the education and skills system, and employers, need to respond to ensure that change makes everyone, not just a few, better off. This final report brings together evidence from across the programme.

Whilst the future is inherently uncertain, our research represents – at the time of writing - the most rigorous and realistic assessment of how jobs and skills may change, and on which the response of policy makers, employers and educators should be based.

As much of the evidence from the programme is limited to England and skills policy is devolved to Scotland, Wales and Northern Ireland, the recommendations set out apply specifically to England unless otherwise stated. However, we use employment projections produced for the UK and we anticipate that many of our insights and recommendations have relevance for other UK nations.

The global economy is changing fast

- Artificial intelligence (AI), automation, and wider demographic, environmental and economic changes are transforming the labour market. The number of jobs is expected to grow, but the occupations that are growing are increasingly professional and technical (Wilson et al., 2022).
- These jobs demand higher-level qualifications and high levels of Essential Employment Skills (EES) like problem solving, communication and collaboration (Scott et al., 2024).
- Some 3.7 million workers in England, many of whom are in higher-skill occupations, already have substantial deficiencies in EES. This is projected to increase significantly to around seven million by 2035 unless action is taken now (Bocock, Del Pozo Segura and Hillary, 2024).
- A shortage of skilled employees at the top end of the labour market could constrain growth, whilst fewer jobs at the lower end could result in high levels of worklessness.

Low- and mid-skilled jobs are disappearing

- "Occupational upgrading" — more growth at the top of the jobs ladder and decline in the middle and bottom of the occupational distribution — has been happening since the 2000s (Cominetti et al., 2022), but is now happening at a faster rate, with more significant implications for workers in mid- and lower-skilled jobs than has been seen previously.
- Around 12 million people in England work in occupations (e.g., administrators, sales, and elementary occupations) which are in decline due to the impact of the adoption of technology and other changes. Actual employment changes since 2021 show this decline is happening faster than previously projected, by as much as three times for some groups.
- Between one and three million jobs in these declining occupations could potentially disappear by 2035, based on this accelerated rate of change. This creates opportunities to improve living standards by moving labour into more productive occupations, but it also carries threats.

Large-scale job displacement is a realistic possibility

- Whilst previous periods of change have displaced workers from some occupations without creating large-scale unemployment, there are reasons to think it may be different in future.
- This is partly because examples of lower-skilled but growing occupations are becoming increasingly scarce, offering limited opportunities for displaced low-skill workers. Even in the lower-skilled occupations where we previously projected growth, this has been more muted than expected over the last three years (for example, care work has grown much more slowly than we projected), and other lower-skilled occupations have declined more sharply (see Annex 1).
- Significant mismatches between the skills and qualifications of workers in declining occupations and the job demands of growing occupations pose major barriers to changing careers for those displaced from their existing jobs.

The threats are clear

- Most workers in declining occupations lack the skills and qualifications to move into growing, higher-skilled professional and associate professional occupations.
- Young people with low skills and qualifications will be poorly placed to access higher-skilled jobs, whilst opportunities in lower-skilled occupations are likely to dwindle. For example, employment in sales and customer service occupations fell by 10 per cent in the three years from 2021 to 2024 (see Annex 1).
- Young workers start further down the career ladder than they used to and progress more slowly after that point (Blundell et al., 2020). Artificial intelligence may accelerate this trend, with large language models able to perform many junior tasks, reducing entry-level positions (Levanon et al., 2025).
- Even graduates face rising unemployment rates and are less likely to access professional jobs, with fewer lower-paid jobs to fall back on (see Levanon et al., 2025 for American data). Graduates are experiencing multiple challenges due to general labour market slowdown, a sharper decline in graduate-level job openings, and reduced demand for lower-skilled roles which do not require a degree but are often taken up by new graduates (Allas and Goodman, 2025).

The result: widening inequalities and slower economic growth

- Unless addressed, these trends risk deepening divides between workers in high-skill, growing jobs and those in declining occupations who are at greatest risk of slipping into worklessness.
- Unless employers can secure the workers needed to fill the growing number of higher-skilled jobs forecast for the future, this will constrain their ability to drive economic growth.
- This is likely to put additional pressure on public finances as a result of lower tax receipts and higher welfare spending.

Meeting the Skills Imperative

The direction of change in the labour market will be shaped by the actions of government, employers, the education system and individuals. Delivering growth that benefits everyone, as outlined in the Labour manifesto (Labour Party, 2024), will require disruption in the labour market to be proactively managed through changes in policy and practice.

Minimising the costs of labour market disruption can be achieved in two main ways.

1. Ensuring more young people leave education with the qualifications and skills - including transferable EES - needed to compete for entry-level roles in growth occupations.
2. Supporting more adult workers in declining occupations who are displaced, or at risk of being displaced, to reskill and transition into growth occupations.

Ensuring young people leave education with a solid foundation of the skills and qualifications required to enter, or progress into, growth occupations is likely to be more effective in the long term. However, the majority of people who will be in the labour market in 2035 are already in work today, which suggests that reskilling and upskilling existing workers cannot be ignored.

There are significant barriers.

For young people:

Gaps in skills emerge early and widen over time, shaped by inequality at home, school quality, and access to wider opportunities (Bocock, Del Pozo Segura and Hillary, 2025a). In education systems with more 'branching off' points and more differentially valued post-16 education pathways, as in England, young people's qualification and subject choices often lock in socio-economic divides (Boudon, 1974; Jackson, 2013). Systematic change is needed to impact young people's choices and skill development throughout their journey through education.

For low-skilled adults displaced from their jobs:

There will be fewer opportunities to re-enter the labour market in a job that requires similar skills and qualifications to their previous role. Whilst there will still be some opportunities to make 'lateral moves' into other growing occupations with similar pay levels, these opportunities will grow scarcer, and will still require workers to reskill. 'Upgrading' into growing areas of the economy typically demands qualifications and skills many do not have. The adult skills system is underfunded and fragmented – with public investment falling by 38 per cent between 2010/11 and 2020/21 (Tahir, 2023) – leaving workers in declining occupations at even greater risk of being left behind. Reinvigorating the adult skills system must be a national priority.

We need a system of lifelong learning that develops individuals' EES and technical skills throughout early childhood, education and work, as outlined below.

A lifelong learning approach

Meeting the future skills challenge will require a cradle-to-career approach - strengthening support in the early years, tackling inequalities in schools, cultivating pathways into growth occupations, and rebuilding the adult skills system to deliver growth that benefits everyone. This is particularly important for the most disadvantaged in our society.

Birth to Five

Children's material, emotional and educational environments explain a significant share of inequalities in their cognitive and behavioural development (Bocock, Del Pozo Segura and Hillary, 2025a), shaping later skills. Skills are cumulative and gaps emerge early and widen over time, shaping later outcomes. Parents need more support, especially those from disadvantaged backgrounds.

The policy response should:

- Expand family support for young families and ensure this support effectively targets areas and households that are disadvantaged.
- Support disadvantaged families to access high-quality early childhood education and care (ECEC) settings, ensuring their children benefit most from expansions in childcare.
- Tackle challenges in the early years workforce - including pay, qualifications and continuing professional development – to ensure all children can benefit from high-quality ECEC.

School Years

As children grow, so do the gaps in their skills. Data from the Programme for International Student Assessment (PISA) suggests that England has made little progress in tackling inequalities at the end of childhood. Socio-emotional skills among 15- to 16-year-olds are also weaker than in almost every comparable OECD country.

Essential Employment Skills (EES) can be developed in school as part of teaching the national curriculum. However, schools need to be supported and incentivised to ensure they focus on this alongside gaining knowledge.

The policy response should:

- Acknowledge EES as a vital part of education - for both life and work - and clearly articulate how EES can be effectively developed as part of teaching a knowledge-rich curriculum. The recent Curriculum and Assessment Review highlights oracy, digital literacy and media literacy (Curriculum and Assessment Review, 2025), which is a welcome start. However, other EES should also be emphasised.
- Promote a common skills framework and tools that educators can use to assess children's progress. The government could start by evaluating existing frameworks which are already commonly used, such as the Skills Builder Universal Framework, and promoting existing resources such as the Careers and Enterprise Company's (CEC) Future Skills Questionnaire and equalex framework for work experience. Whilst the Curriculum and Assessment Review recommends a new oracy framework (Curriculum and Assessment Review, 2025), a broader framework is needed that encompasses other EES as well.
- Build training on how to develop EES into the Initial Teacher Training and Early Career Framework as well as wider teacher professional development.
- Expand disadvantaged children's access to enrichment activities (including extra-curricular activities and careers education), ensuring funding and expectations are sufficient, explicit and deliberately build young people's EES.
- Increase the share of education funding that is targeted towards disadvantaged pupils and lower-performing schools, to counteract inequalities which otherwise widen as young people progress through the school years and post-16 education system.
- Invest in further research to develop valid and reliable measures of EES as well as integrating them into international comparative assessments, cohort studies and evaluations, to help build an even richer understanding of the development of EES.
- Investigate how 'high-performing' countries embed EES into teaching and the curriculum.

Education to Employment

All young people should leave education with a strong base of the EES needed for both work and life.

The changes expected in the labour market create more opportunities for highly-skilled and qualified young people, but they also create risks for those with low qualifications and skills. Employers consistently report that young people lack the EES they need to work effectively when they leave education.

Further education (FE) colleges, other post-16 providers and higher education (HE) providers are potentially important for helping young people to continue developing their EES alongside acquiring qualifications. The government should ensure that more young people leave education equipped to enter growth occupations, building on the Prime Minister's announcement that he wants to see two-thirds of young people going on to university, further education, or a 'gold standard apprenticeship' by the age of 25 (Prime Minister's Office, 2025).

The proposals set out in the recent government White Paper on Post-16 Education and Skills (the 'post-16 White Paper') (HM Government, 2025) address some of these issues.

The response from government and education providers should:

- Ensure that national frameworks and incentives create closer cooperation between educators, government and employers, including appropriate levels of engagement with groups representing young people's interests. The government has indicated its intention to encourage FE and HE providers to work together to offer more flexible, modular provision and progression pathways from FE to HE, supported by transferable credits, in the post-16 White Paper.
- Explore what additional incentives or changes to funding and accountability measures might be introduced to encourage, recognise and reward efforts by post-16 providers and universities to develop their students' EES, and support successful pathways into employment or further study.
- Evaluate ways of assessing EES that education providers can use to monitor and address student's gaps and learning needs.
- Help students to understand the importance of developing their EES and to articulate them using a common skills framework. In the post-16 White Paper, Skills England has been tasked with exploring the development of a 'skills passport'.
- Establish and promote a clear and coherent network of high-quality vocational and technical routes into professional jobs.
- Drive up participation rates in literacy and numeracy education beyond the age of 16, given these complement, and are complemented by, the development of EES.

Adulthood

Most people who will be in the labour market in 2035 are already in work today. Professional jobs are expanding while low-skill roles decline, putting millions at risk. Workers in shrinking occupations must be supported to transition — either through 'upgrades' into higher-skilled roles or "lateral moves" into the few lower-skilled jobs still growing. But mismatches in skills and qualifications make upgrades difficult, and opportunities for lateral moves are limited. Public and private investment in adult learning has also fallen sharply since 2010, leaving the system underfunded and fragmented.

However, our research has shown that employees believe they have more skills to offer, particularly at the lower-skilled end of the labour market. There is a clear difference of view between employees and employers about the workforce's skills.

The response from government and employers should:

- Reinvigorate the adult skills system, including through a step change in funding, to promote and reduce the barriers to adults retraining and transitioning from declining occupations into growth sectors.
- Ensure that Human Resources (HR) and management practices enable employers and line managers to accurately assess, utilise and develop their workers' existing skills.
- Adopt a skills-based hiring approach in recruitment and draw on a common skills framework to articulate EES requirements.

Whilst we have identified challenges and opportunities within each life stage above, understanding the connections between stages will help ensure the opportunities to support lifelong learning are effective and sustained. Skills development is cumulative and skills gaps compound from early childhood through school and into adulthood. They are also reinforced by how education systems, employers and government interact. All young people, particularly those from disadvantaged backgrounds, should leave education with a solid base of the EES needed for both work and life, and a strong appetite for lifelong learning and development.

A joined-up, lifelong learning system - focused on both technical skills and EES, addressing skills inequalities, supporting disadvantaged young people, and nurturing collaboration - is essential for delivering economic growth that benefits everyone.

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Stage 1: Birth to Five

- Expand family support, targeting the most disadvantaged
- Support disadvantaged families to access high quality early years education and care (ECEC)
- Strengthen the early years workforce

Stage 2: School Years

- Acknowledge EES development as a vital part of education and articulate how it sits within a knowledge-rich curriculum
- Promote a common skills framework and assessment tools, whilst training teachers on how to develop EES within and beyond the curriculum
- Expand access to enrichment activities, particularly for disadvantaged pupils
- Increase the share of education funding targeting disadvantaged pupils and lower-performing schools
- Invest in further research on EES measurement and development

Stage 3: Education to Employment

- Incentivise closer cooperation between educators, government and employers
- Incentivise FE and HE providers to place a greater emphasis on students' EES
- Evaluate tools for assessing EES. monitoring and addressing students' skills gaps, and helping students to reflect on the development of their EES
- Cultivate a clear and coherent network of high-quality vocational and technical pathways into growth occupations
- Increase participation in literacy and numeracy beyond age 16

Stage 4: Adulthood

- Reinvigorate the adult skills system, with a step change in funding and a focus on retraining workers
- Ensure employers' HR and management practices accurately assess, utilise and develop their workers' skills

The Challenge Now and Ahead

The labour market is undergoing profound change. Technological advances and wider economic shifts are reshaping demand for jobs and skills.

The change opens up opportunities for the UK but also significant risks. Total employment - particularly in higher-skilled roles - is rising. Meanwhile, between one and three million jobs could be lost from low- and mid-skilled occupations by 2035.

As occupations continue to change, Essential Employment Skills (EES), which are already critical across the workforce, will become even more decisive for success. But by 2035, seven million people could lack the EES they need for their job.

These accelerating shifts risk deepening inequalities and constraining economic growth if left unchecked. An urgent, coordinated response is needed, focused on building a system of lifelong learning.

Introduction

Over the past five years, *The Skills Imperative 2035* research programme has explored how the UK labour market is likely to change in the future and how the education and skills system, and employers, need to respond. This has involved: projecting the future shape of the UK labour market; identifying the skills likely to be most vital across the future labour market; measuring the supply of, and gaps, in these skills; examining the determinants of young people's skill development; identifying the groups at highest risk of falling out of the labour market due to changes in jobs and skills requirements; and learning from 'high-performing' education systems abroad.

This final report brings together evidence from over 15 working papers and policy reports published as part of the programme. These reports constitute a comprehensive evidence base for understanding how jobs and skills needs are changing - including because of increasing artificial intelligence (AI) and automation; how well current provision meets those needs; and where the greatest risks and opportunities lie.

In this section, we describe how the UK labour market is likely to change over the next decade, which skills are growing in importance, and who is most vulnerable to being left behind. In subsequent sections, we summarise the evidence on skill development across four life stages and put forward recommendations, based on this evidence, for building a future-ready workforce as well as equipping people of all ages with the skills needed to lead fulfilling lives.

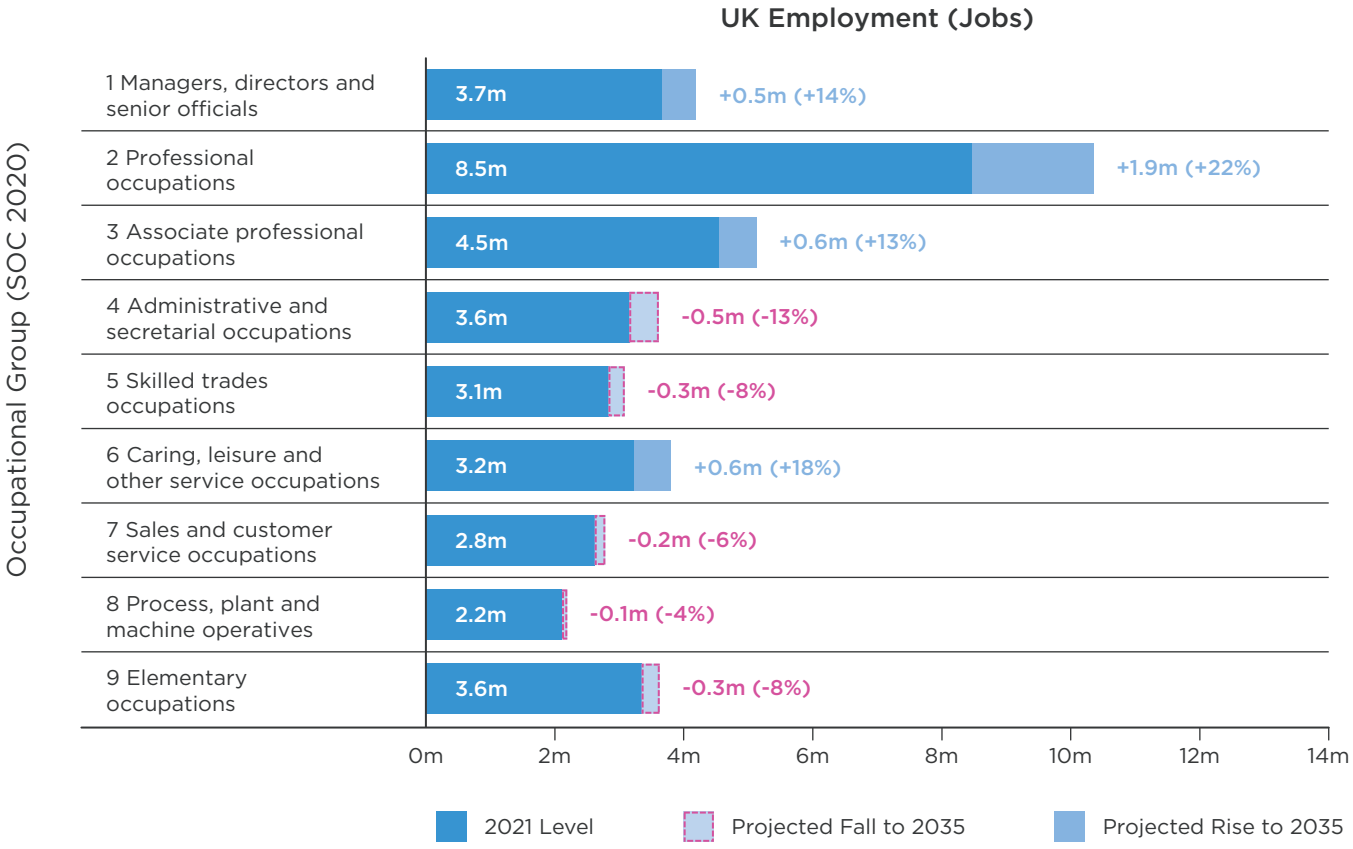
The labour market is changing. Whilst demand for higher-skilled occupations is increasing, it is declining fast for lower-skilled jobs.

Global mega-trends are changing the structure of the UK labour market - both the jobs that people do and the skills they need. These mega-trends include globalisation, geopolitical shifts and offshoring; the economic impact of the UK leaving the European Union; demographic changes, including immigration and the UK's ageing population; and climate change and the effects of policies and investments designed to tackle it.

Above all, technology is driving change, particularly in areas like computing, robotics and - most recently - AI. Technology not only means that machines can automate some tasks, it also creates many new types of work, skills and ultimately jobs. It has effects on both productivity and economic growth and the distribution of jobs across the economy. Researchers have tended to find that technological developments over the last century have replaced workers doing more basic, routine-based tasks, whilst augmenting (i.e. expanding) work for those with other skills, at least in the short- to medium-term (Acemoglu and Restrepo, 2020).

The anticipated effects of these mega-trends were reflected in the UK employment projections we published in 2021, which are shown in Figure 1[1] (Wilson et al., 2022). These employment projections show the continued growth in total UK employment, by around 2.3 million jobs (seven per cent), but this growth is not even. The projected changes are dominated by growth in higher-skilled, generally better-paid occupations (e.g., professionals, associate professionals and managers). Meanwhile, despite growth in overall employment, most low- and mid-skilled occupations (e.g., administrators, sales, and elementary occupations) are projected to decline.

Figure 1: 2021 Employment levels and projected change to 2035 in *The Skills Imperative 2035* employment projections (Human Centric Scenario)



Source: The Skills Imperative 2035 employment projections.

1 *Earlier in this programme, we produced Baseline employment projections and several Alternative Scenarios. Figure 1 shows the projections from the Human Centric scenario, which is the Alternative Scenario with projections that are most similar to actual changes in employment between 2021 and 2024. This built on the Automation scenario but focused on the demand for and provision of health and education services in future.*

These trends pose significant risks to workers in lower-skilled occupations. Growth in employment in the highest-paid occupations has tended to outstrip growth in other occupations since at least the 1980s (Cominetti et al., 2022). However, the lack of growth in almost all lower-skilled occupations is relatively new. Previous decades saw a decline in mid-skilled occupations (specifically manufacturing jobs), but lower-skill, lower-pay jobs grew at the same time as high-skill, high-paid jobs. Since the early 2000s, growth in lower-paid jobs has gone into reverse, whilst mid-skilled occupations have also continued to decline. This increases the threat that structural changes in the labour market pose to workers in lower- and mid-skilled occupations, who typically lack the qualifications and skills to transition into higher-skilled, higher-pay jobs.

Concerningly, new evidence produced for this final report suggests that, whilst the labour market is changing in the way we predicted, the pace of change has accelerated significantly: the fall in employment in mid- and low-skilled occupations between 2021 and 2024 has been three times greater than we previously projected. The pandemic reshaped labour markets in ways that hit some mid- and low-skilled jobs harder than professional ones (for example, as consumer demand tilted away from face-to-face services), and this may have sped up change that would otherwise have happened at a slower pace. We may also be seeing the early impact of AI adoption, with even faster change yet to come. Whereas previously we projected that one million jobs would be lost from declining occupations in the UK between 2021 and 2035, our analysis of more recent employment data suggests this could potentially be as high as three million (see Annex 1 for details).

The skills required for different jobs are changing too. A set of 'Essential Employment Skills' (EES) will become increasingly vital.

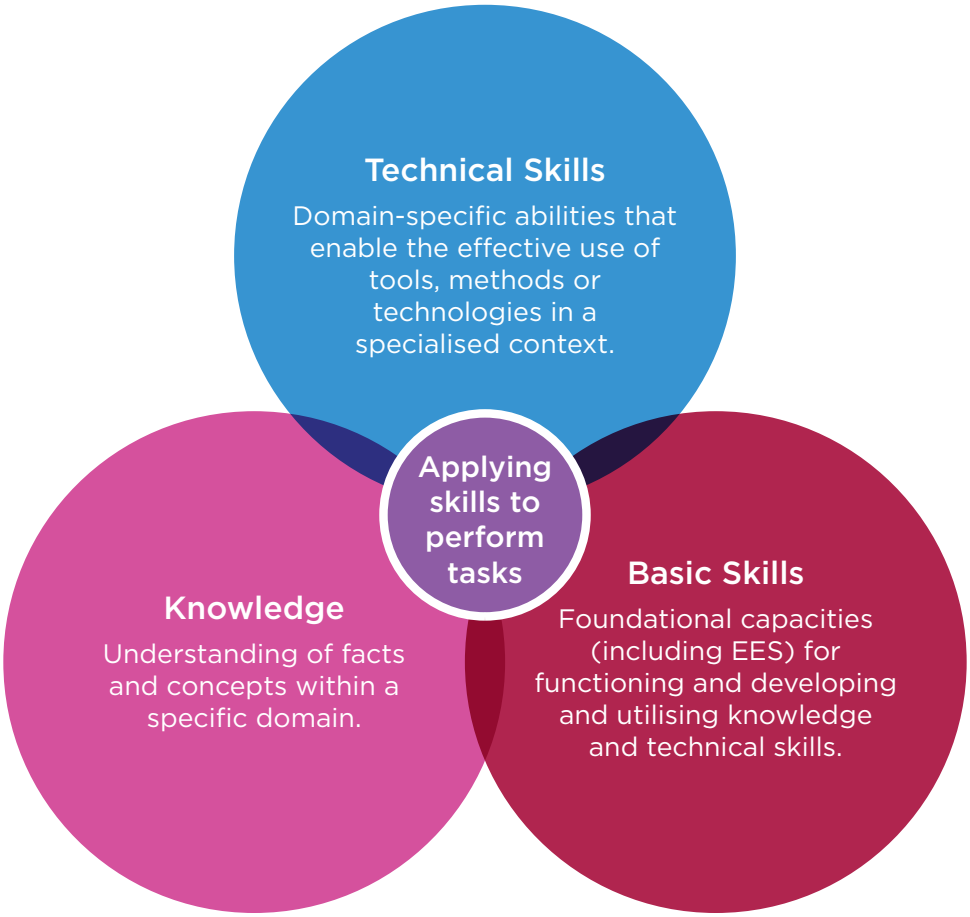
Across the labour market, some skills are growing in importance, whilst others are declining. Earlier in this programme, we projected the UK's future skill needs and identified a set of skills that are already heavily utilised today, but which will become even more vital across the whole economy over the next decade (Dickerson et al., 2023). We refer to these skills as Essential Employment Skills (EES). They are: communication; collaboration; information literacy; organising, planning and prioritising; problem solving and decision making; and creative thinking. (EES are defined on p.5 of this report.) These skills rank as some of the most important skills in many higher-skilled occupations, alongside the technical skills that each role requires (Dickerson et al., 2023).

Essential Employment Skills (EES) are transferable skills, but they are combined with other skills to perform work tasks. They complement, and are complemented by, literacy, language and numeracy skills. Together, we refer to these skills as **basic skills**. When performing tasks to achieve goals, people draw on these basic skills in combination with **domain-specific knowledge** and **technical skills**, as illustrated in Figure 2. To meet future skills needs, workers need to have the EES and other basic skills, as well as relevant knowledge and technical skills, to perform their jobs effectively.

Our analysis shows that EES are particularly valuable in professional and associate professional environments rich in other human capital (Dickerson et al., 2023). However, deficiencies in these skills are already widespread amongst higher-skilled workers, and shortages are expected to get worse. Based on the results of NFER's first-of-its-kind Essential Employment Skills survey, one in five workers in high-skilled occupations have substantial EES deficiencies, which could be jeopardising their ability to do their jobs effectively. Moreover, the number of workers in England with substantial EES deficiencies could nearly double to seven million people by 2035 (Bocock, Del Pozo Segura and Hillary, 2024)[2]. For the UK economy to thrive, a greater focus is needed on how young people and adult workers develop EES, both in education and beyond.

2 *Other surveys support the conclusion that EES are in short supply. Amongst employers with staff with skills gaps in 2022, 70 per cent reported a lack of self-management skills, 48 per cent a lack of team working skills, 48 per cent a lack of leadership skills, and 40 per cent a lack of complex problem solving skills (IFF Research, 2023).*

Figure 2: Categorising skills



More young people need to be equipped with the skills and qualifications to work in growing occupations.

There are likely to be more opportunities in the future for young people to work in high-skilled, well-paid jobs. But, to find success in the labour market over the next decade, young people will increasingly need to leave education with the skills and qualifications required to work in growing professional and associate professional jobs. These jobs typically require higher-level qualifications equivalent to at least the first year of a degree, as well as higher levels of technical skills and EES, than other jobs (Scott et al., 2024).

Cross-country analysis of young people's education and skills shows that the English education system is performing well in developing young people's numeracy and literacy skills. However, young people in England have lower socio-emotional skills than their peers in most other OECD countries (Lucas et al., 2025). These socio-emotional skills are likely to be closely aligned with EES in early adulthood. This raises serious doubts about whether young people today are being fully equipped to meet the demands of jobs that will exist in the future. There is a need for greater emphasis on the development of EES, alongside knowledge, within and beyond the education system.

Skills inequalities also suggest that some young people are likely to be left behind, competing for a dwindling number of jobs in low- and mid-skilled occupations. Inequalities in socio-emotional skills are larger in England than in any other country, according to data from the Programme for the International Student Assessment (PISA)[3] (2022) (Lucas et al., 2025). With job growth concentrated in higher-skilled occupations that use EES intensively, England cannot afford to let a significant minority of young people reach the labour market with low levels of these skills.

3 *The Programme for the International Student Assessment is a cross-country programme of assessment and analysis of students' knowledge and skills.*

People with low levels of skills (including EES) and qualifications are competing for a dwindling number of jobs in high-risk occupations.

Our employment projections suggest that labour market change poses a clear threat to workers in low- and mid-skilled occupations. We previously identified a group of 'high-risk occupations', such as retail workers, machine operatives, administrators, secretaries and elementary workers, for whom the threat of displacement from the labour market is greatest, as illustrated in Figure 3. In the last decade, workers in these occupations have been far more likely to move into unemployment or economic inactivity than other workers, which underscores the risk these groups face (Scott et al., 2024).

The effects of labour market change will not be felt evenly across society. Workers in high-risk occupations are disproportionately at either end of the age distribution, working part-time and located outside London and the South-East. They also tend to have lower-level qualifications, with around half having no more than GCSEs, and their self-reported behaviours indicate that they have lower levels of EES than workers in higher-skilled jobs (Scott et al., 2024). This means they are not well positioned to move into higher-skilled growth occupations. Movements from high-risk occupations into growing occupations are scarce, as mismatches between skills and qualifications in high-risk occupations and those of growth occupations pose significant barriers. Those that do make these moves tend to be younger people, those with higher-level qualifications, and those in or near London (Scott et al., 2024). Moreover, whilst there are some lower-skilled occupations that are projected to grow, including care work and customer service jobs[4], workers seldom move from high-risk occupations into these jobs at present (Scott et al., 2024).

It is not just workers already in declining occupations that face a threat. Young people who leave education with low levels of skills and qualifications tend to take jobs in high-risk occupations. Without action, as opportunities in these areas of the labour market dry up, we are likely to see rising numbers of young people who are not in education, employment or training (NEET).

Overall, this suggests that:

- Millions of workers in high-risk occupations may need to retrain to gain the skills and qualifications needed to '**upgrade**' into growth occupations.
- If they cannot make upgrades, they may need to make a '**lateral move**' into a growing lower-skilled occupation, but such occupations are increasingly scarce.
- Many young people may need to keep pursuing skills and qualifications for longer than they have previously in order to secure jobs in growing occupations.

It is therefore vital that workers in high-risk occupations and young people focus on developing and demonstrating the skills needed in growth occupations.

4 *Employment in customer service occupations has fallen significantly between 2021 and 2024, suggesting it could also be a high-risk occupation.*

Figure 3: Higher-risk occupations, lower-paid growing occupations and better-paid growing occupations (England)

Source: Employment numbers and qualifications from analysis using The Skills Imperative 2035 labour market projections (see Working Paper 2). Qualifications uses data for 2021. Hourly wages from analysis using Annual Population Survey (APS) 2021/22.

Higher-skilled workers will experience changes in the skills required to do their jobs too. EES can enable them to adapt.

Artificial intelligence is already being adopted across an increasingly large range of cognitive tasks prevalent in higher-skill occupations, for example in writing legal contracts, producing software code, and generating marketing content (Singla et al., 2025). Breakthroughs in generative AI continue to rapidly expand machine capabilities, with each iteration becoming more general, adaptable to new tasks, and deployed faster into real-world use. There is considerable speculation about the impact this will have on jobs. Over the medium term, increases in the scale, scope and complexity of tasks that AI can perform may accelerate 'occupational upgrading', with job growth increasingly concentrated in higher-skilled, mid- and senior-level professional jobs, particularly in AI-related roles. Headcount reductions may also become commonplace in many mid- and low-skilled occupations, for example, service operations and supply chain management jobs (see Singla et al., 2025 for predictions). Entry-level positions may also be increasingly eliminated in occupations where large language models can perform junior-level tasks. There are some indications this is already happening. In the USA, the share of openings requiring fewer than three years of experience is declining in many fields, whilst the relative demand for senior talent is growing (Levanon et al., 2025). Artificial intelligence may also be accelerating an existing trend towards young workers starting further down the career ladder than they used to and progressing more slowly after that point (Blundell et al., 2020).

Notable commentators have suggested that, by the end of the decade, AI may not only understand, learn and apply knowledge across a wide range of tasks as well as (or better than) a human, but it may also manage and deliver end-to-end outputs with minimal human input (e.g., Kondo, 2025; Kaput, 2025; Pillay, 2025; Edwards, 2025; Rose, 2025). Alternatively, the effects of further breakthroughs in AI could be restrained by data and computational limitations (Thompson et al., 2022), or economic and political bottlenecks in adoption due to concerns about costs, interpretability, trust, and alignment with human values (Übellacker, 2025; Ahn et al., 2021; Choung, David and Ross, 2022). The long-term effects of AI are impossible to predict with any certainty. For now, recent labour market data (shown in Annex 1) suggests that occupational upgrading is accelerating and skills requirements are changing, with higher-order, human centric skills, such as communicating and collaborating with colleagues and customers, thinking creatively and making complex decisions (which complement the technology that will be adopted in the labour market) becoming increasingly vital.

Labour market change is expected to exacerbate inequalities as well as hold back economic growth. A national response is needed, focused on building a system of lifelong learning.

This section has outlined challenges which will affect groups differently:

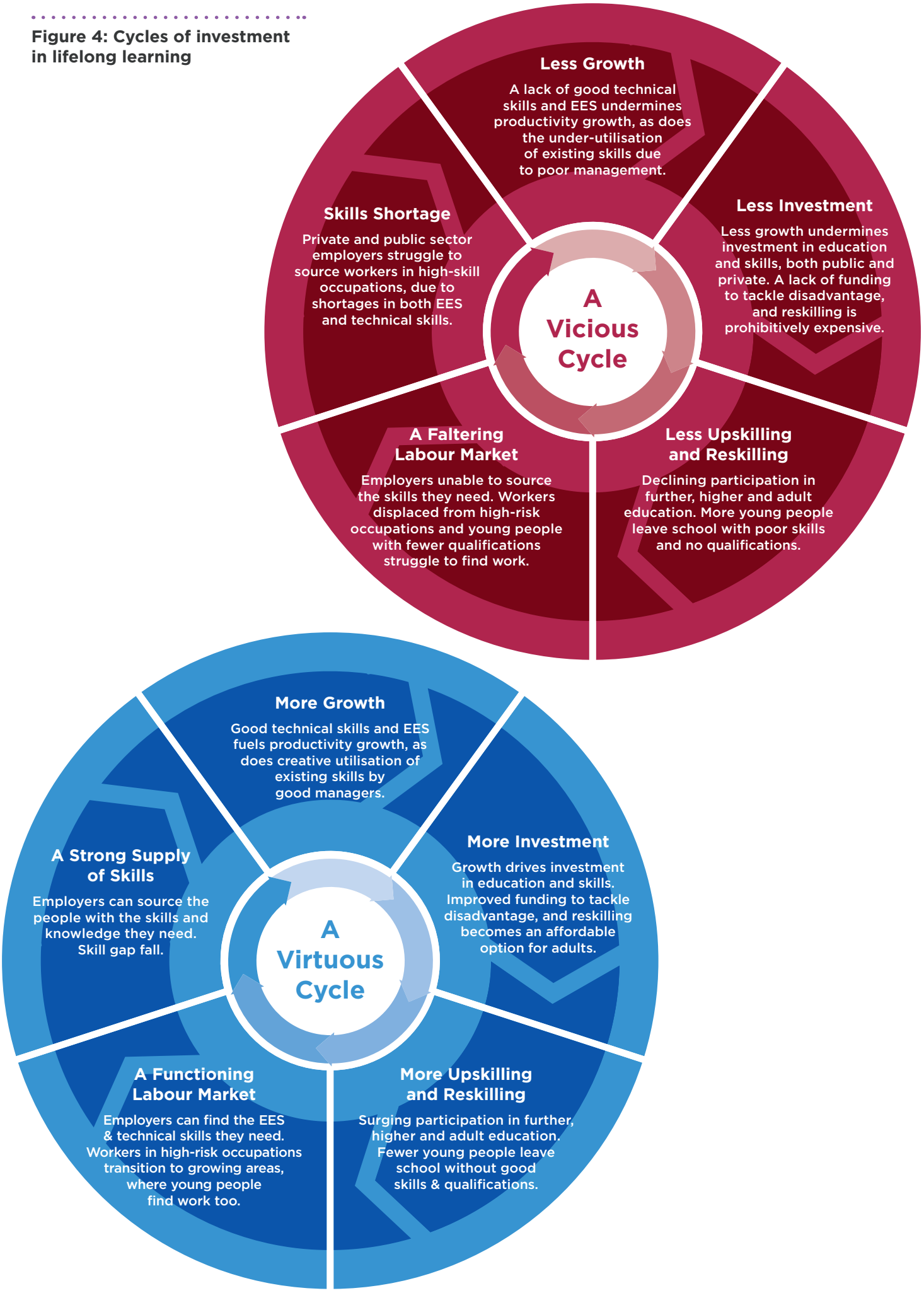
1. Young people need to leave education with the qualifications and EES required to enter increasingly competitive entry-level roles and work in higher-skilled jobs.
2. Many people working in lower-skilled, high-risk occupations are likely to be displaced from those jobs over the next decade. They will need to upgrade their qualifications and EES to change careers and stay in work.
3. Workers in higher-skilled occupations are likely to thrive in growing areas of the economy, but they will also need to upgrade their skills, particularly their EES, to ensure technology augments - rather than replaces - their roles.

Without action, there are likely to be many negative consequences. Social and economic inequalities are likely to widen. Gaps in income between people from lower-income households (who are more likely to have low-skill jobs) and their more advantaged peers (who are more likely to have high-skilled jobs) are likely to grow. The divide in lifetime earnings between young people from more advantaged backgrounds and their less-advantaged peers is likely to increase. Even highly-qualified and skilled young people could find themselves competing for fewer entry-level roles. Economic growth will be constrained, unless employers can secure sufficient numbers of higher-skilled workers to fill increasing numbers of jobs in professional and associate professional occupations.

A national response is needed to build a system of lifelong learning that bridges the divide between the skills needs of growth occupations and the skills of those most vulnerable in the labour market. This will help set the country on a virtuous cycle of skill development and growth rather than a vicious cycle of decline (Figure 4).

This section has established why a national mission to establish a system of lifelong learning is needed to meet present and emerging challenges in the UK labour market. In the remainder of this report, we suggest what this mission needs to include across four life stages: birth to five, the school years, education to employment, and adulthood.

Figure 4: Cycles of investment in lifelong learning



Lifelong Learning Stage 1

Birth to Five

- **Substantial inequalities in children's behavioural and cognitive skills are evident very early in life.**
- **Skills development is highly cumulative. Inequalities grow over time if not tackled.**
- **Addressing inequalities in children's early development is likely to be a more effective strategy than tackling them later in childhood.**

The policy response should:

- **Expand family support for young families and ensure this support effectively targets areas and households that are disadvantaged.**
- **Support disadvantaged families to access high-quality early childhood education and care (ECEC) settings, ensuring their children benefit most from expansions in childcare.**
- **Tackle challenges in the early years workforce - including pay, qualifications and continuing professional development (CPD), to ensure all children can benefit from high-quality ECEC.**

Introduction

Meeting future skills needs begins with children's early years. Children's early development plays an important role in determining their cognitive and behavioural skills at the end of childhood. This influences their progression through tertiary education and the skills they have when looking to enter work, and therefore their ability to enter growth occupations, either at the point of entry or in future.

In this section, we summarise evidence on the factors most closely associated with children's behavioural and cognitive development in the early years. We also outline changes that would better support their development. We refer to children's cognitive and behavioural outcomes because these are the outcomes measured in our data (see Working Paper 6 Technical Report for more details). We see these outcomes as closely aligned with Essential Employment Skills (EES) in early adulthood.

Evidence Overview

Home and Family

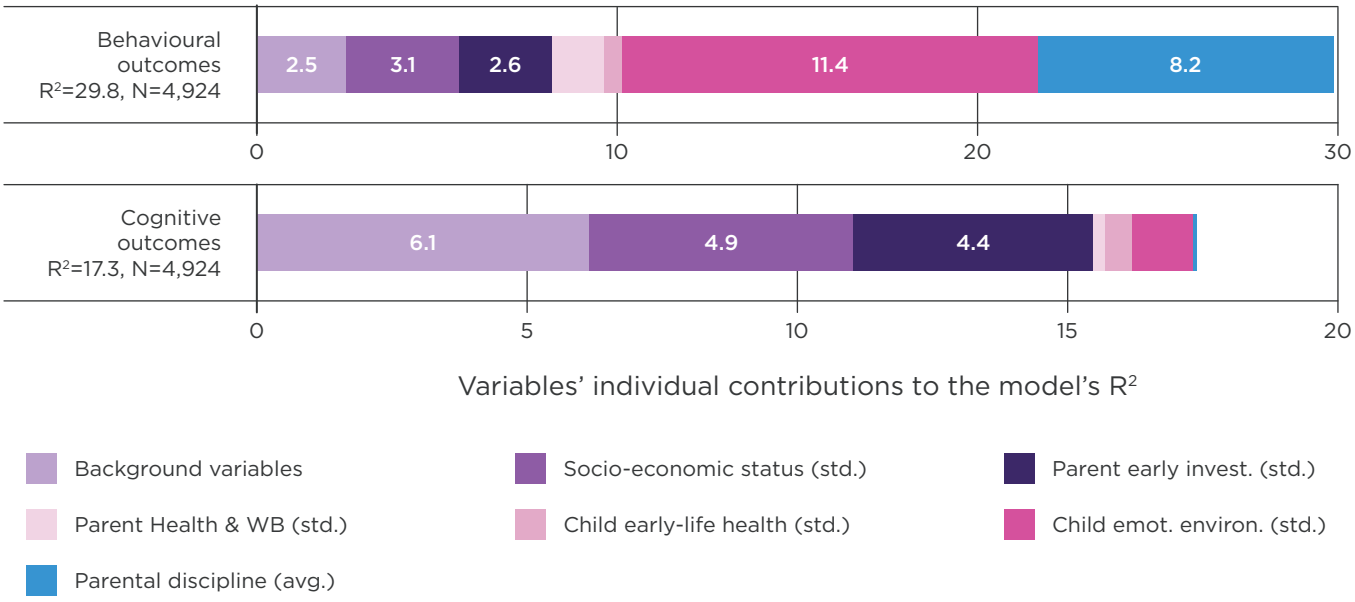
Children's material, emotional and educational environments at home explain nearly 30 per cent of the variation in their behavioural outcomes and over 10 per cent of the variation in their cognitive outcomes at age three/four (Bocock, Del Pozo Segura and Hillary, 2025b). This is shown in Figure 5, which shows how much of the variation in outcomes at age three/four is explained by factors measured in the data. Taken together, these factors explain nearly a third of the variation in behavioural outcomes and a sixth of the variation in cognitive outcomes.

The effects of these differences in early development are enduring and persistent - around a fifth of the variation in children's behavioural and cognitive outcomes at age seven/eight is explained by differences in these outcomes at age three/four. This is likely to be because differences in children's family backgrounds affect their attitudes to school, perceptions of academic ability, occupational aspirations and peer behaviour (The Sutton Trust, 2018, 2019; Wu et al., 2021). This reinforces the case for intervening at an early age to support children at risk of falling behind.

Our results suggest that tackling socio-economic deprivation and supporting parents to nurture their children's early development at home may have the biggest effect on early cognitive outcomes, whereas influencing children's emotional environment and parents' use of discipline may have a greater impact on their behavioural development (Bocock, Del Pozo Segura and Hillary, 2025b).

Overall, substantial increases in children's cognitive and behavioural outcomes are likely to require a holistic package of policies that can successfully affect a range of factors related to their home and learning environments over a sustained period. However, microeconomic simulations produced earlier in this programme suggest that, of all the areas we looked at, targeted family support and services for disadvantaged families and their children in the early years are likely to be most impactful (Bocock, Del Pozo Segura and Hillary, 2025b).

Figure 5: Estimated impact of children's home environment on behavioural and cognitive outcomes at age 3/4



Note: Behavioural outcomes are based on the reverse of children's scores from the Strengths and Differences (SDQ) Questionnaire, which is a behavioural screening tool used to assess the emotional and behavioural needs of children. A lower score indicates greater behavioural difficulties. R-squared indicates the proportion of the total sample variation in the dependent variable that is explained by the independent variables in our model. The model includes background variables (sex, age, ethnicity, and English as additional language) and home background variables. All the variables in the regression have been standardized, so that they have a zero mean and a unit standard deviation. WB refers to "wellbeing". Value labels for sets of variables with contributions lower than 2 have been omitted.

Source: University of London, Institute for Education, Centre for Longitudinal Studies (2022-23). Millennium Cohort Study Sweeps 1-2.

Family Support

By expanding access to effective family support programmes, government can help equip more families with the resources and techniques that have been shown to positively impact on children's development.

There are many examples of robustly evaluated family support programmes that have had a positive impact on disadvantaged children's development. These include approaches that support and improve parents' health behaviours, children's school readiness, and parents' interactions with their children or children's behaviour once they have started school (e.g., Nowak and Heinrichs, 2008; Day et al., 2012; Conti et al., 2021; Jeong et al., 2021; Robling et al., 2021).

In recent years, evidence of the impact of the Sure Start[5] programme has been mounting. Sure Start improved children's home environments and emotional development in the short term (Melhuish, Belsky and Leyland, 2010). This fed through into improvements in longer-term outcomes, including in children's GCSE results (particularly for disadvantaged children), hospitalisations and socio-emotional outcomes (particularly children's internalising behaviours such as anxiety or depression), and their self-reported mental health (Carneiro et al., 2025). These outcomes are likely to relate to young people's EES development and present a strong case for expanding access to family support programmes to aid children's early skill development.

Early Childhood Education and Care (ECEC)

Beyond the home, supporting disadvantaged children to access high-quality ECEC can help compensate for inequalities in children's material, emotional and educational environments at home. Attending ECEC settings with a high-quality workforce and standard of provision has a positive impact on children's early base of skills, and this can be particularly beneficial

5 *The Sure Start programme started in 1999 and was originally aimed at early intervention for under four-year-olds in disadvantaged areas, focusing on outreach services, support for families, play, primary healthcare and support for those with special needs, as well as provision focused on local needs (Bate and Foster, 2017). The aims and structure of the Sure Start programme changed over time. Most of the evaluation results referred to here refer to children who would have come into contact with the programme before 2010.*

for children from low-income families who may be behind in areas of their social, behavioural and/or language development (Brown et al., 2023). Our research has found that countries with a high-quality ECEC workforce typically use three key approaches to raise the quality of their workforce: raising initial qualification requirements, improving salaries, and ongoing professional development (Lucas et al., 2025). Increasing staff to child ratios is also associated with better-quality provision within ECEC settings (Brown et al., 2023).

Children from more affluent families are likely to be able to access more or higher-quality ECEC provision than their peers from disadvantaged families (Balladares and Kankaraš, 2020). A key policy focus should be on targeting high-quality ECEC provision towards disadvantaged children and their families to support those children's skill development.

Background Factors

Differences in children's socio-economic backgrounds help explain differences in their cognitive and behavioural development. The effects of socio-economic status on children's cognitive and behavioural outcomes at age three/four and age seven/eight remain significant after controlling for differences in a range of emotional and educational factors, suggesting there are other mechanisms through which socio-economic status is influencing these outcomes. If socio-economic inequalities worsen in the future, this is likely to have a knock-on effect on inequalities in children's developmental outcomes.

Interventions for Lifelong Learning Stage 1: Birth to Five

Our research identifies two main ways of tackling the effects of inequalities in children's early home environments on their skills development between birth and age five:

Improving family support for disadvantaged families.

Supporting children from disadvantaged households to access high-quality ECEC settings, to help compensate for inequalities in home provision.

Family support for disadvantaged families

During the early 2000s, over 500 Sure Start Local Programmes were established, targeting families in low-income communities and delivering integrated family support services. This included antenatal home visits and parental health workshops along with early literacy playgroups aimed at boosting school readiness. Initiatives introduced later, like the Family Nurse Partnership, which provided intensive coaching on maternal nutrition and child development, were also initially targeted at families in disadvantaged communities, as were parenting programmes which improved parent-child interaction and supported children's behavioural development.

However, changes in the later 2000s diluted the focus on disadvantage and, after 2010, successive budget cuts led to the closure or scaling back of hundreds of Sure Start Centres and the decommissioning of many targeted family support interventions (Carneiro et al., 2025). Between 2010 and 2022, around one in three Sure Start Children's Centres in England closed or reduced their services, and overall spending on family services dropped by around three quarters (Ibid). As a result, the availability of early years health promotion services, school readiness activities, and evidence-based parenting courses dwindled, as did the focus of remaining services on disadvantaged families. This has left these families with far fewer opportunities for preventative help and support in nurturing their children's early cognitive and behavioural development.

In July 2025, the government set out (in 'Giving every child the best start in life') the first steps to reversing this trend, as part of 'a decade of renewal… laying the foundations for further reform' (DfE, 2025b). This includes a commitment of £500 million over three years to create and run up to 1,000 Family Hubs offering integrated, holistic early parenting and family support. These will increase access to family services and support for disadvantaged families and reflect a clear change of direction. However, the number of Best Start Family Hubs will be lower than Sure Start at its peak in 2010, when it cost £2.5 billion annually, operated around 3,600 centres and received roughly a third of all spending on services for underfives (Carneiro, Cattan and Ridpath, 2024).

Government should consider what more it can do to expand family support for young families. This could involve committing to an ambition to gradually scale up Family Hub funding to at least £1 billion annually by 2028.

A smaller budget makes it vital to effectively target funding towards disadvantaged families. Best Start Family Hubs will be 'located in areas of disadvantage', but there is no suggestion that funding allocations will be restricted to the most disadvantaged communities. By contrast, Sure Start Local Programmes targeted the top 20 per cent most deprived wards to select areas eligible for funding.

Given funding limitations, the government should consider what more it can do to ensure family support effectively targets areas and households that are disadvantaged. For example, DfE could:

- **Allocate a greater share of Family Hub funding based on area-level deprivation.**
- **Require local authorities to demonstrate how their services are targeting the most disadvantaged communities within their area, and report on child development and health outcomes by deprivation quintile, with future funding uplifts tied to performance.**
- **Designate 'enhanced' Family Hubs in disadvantaged communities that offer a greater range of walk-in, home visiting and outreach family support services.**

Disadvantaged families' access to high-quality ECEC settings

At present, uneven access to high-quality ECEC is contributing to inequalities in children's early development. This feeds through into inequalities between young people from different socio-economic backgrounds in their later outcomes, and the rates at which they progress into growth occupations. Recent evidence indicates that, whilst 63 per cent of children between birth and age four in England receive some form of 'formal childcare', usage is significantly greater in the least deprived areas of England (75 per cent) compared to the most deprived (56 per cent) (DfE, 2024). The ECEC participation gap in England is also notably larger than the OECD average (OECD, 2024).

Over the past decade, the large increase in total entitlements funding has been driven by expansion in the free childcare working parents can access, whilst funding allocated for the disadvantage entitlement and universal offer has fallen in real terms (NAO, 2020). The expansion of funded childcare entitlements for working parents has also eroded local authorities' ability to engage the most disadvantaged families and subsidise places in high-quality settings. Some local authorities have reported a decline in, or removal of, additional free hours that had previously been allocated specifically for disadvantaged children, as they have struggled to deliver the 30-hour entitlement, which doubled the free hours for working parents of three- to four-year-olds from 2017 (Treasury Select Committee, 2018). Families on means-tested benefits who once qualified automatically for free ECEC places are now increasingly crowded out by middle- and higher-income families who are eligible for expanded childcare entitlements (Drayton and Farquharson, 2023). The transition to Universal Credit, a squeeze on generosity in the benefits system, and a cash-terms freeze on income thresholds for eligibility for the two-year-old offer have all meant that a smaller proportion of disadvantaged families are now eligible for targeted, free ECEC places (Farquharson, 2023). The two-year-old offer[6] covered 40 per cent of children when it was introduced in 2015 but, by 2022, just a quarter of children were eligible (Drayton and Farquharson, 2023). Whilst the expansion of childcare entitlements for working parents will benefit over half of parents with a child between the age of nine months and two years, those in the bottom 30 per cent of the income distribution will experience almost no benefit (ibid).

The incentives for high-quality ECEC settings to prioritise access for disadvantaged children have also reduced over time. The value of the main incentive - the Early Years Pupil Premium (EYPP) - remained flat between 2017/18 and 2021/22, amounting to a drop of around 10 per cent in real terms. Whilst the annual EYPP funding rate will rise considerably in 25/26 from £388 to £570, this will only restore EYPP to its 2017/18 value in real terms (Drayton and Farquharson, 2025). The government has committed to 'provide additional funding to extend EYPP in areas most in need' (DfE, 2025b), but it is not yet clear whether this refers to increasing the rate, eligibility, or scope of the EYPP; which areas will receive this additional funding; or how much additional funding is being allocated to this extension. Evidence also suggests that the logistical and administrative complexity of verifying disadvantage for 'top-up' payments discourages providers from reserving places for lower-income children (House of Commons Education Committee, 2023).

6 *The two-year-old offer entitles parents to 15 hours per week of free ECEC and is means tested, targeting disadvantaged children and those with additional needs. It is additional to the universal entitlement.*

The result is a gradual erosion of the focus of ECEC funding on improving disadvantaged families' access to high-quality ECEC settings.

The government should support disadvantaged families to access high-quality early childhood education and care (ECEC) settings, ensuring their children benefit most from expansions in childcare, including by:

- **Increasing eligibility for the two-year-old offer[6], which targets additional free early education and childcare towards disadvantaged children.**
- **Extending the eligibility to 30 hours of free childcare for children aged nine months to four years to the poorest families, including parents that are not working but can demonstrate that they are trying to get back into work.**
- **Committing to above-inflation increases in the EYPP and increasing the proportion of the early years national funding formula that is based on deprivation.**

Beyond funding, building a high-quality workforce in the early years sector is key to underpinning a high standard of ECEC provision for young children, particularly children from disadvantaged backgrounds. Whilst the early years workforce has grown substantially in recent years (as provision has ramped up), many providers still face significant staffing, recruitment and retention challenges whilst pay remains much lower than other sectors, even for similar workers (Flemons and Worth, 2025). More highly-qualified early years educators are associated with better child outcomes, particularly amongst children from low-income families (Brown et al., 2023). Indeed, some of the high-performing countries we considered as part of this research require early years educators to be relatively highly qualified. In Estonia, ECEC teachers must hold a bachelor's degree (Level 6) (OECD, 2020), whilst in Canada they are typically required to be fully qualified kindergarten teachers or qualified early childhood educators, most of whom have completed a two-year college programme (Employment and Social Development Canada, 2021). By contrast, in England, just over 40 per cent of school-based staff have a degree (Level 6), but substantially fewer staff in non-school based settings, which make up the bulk of the sector, have a degree (Flemons and Worth, 2025).

The government has responded to some of these workforce challenges. It has increased hourly funding rates, which might enable more providers to offer competitive pay to recruit and retain staff. Its new early years strategy has outlined a set of policies to improve skills and qualifications across the workforce.

To build on this, government should set out further steps to tackle challenges in the early years workforce, which include pay, qualifications and CPD. This should include:

- **Continuing to increase funding rates and implement a pay structure that rewards higher qualifications and career progression.**
- **Implementing its policy proposals to swiftly upskill the workforce.**

The measures outlined in this section would give more children a solid early base of skills in the early years, laying the foundations for their development thereafter. Skills development is highly cumulative and inequalities become more entrenched as children get older. Setting more young people on a path towards high-skilled growth occupations starts in the early years.

Lifelong Learning Stage 2

School Years

As children grow, so do the gaps in their skills. England has made little progress in addressing inequalities at the end of childhood.

Socio-emotional skills among 15- to 16-year-olds are weaker than in almost every comparable OECD country and there is a relatively high level of inequality in these skills.

Employers feel that young people leave education without the Essential Employment Skills (EES) to thrive in the workplace. There is wide variability in the emphasis that schools and colleges place on the development of these skills, as well as concerns that policy makers do not consider EES important.

The policy response should:

Acknowledge EES as a vital part of education - for both life and work - and clearly articulate how EES can be effectively developed as part of teaching a knowledge-rich curriculum.

Promote a common skills framework and tools that educators can use to assess children's progress. Government could start by evaluating existing frameworks which are already commonly used, such as the Skills Builder Universal Framework.

Build training on how to develop EES into the Initial Teacher Training and Early Career Framework as well as wider teacher professional development.

Expand disadvantaged children's access to extra-curricular activities and introduce appropriate funding and expectations for enrichment activities which explicitly and deliberately build EES.

Increase the share of education funding that is targeted towards disadvantaged pupils and lower-performing schools, to counteract inequalities which otherwise widen as young people progress through the school years and post-16 education system.

Invest in further research to develop valid and reliable measures of EES as well as integrating them into international comparative assessments, cohort studies and evaluations, to help build an even richer understanding of the development of EES.

Investigate how 'high-performing' countries embed EES into teaching and the curriculum.

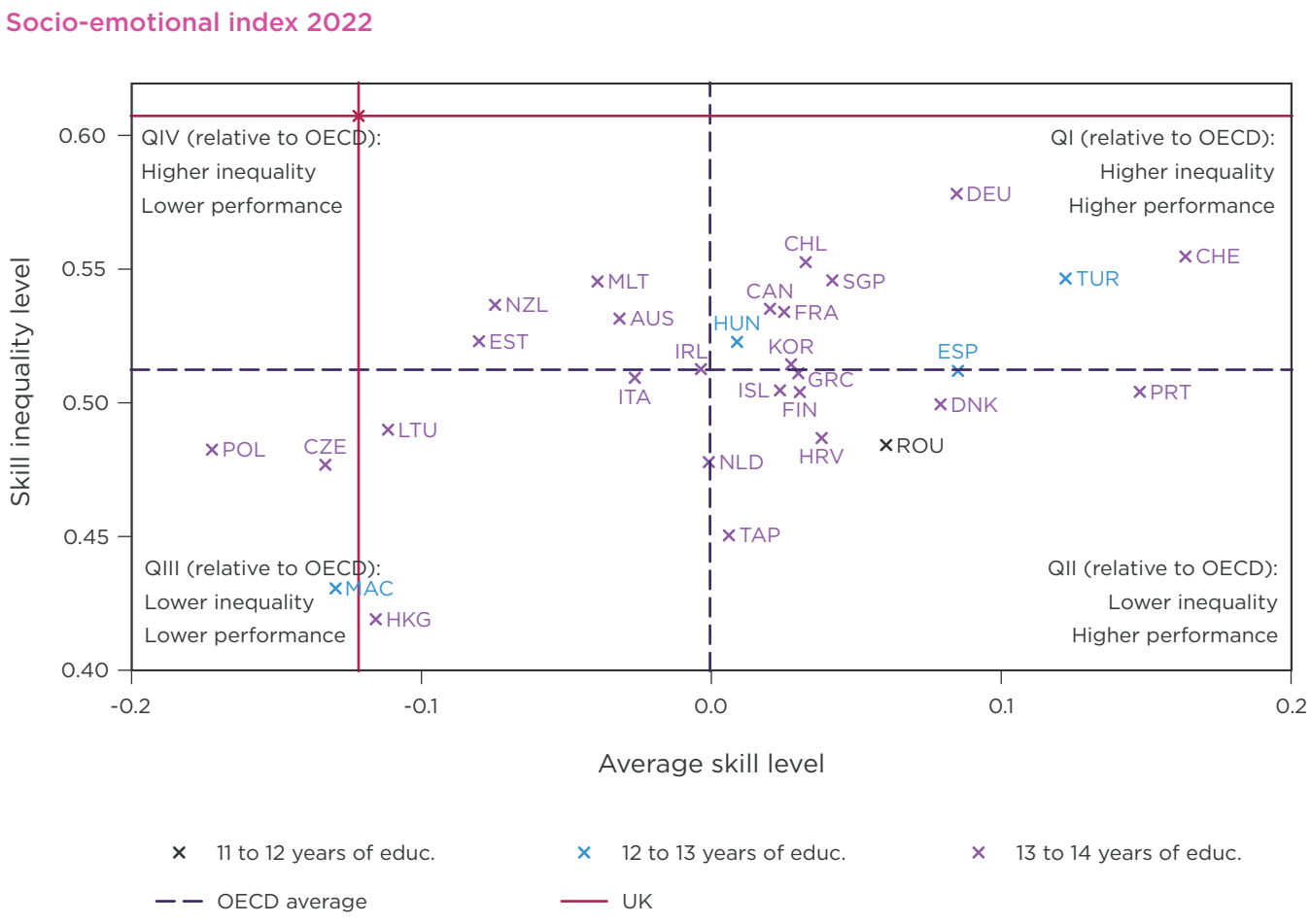
Introduction

Young people's base of EES and qualifications at the end of secondary school influence their subsequent progression through the education system and into the labour market.

The attainment gap between disadvantaged students and their more advantaged peers is already well documented - it emerges early and widens through secondary school, with the attainment gap at age 16 significantly larger than at the end of primary school. This reflects cumulative inequalities in access to support, resources and learning opportunities (e.g., Jiménez et al., 2025). The same is true of young people's socio-emotional and other cognitive skills, which are aligned to their EES in adulthood (Bocock, Del Pozo Segura and Hillary, 2025a). Differences in children's material, emotional and educational environments at home continue to widen skills inequalities through the school years, as does variability in school quality. By the age of 15/16, inequalities in children's reading, maths and science skills are above the OECD average and inequalities in young people's socio-emotional skills[7] are higher than any other country, according to data from the Programme for International Student Assessment (PISA) 2022 (Lucas et al., 2025), as shown in Figure 6. This means that many young people, particularly those from poorer families and lower-performing schools, leave secondary education with low GCSE attainment and a low base of skills, setting them on a path towards declining high-risk occupations (or ending up not in education, training or employment (NEET)).

Our research suggests a greater focus is needed on ensuring that all young people leave secondary school with a strong base of EES as well as qualifications.

Figure 6: The average level of, and inequality in, socio-emotional scores for pupils age 15/16 in PISA 2022, by country



Source: NFER analysis of data from the Programme for International Student Assessment (PISA) 2022.

7 *Based on an index derived from measures in PISA 2022 of young people's curiosity, persistence, emotional control, stress resistance, assertiveness, empathy and co-operation.*

Evidence Overview

Home and Family

Home and family factors continue to play an important role in children's skill development as they get older. In our research, young people developed fewer behavioural difficulties and had better cognitive outcomes at age 17 when they were from better-off and more emotionally stable backgrounds. They also engaged in more extra-curricular activities and were absent from school less frequently. Children's socio-economic status (SES) remained a significant predictor of their development throughout the school years even after controlling for earlier differences in their outcomes (Bocock, Del Pozo Segura and Hillary, 2025b).

Schools

Our research with curriculum leaders (see Annex 2) shows wide variation in how schools approach EES development. Some integrate EES across the curriculum, others use discrete programmes or equate them with enrichment, oracy, or careers education, while some assume these skills develop 'naturally'. Some school curriculum leaders explained that their approaches often reflect students' needs: schools with disadvantaged intakes place greater emphasis on EES, whereas schools with more advantaged intakes rely on out-of-school opportunities. Differences also appear to stem from how leaders conceptualise EES — as skills to be developed through subjects, character virtues to be woven into the school's ethos and language but 'taught in a very different way', or attributes to be developed discretely outside subject curricula — highlighting the lack of a consistent approach.

Our research on high-performing education systems suggests the countries with the strongest socio-emotional skill levels at age 15/16 make the development of these skills an explicit priority. In Switzerland (labelled 'CHE' in Figure 6), socio-emotional skills are explicitly covered in the curriculum frameworks for each language region and there are national guidelines for the assessment of these skills (OECD, 2023). Curriculum 21, which is a framework that has been implemented across the German-speaking cantons (which make up the majority of Swiss cantons), outlines the socio-emotional competencies that schools should seek to develop in pupils, such as persistence, emotion identification and regulation, and self-reflection (Lehrplan21, 2016). Similarly, in Portugal, guidelines for the progression and development of socio-emotional skills have been published to support schools (Figueira et al., 2021). By contrast, in England, some school curriculum leaders feel that EES have been 'squeezed out' of the national curriculum due to curriculum overload, limiting opportunities to help students integrate subject knowledge with more general thinking and socio-emotional skills that enable them to perform tasks which require planning, organising, problem solving and collaboration.

Beyond School

Engaging more frequently in extra-curricular activities - such as exercise, music and volunteering - is also associated with better behavioural and cognitive development between the ages of seven/eight and 16/17 (Bocock, Del Pozo Segura and Hillary, 2025a). Wider literature also shows there is a direct link between household income and participation in extra-curricular activities, with children from poorer backgrounds participating in fewer extra-curricular activities and less frequently (Donnelly et al., 2019; Robinson, 2024). Whilst we cannot completely rule out the possibility that young people with better behavioural and cognitive development are more likely to engage in these activities, the data suggests that more equitable access to extra-curricular activities is likely to put more young people from disadvantaged backgrounds in a better position to develop high levels of EES.

Interventions for Lifelong Learning Stage 2: School Years

From our research, we identify three main ways of supporting more young people's development of skills and qualifications:

Ensuring that all young people leave secondary school with a strong base of EES, particularly young people from disadvantaged backgrounds.

Supporting more disadvantaged young people to access enrichment activities more frequently.

Supporting lower-performing schools.

Ensuring that all young people leave secondary school with a strong base of EES

Based on research insights from earlier in this programme and more recent qualitative research with school curriculum leaders (see Annex 2), we identify policy and practice recommendations for supporting young people's EES development across five areas: (i) curriculum intent and implementation, (ii) assessment, (iii) careers education, (iv) workforce, and (v) enrichment. Allocate a greater share of Family Hub funding based on area-level deprivation.

(i) Curriculum intent and implementation

In the focus groups we ran, school curriculum leaders frequently complained that curriculum overload prevented their school from placing greater emphasis on supporting students to combine subject-specific knowledge with general thinking and socio-emotional skills and apply them to "practical real-world scenarios, problems and projects". Most school curriculum leaders said or implied that they understood the critical importance of disciplinary knowledge in laying the foundations for the development of transferable skills, but they also thought these skills needed to be consciously developed by educators and effortfully learned through the application of knowledge to situations which required young people to plan, organise, problem solve, gather and use information, and communicate and collaborate with others. Most school curriculum leaders felt the national curriculum lacked an ambition for young people to be able to do this.

For example, one leader captured the general sentiment:

> ***"We need to ask, 'what do we want our students to leave us with at 16 or 18?' 'What skills do they need for the world of work and how do we measure that?' Because at the moment there isn't enough focus on it [EES]...Schools are exam factories...you might have other things that you say you want to do, but ultimately, we are judged against our results. Yes, there is your moral purpose...but deep down, if it's not in the curriculum and assessed then it becomes less important."***

Therefore, as part of its response to the Curriculum and Assessment Review the government should acknowledge EES as a vital part of education. It should clearly articulate how EES can be effectively developed as part of teaching a knowledge-rich curriculum, with the ambition being that young people can combine domain-specific knowledge with skills to plan, organise, problem solve, think critically and creatively, and communicate and collaborate effectively with others. Whilst the Curriculum and Assessment Review lays out an ambition for embedding oracy in learning (Curriculum and Assessment Review, 2025), other EES should also be emphasised as well.

School curriculum leaders also want guidance on how to develop their students' EES, and how to monitor students' progress and evaluate the impact of their initiatives (see Annex 2). Therefore, government should promote a common skills framework and tools that educators can use to assess children's progress.

There are existing skills frameworks to draw from, both in the UK – for example, the Skills Builder Universal Framework - and abroad. For example, in Australia, 'general capabilities' are mapped throughout the curriculum explaining their links to subjects (Australian Curriculum, 2025), and in the Netherlands, a framework with nine transferable competencies is being woven into all subject areas as part of the 'Platform Education 2032' curriculum reforms (Platform for Education 2032, 2016).

We recommend that:

EES should be mapped throughout the curriculum in a way that supports clarity and consistency for educators about how students should be able to develop knowledge within each subject that draws on, and develops, their EES.

Schools themselves can support their students to develop their EES by:

- **Making EES a core part of their ethos, culture and the language used by leaders, educators and students.**
- **Encouraging their teachers to look across their curriculum and identify opportunities where EES can be developed further as part of the curriculum.**

(ii) Assessment

Essential Employment Skills are not routinely assessed in schools, and leaders have concerns about how to reliably measure these skills and what level of each skill students should be able to demonstrate at different ages (see Annex 2).

We recommend:

- **Schools should be given guidance, tools and training on how to formatively assess young people's development of EES.**
- **Government should invest in research to explore different approaches to assessing students' EES (alongside their knowledge and domain-specific skills).**

(iii) Careers education

As part of current statutory careers guidance, the Department for Education (DfE) already encourages schools (and colleges) to integrate the essential skills in fhe Skills Builder Partnership's Universal Framework into their careers provision (DfE, 2025a). The Careers and Enterprise Company (CEC) has also integrated 'essential skills' into its Future Skills Questionnaire for learners and Employer Standards (Healey, 2024).

To go further, we recommend that:

- **DfE should expand on current statutory careers guidance, encouraging all schools to shape work experience and employer encounters around a common skills framework. This could build on schools and colleges' self-evaluation against the Gatsby Benchmarks and involve promoting curriculum resources made available by the Careers and Enterprise Company (CEC), as well as the CEC's Compass+ tool for self-evaluation against national standards, as proposed by the Skills Builder Partnership (Chan and Ravenscroft, 2024).**
- **DfE should encourage employers to use the same common skills framework to inform the design and delivery of work experience and placements, and the CEC should integrate this framework into standards for careers leader training.**

(iv) Workforce

Staff will need training and guidance on how to most effectively develop EES. We recommend that government build training on how to develop EES into the Initial Teacher Training and Early Career Framework, as well as wider teacher development.

(v) Enrichment

Enrichment refers to a broad range of activities and experiences that support young people's social, personal and educational development. These activities help young people to develop EES, particularly socio-emotional skills like collaboration and communication (e.g., Donnelly et al., 2019). However, evidence suggests that students from lower-income households, those with lower prior attainment, and those with poorer health and special educational needs or disabilities are less likely to participate (Donnelly et al., 2019; Robinson, 2024).

Government has recently announced £22.5 million to boost extra-curricular clubs in schools (Chantler-Hicks, 2025), which is welcome but unlikely to be sufficient to fund a universal 'enrichment guarantee'[8]. Limited resources increase the need to effectively target the new investment at the most disadvantaged children. This could be done via a national extra-curricular bursary scheme targeted at disadvantaged families, as advocated by the Social Mobility Commission (Donnelly et al., 2019), or by weighting funding towards schools with disadvantaged intakes, as advocated by a partnership led by the National Centre for Social Research (Chanfreau et al., 2016). Major et al. (2024) have made similar recommendations. We recommend that government should expand disadvantaged children's access to extra-curricular activities. DfE announced earlier this year (March 2025) its intention to develop an 'Enrichment Framework', providing advice for schools on how to plan a high-quality enrichment offer.

To go further, the DfE could:

Clarify the expectations for enrichment activities in schools, placing emphasis on widening disadvantaged children's access to these activities. This could be done by introducing clear expectations and benchmarks for enrichment activities.

Increase funding for enrichment programmes which explicitly build EES, particularly for disadvantaged children, to spread access to these programmes more evenly.

Supporting lower-performing schools to improve

Differences in school performance contribute to skills inequalities (Bocock, Del Pozo Segura and Hillary, 2025a). Greater support for lower-performing schools can help set more young people on a path towards leaving education with the skills and qualifications required to progress into growth occupations. It is crucial that government and other research funders invest in robust, long-term evaluations of the effects of school improvement programmes and packages of support.

The government should also increase the share of education funding that is targeted towards disadvantaged pupils and lower-performing schools, to counteract inequalities which otherwise widen as young people progress through school and post-16 education.

Research by NFER shows that England's school system is also facing a substantial challenge in ensuring there are sufficient numbers of teachers employed in secondary schools, with lower-performing schools facing more acute shortages (McLean, Worth and Smith, 2024). Schools with high numbers of disadvantaged pupils typically have more inexperienced teachers, fewer teachers with a specialist degree in a STEM subject and higher turnover and absence rates (Cardim-Dias, Jiménez and Zuccollo, 2025). A range of policies are required to address these challenges, including action on pay, flexible working, and workload reduction, and increased access to high-quality professional development for teachers in schools serving disadvantaged communities.

8 *A partnership involving the Duke of Edinburgh's Award suggested a guarantee providing a minimum number of hours of enrichment to all pupils every year might cost £150m-£180m (Hallgarten et al., 2025).*

Lifelong Learning Stage 3

Education to Employment

- Anticipated changes in the labour market present opportunities for young people who are highly skilled and qualified, but they also carry threats for young people who have low skills (particularly Essential Employment Skills, EES) and low-level qualifications.
- Most employers believe young people tend to leave education lacking in (EES).
- Growing professional occupations rely particularly heavily on a graduate workforce, but degree level participation rates have plateaued in recent years and high-quality alternative routes into professional jobs do not exist at scale.
- The post-16 education system also results in employment outcomes being structured along socio-economic lines, with differences in young people's aspirations and expectations influencing their choices of post-16 qualifications, and students from richer families tending to dominate the best progression routes and the courses that yield the highest earnings returns.

Solutions include:

- Ensuring that national frameworks and incentives create closer cooperation between educators, government and employers, including appropriate levels of engagement with groups representing young people's interests.
- Exploring the additional incentives or changes to funding and accountability measures that might be introduced to encourage, recognise and reward efforts by post-16 providers and universities to develop their students' EES and support successful pathways into employment or further study.
- Evaluating ways of assessing EES that education providers can use to monitor and address student gaps and learning needs.
- Helping students to understand the importance of developing their EES and to articulate them using a common skills framework.
- Establishing and promoting a clear and coherent network of high-quality vocational and technical routes into professional jobs.
- Driving up participation rates in literacy and numeracy education beyond the age of 16.

Introduction

Today's young people face challenges in accessing growing high-skilled occupations. Many employers believe that young people leave education without the EES they are looking for. In a recent survey, 64 per cent indicated that young people often lack important social skills and 34 per cent said that they are not good communicators (Crowley, 2024).

Growing professional occupations often require Level 4+ qualifications to enter. In our Baseline employment projections, the proportion of the employed population in the UK with a Level 4+ qualification is projected to increase from 48 per cent in 2020 to 61 per cent by 2035 (Wilson et al., 2022). However, there is still a significant minority (nearly 30 per cent) of people with higher-level qualifications who are working in high-risk occupations which are projected to decline in future (McIntosh et al., 2025).

Finally, entry-level opportunities are declining, increasing the pressure on young people to demonstrate that they have sufficient breadth of skills and experiences to thrive in the workplace (Almeida, 2025; Bocock, Scott and Tang, 2025; Taggart, 2025).

Evidence Overview

Home and Family

Young people's home environments shape skill development through primary and secondary education (Boudon, 1974). Young people from different backgrounds also make different choices: those from poorer socio-economic backgrounds are less likely to follow pathways that lead to high-growth professional occupations. Choice differences account for a quarter to a third of variation in progression to Level 2, Level 3, A Levels and higher qualifications, after controlling for background characteristics such as prior attainment and socio-economic status (e.g., Social Mobility Commission, 2016). These effects differ across education systems (Jackson, 2013), and systems with more 'branching off' points and unevenly valued pathways tend to end up with education and employment outcomes structured along socio-economic (and ethnic and gender) lines. Aspirations and expectations heavily influence choices, and students from richer families dominate the best progression routes and the courses which yield the highest earnings returns (Jackson, 2013; Boudon, 1974). Government should ensure England's post-16 education and training system minimises the effects of socio-economic segregation into different post-16 tracks.

Structure of Post-16 Education

Earlier in this programme we reviewed cross-country comparative evidence which showed tracking pupils into academic and vocational pathways tends to magnify the effects of socio-economic status on pupils' outcomes, but that the impact of tracking depends on system design (Lucas et al., 2025). Systems with high participation rates in vocational education, common curricula elements, and open progression routes that allow students to easily switch between tracks partially offset the effects of tracking (Lucas et al., 2025). High-quality vocational tracks that attract students from all abilities and circumstances also reduce skills inequalities because peer effects support the development of lower achievers in the vocational track. Countries that direct a greater share of funding to vocational pathways also achieve greater 'parity of esteem' (Lucas et al., 2025). Austria illustrates this: about 70 per cent of each cohort take a vocational programme, with over half of these young adults starting apprenticeship training, and programmes are highly valued by employers and society (ibid).

Government reforms to raise the prestige of technical education have mainly focused on the introduction of T Levels and apprenticeship standards, but uptake remains low, delivery capacity limited, and employer engagement weak. Uptake of T Levels was less than three per cent of publicly-funded qualifications for 16- to 18-year olds in 2024/25, and colleges face challenges with staffing, specialist equipment, and delivery capacity. Apprenticeship starts have fallen and shifted away from young people in more disadvantaged areas, towards older, more

experienced employees in more advantaged areas (Cavalglia, McNally and Ventura, 2022). Weaker students are also more likely to withdraw before finishing their programme (NFER, forthcoming)[9]. The government's proposals to introduce new V Level qualifications could help to address this situation if designed and implemented effectively. Beyond these Level 3 qualifications, a major initiative to improve the quality, visibility and employer recognition of Higher Technical Qualifications (HTQs) (Levels 4 and 5) is underway, but will require significant time and investment to increase employer and learner awareness (IFF Research, 2023; Hingley et al., 2022). Without stronger coordination and sustained funding, higher technical vocational pathways are likely to remain nascent in England.

The government's new post-16 White Paper emphasises the importance of high-quality alternative pathways into growth occupations, particularly HTQs at Levels 4-5 (HM Government, 2025). Our case studies of high-performing education systems highlight examples of countries with well-established higher technical and vocational pathways. For example, Austria offers established post-secondary vocational education and training (VET) courses, which can be university-based or based in higher technical colleges, on to which students can progress after completing school-based programmes (Cedefop, 2022). By contrast, in England, higher vocational and technical qualifications have been overshadowed by a strong emphasis on traditional university degrees. In 2019, only 10 per cent of adults aged 18-65 held a Level 4-5 qualification as their highest achievement, compared with 20 per cent in Germany and 34 per cent in Canada (DfE, 2019).

In England, vocational/technical qualifications are often regarded as lower status than academic qualifications at the same levels (Social Mobility Commission, 2021). The divide between vocational/technical and academic pathways from Level 3 is especially sharp in England, with few curricula elements compulsory across all tracks; literacy and numeracy, for example, are not compulsory across all pathways, in contrast to most other OECD countries. Neither is the development of a common set of EES a compulsory requirement in England, whereas a growing number of other countries are embedding a set of 'transversal competencies' (similar to our EES) across tracks (Cedefop, 2025).

Preparing young people for work

Adults with higher levels of EES are much more likely to work in growing occupations (McIntosh et al., 2025). This is likely to be because workers in growth occupations utilise EES much more intensively and consequently develop these skills at a faster rate, and because young people who leave education with higher levels of EES are more attractive to employers in growth occupations. Employers are increasingly prioritising these skills (Mckend, 2024) but feel those leaving education lack critical thinking, adaptability, communication, and planning skills (CBI, 2024). Greater emphasis on developing young people's EES throughout the tertiary education system is needed.

Qualitative research with college curriculum leaders (see Annex 2) suggests colleges, in the same way as schools, vary widely in their approaches to developing EES. Some claim to have made EES or a similar set of 'character virtues' central to their college's ethos, whereas others treat them as peripheral or expect young people to develop them 'naturally' outside education. Some college leaders say EES are 'squeezed out' of syllabuses, and that colleges are left to 'play catch up' because these skills are not emphasised at school. It would be valuable to extend this research to explore whether similar challenges exist in higher education (HE) institutions, which were not represented in our qualitative research. By contrast, the countries with the highest average socio-emotional skill levels prioritise these skills in educational objectives and curriculum frameworks (Lucas et al., 2025).

Limits in the extent to which employers are able to engage with the education and skills system compound the problem. High-quality industry placements, including for T Level students, remain scarce, and employer engagement in vocational education is less systematic than in many other countries and heavily weighted towards larger employers (CBI/Pearson, 2017; OECD, 2025). The apprenticeship system has also drifted away from its original purpose of creating pathways into employment for young people towards a mechanism for upskilling existing employees. Meanwhile, sectors such as the technology industry have been offshoring junior roles or automating them (Bocock, Scott and Tang, 2025), reducing entry-level opportunities in the UK.

9 *This evidence is due for publication shortly in a report on apprenticeship withdrawals funded by the Gatsby Foundation.*

We recommend that government should:

- **Explore what additional incentives or changes to funding and accountability measures might be introduced to encourage and recognise efforts by post-16 providers and universities to develop their students' EES, and support successful pathways into employment or further study.**
- **Evaluate ways of assessing EES that education providers can use to monitor and address student gaps and learning needs.**
- **Help students to understand the importance of developing their EES and to articulate them using a common skills framework.**

Interventions for Lifelong Learning Stage 3: Education to Employment

The focus of policy makers should be on ensuring that all young people leave education with a strong base of the EES and technical skills required to enter growing professional occupations.

Ensuring that all young people leave education with a strong base of EES

Skills policy must ensure that all young people leave education with a solid foundation of EES, alongside literacy, numeracy and technical skills. Our qualitative research with curriculum leaders (see Annex 2) suggests colleges, like schools, vary in the emphasis they place on EES. A common concern was that EES are marginalised in content-heavy courses, which holds back young people.

For example, one college leader reflected this sentiment:

> ***"We have students going to employers with qualifications that everyone has, and we're finding the employers want them to have skills they don't have."***

College curriculum leaders also want greater guidance about which skills to focus on, how to monitor students' progress and how to evaluate impact.

Enrichment activities and experiences can play an important role in supporting young people's social, personal and educational development whilst at college, just as it does when they are at school. The Curriculum and Assessment Review recommends that post-16 study programmes (ages 16-19) should include a stronger expectation of enrichment activities that are focused on 'applied knowledge and transferable skills that will enable learners to step confidently into adulthood.' (Curriculum and Assessment Review, 2025). The DfE has already stated the intention to create an 'Enrichment Framework' which encompasses 16-19 education as well as the school years. (DfE and Phillipson, 2025).

- **The DfE should clarify the expectations for enrichment activities in post-16 education, placing emphasis on widening disadvantaged children's access to these activities.**
- **As part of this, DfE should introduce clear expectations and benchmarks for enrichment activities that explicitly build EES during post-16 education, and help providers to offer these activities through increased funding.**

Universities should also embed EES across their courses and wider support for students. Qualifications that develop technical expertise without a complementary focus on EES may leave graduates vulnerable to skill decay. Embedding EES development across all programmes will help graduates adapt to

shifting labour markets. Declining entry-level jobs also increase the pressure on graduates to demonstrate they have the EES to thrive in work (NFER, forthcoming).

Engaging employers in work-integrated learning can help young people leave education with the experience and EES employers are looking for. This is exemplified by the Co-op programme in Canada, which alternates periods of academic study with paid, full-time work placements related to students' field of study. Co-op students typically graduate with one to two years of relevant work experience, improving their work readiness. Employers are incentivised to offer Co-op terms through wage subsidies and tax credits, for example the Ontario Co-operative Education Tax Credit and the British Columbia Co-op Education Tax Credit.

Government could consider incentivising employers to provide placements, particularly for disadvantaged students, through subsidies or tax credits, as seen in Canada's Co-op model.

Making curricula elements, particularly numeracy and literacy, common requirements across all upper secondary pathways

Alongside a common EES framework, government should promote the development of literacy and numeracy across all post-16 pathways. Language and literacy skills underpin cognitive processing and communication skills, and numeracy skills underpin problem solving skills and information literacy (OECD, 2024). Earlier in this programme, we presented evidence that the provision of numeracy and literacy education across all upper secondary pathways is associated with reduced skills inequalities in these domains (Lucas et al., 2025). There is a breadth of ways in which this could be operationalised, with content and teaching potentially varying by pathway (Lucas et al., 2025). In most OECD countries, over half of students study maths beyond 16, compared with just 20 per cent in England (Camden, 2024).

We recommend:

The government should drive up participation rates in literacy and numeracy education beyond the age of 16, for a wider range of students.

Nurturing partnership and cooperation in the tertiary education system

Creating a network of clear learning pathways into growth occupations for learners of all ages, circumstances and abilities will require an integrated tertiary system, with greater coordination and collaboration between post-16 and HE providers and greater employer engagement. This is acknowledged in the government's new Post-16 White Paper (HM Government, 2025). England's 21 Institutes of Technology show that colleges, universities, and employers can deliver pathways from Level 3 to 7, and Technical Excellence Colleges aim to deepen employer involvement in priority sectors. The government has announced intentions to expand Technical Excellence Colleges to four more sectors, backed by £175 million, and a core theme running through the post-16 White Paper is the desire to foster greater cooperation and collaboration between providers in the post-16 education and skills system (HM Government, 2025).

This could be achieved through types of national frameworks and incentive structures, including:

National or regional tertiary coordination bodies to set skills strategies, align priorities, and manage pooled funding (e.g., LSIPs in MCAs developed into regional commissioning boards) (Ashwin et al., 2024).[10]

A unified national qualifications and credit framework, integrating the Regulated Qualifications Framework (RQF) and the Framework for HE Qualifications (FHEQ), to simplify credit transfer and quality assurance.

A funding model that encourages collaboration between providers in response to future skills needs.

These frameworks and incentives would build on regulatory proposals in the post-16 White Paper to make the Office for Students the single primary regulator for all higher education providers, including colleges offering provision at Level 4 and above (HM Government, 2025). The government also plans to use its procurement power to require suppliers to create local skills development opportunities, which could promote greater employer engagement (UK Government, 2025).

10 *LSIPs are Local Skills Improvement Plans. MCAs are Mayoral Combined Authorities.*

Lifelong Learning Stage 4

Adulthood

- Workers in declining occupations rarely move into growth occupations. Typically, they need to acquire new, and higher-level, skills and qualifications to make these moves, but face significant financial barriers to doing so.
- Employers report significant skills shortages, including in their workers' Essential Employment Skills (EES). But many workers do not feel their existing EES are well utilised.
- Employer and government investment in adult skills provision has experienced more than a decade of substantial decline.

The response from government and employers should:

- Reinvigorate the adult skills system, including through a step change in funding, to promote and reduce the barriers to adults retraining and transitioning from declining occupations into growth sectors.
- Ensure that Human Resources (HR) and management practices enable employers and line managers to accurately assess, utilise and develop their workers' existing skills.
- Adopt a skills-based hiring approach in recruitment and draw on a common skills framework to articulate EES requirements.

Introduction

As outlined earlier (see p.16-17), our initial employment projections indicated that more than one million jobs in high-risk occupations could be lost in the UK between 2021 and 2035, with the latest estimates suggesting this figure may rise to as many as three million. Workers in these roles will need to transition into expanding areas of employment, which in turn requires access to the skills, qualifications and experience necessary to make such moves successfully. At the same time, evidence from earlier in this programme suggests that many employees have EES that are underutilised in the workplace. This issue is especially pronounced in lower-skilled occupations, indicating that there may be a significant reservoir of untapped potential within the UK economy.

This section summarises evidence on the barriers to workers in high-risk occupations transitioning into growth occupations, before demonstrating why and how the adult education system - after a decade of decline - will need to be revitalised to help workers overcome these barriers. We explore the roles that both government and employers need to play.

Evidence Overview

Transitions

Earlier in this report, we highlighted that many workers in high-risk occupations may need to successfully transition into growing occupations if they are to remain in work. Earlier in the research programme, we also identified two types of successful transition:

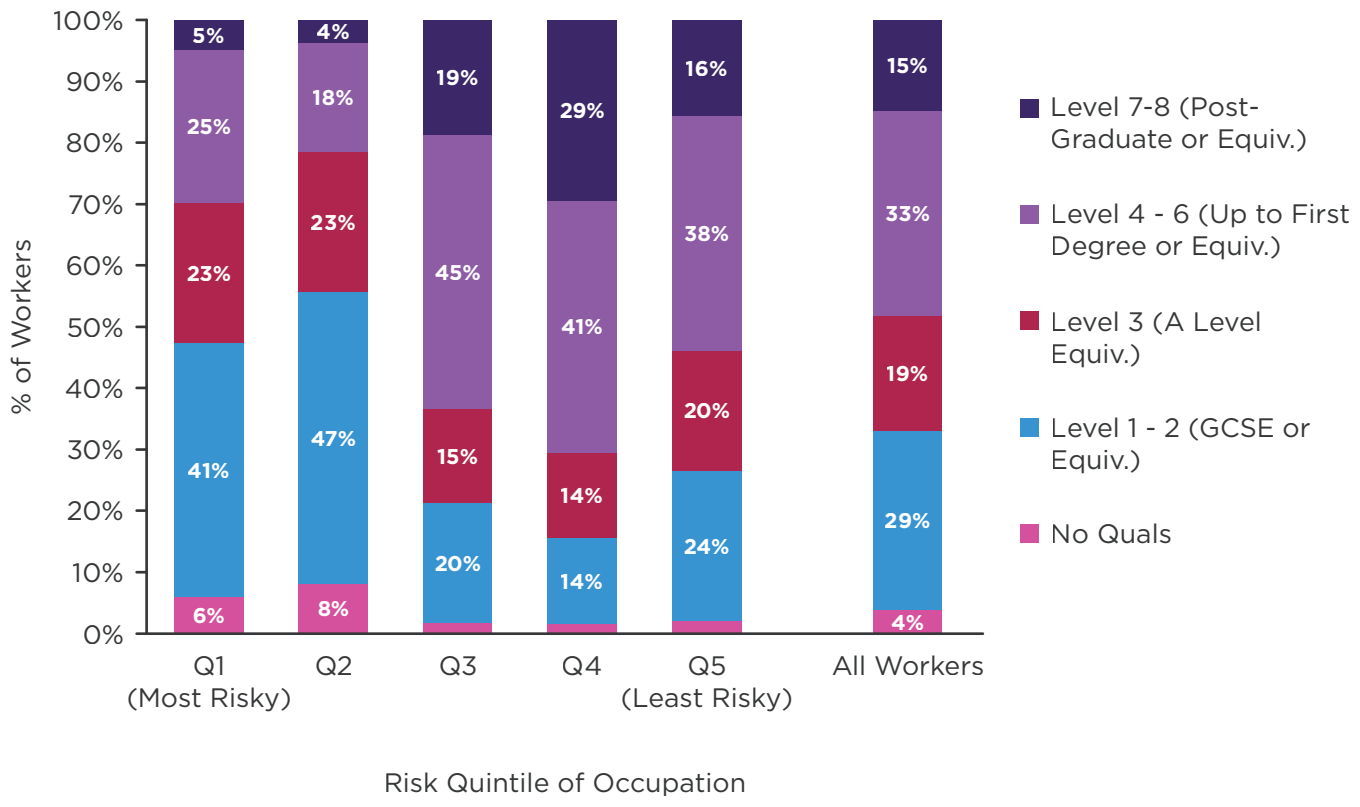
Lateral moves into the relatively limited set of lower-skilled occupations that are still expected to grow, such as roles in care.

Upgrades into the much larger group of higher-skilled occupations that are expected to grow substantially, which are primarily in professional and associate professional roles.

However, our research has also highlighted that workers in high-risk occupations in the UK rarely make these kinds of lateral moves or upgrades at present (Scott et al., 2024). This is partly because growing professional and associate professional occupations tend to require specialist and higher-level qualifications (ONS, 2025c). Figure 7 illustrates the gap in qualification rates between workers in high-risk occupations ('Q1' & 'Q2' occupations) and those in growth areas (Scott et al., 2024). In 2021, only 26 per cent of workers in high-risk occupations in England had qualifications at Level 4 or above. By comparison, 44 per cent of workers in lateral move occupations and 72 per cent in upgrade occupations' had such qualifications.

The data on job transitions reinforces this picture. Having qualifications at Level 4 or above is strongly predictive of making a successful transition from a declining occupation into a growing one. Workers in high-risk occupations who are qualified at this level are 12 times more likely to upgrade than their counterparts without formal qualifications. Growth occupations also typically demand, utilise and develop higher levels of EES. Workers in these jobs tend to have higher levels of EES than their peers in other occupations, suggesting that prospective career changers will need to demonstrate they have sufficient EES to successfully transition. Overall, this evidence raises important policy questions about how education, training and employer practices can better support workers in high-risk roles to reskill and make successful transitions.

Figure 7: Highest qualification of workers by occupational risk category (England, 2021)



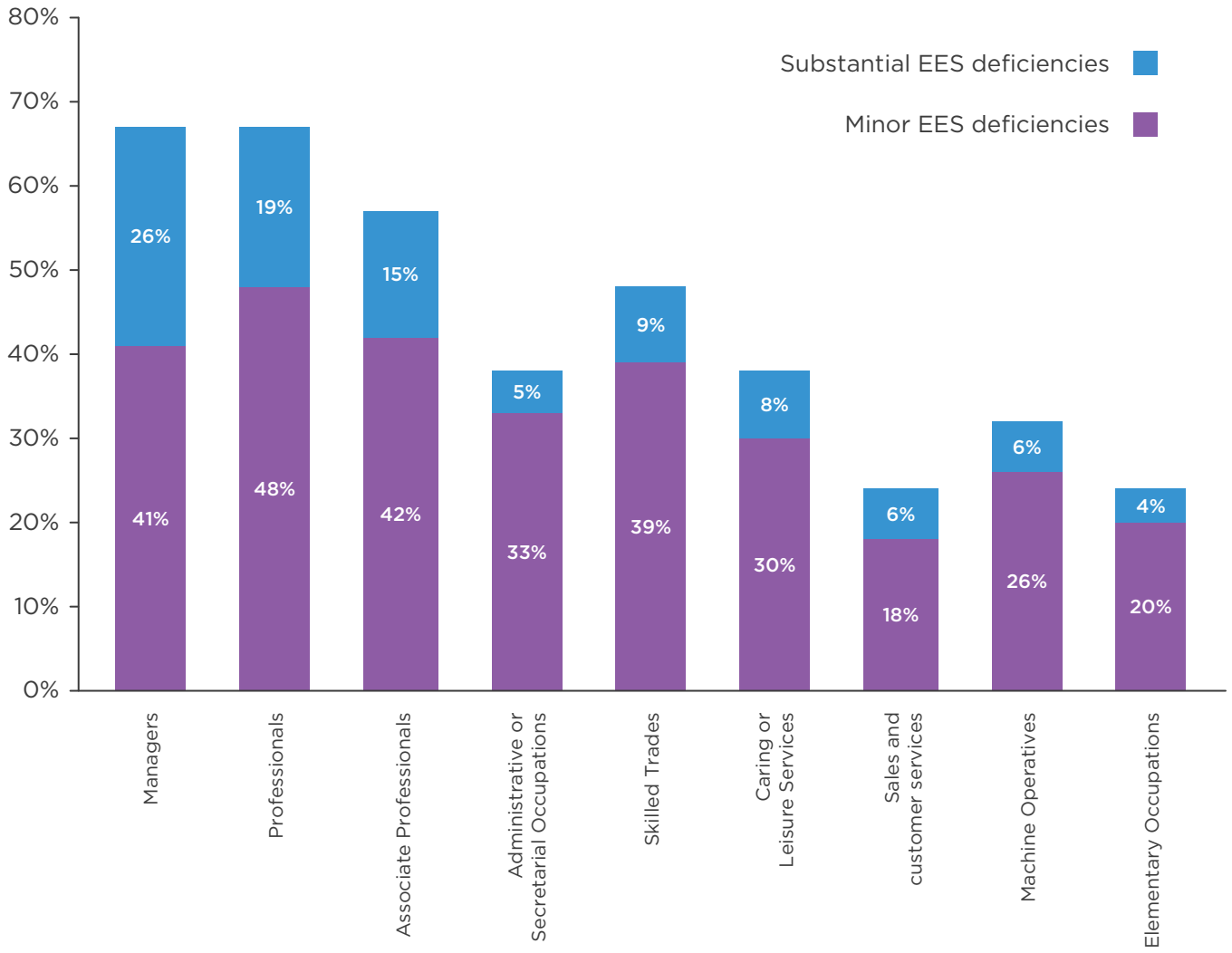
Source: NFER analysis of The Skills Imperative 2035 labour market projections (see Working Paper 4).

Skills demand, gaps and utilisation

Many workers in lower-skilled occupations face barriers preventing them from moving into higher-skilled roles, and employers continue to report significant skills shortages. Vacancies have risen substantially since 2011, particularly in critical sectors like health and social work and construction. Around a quarter are classified as 'skills shortage vacancies' - unfilled due to a lack of applicants with the required skills, qualifications or experience (DfE and Skills England, 2025). Enabling workers in high-risk occupations to acquire the skills necessary for lateral moves or upgrades represents a substantial opportunity to address these shortages.

Furthermore, as shown in Figure 8, workers report gaps in their EES across the economy. Nearly one in five workers in higher-skilled occupations report behaviours that suggest they have substantial deficiencies in the EES they possess, relative to the skills requirements of their jobs, which amounts to approximately 2.8 million workers in England (Bocock, Del Pozo Segura and Hillary, 2024). Without intervention, this number is projected to rise by 2035 as EES become increasingly critical, particularly in high-skilled roles. These findings highlight the importance of sustained investment in workforce development, including targeted support to strengthen EES.

Figure 8: Proportion of workers in 2023 with EES deficiencies, by occupation

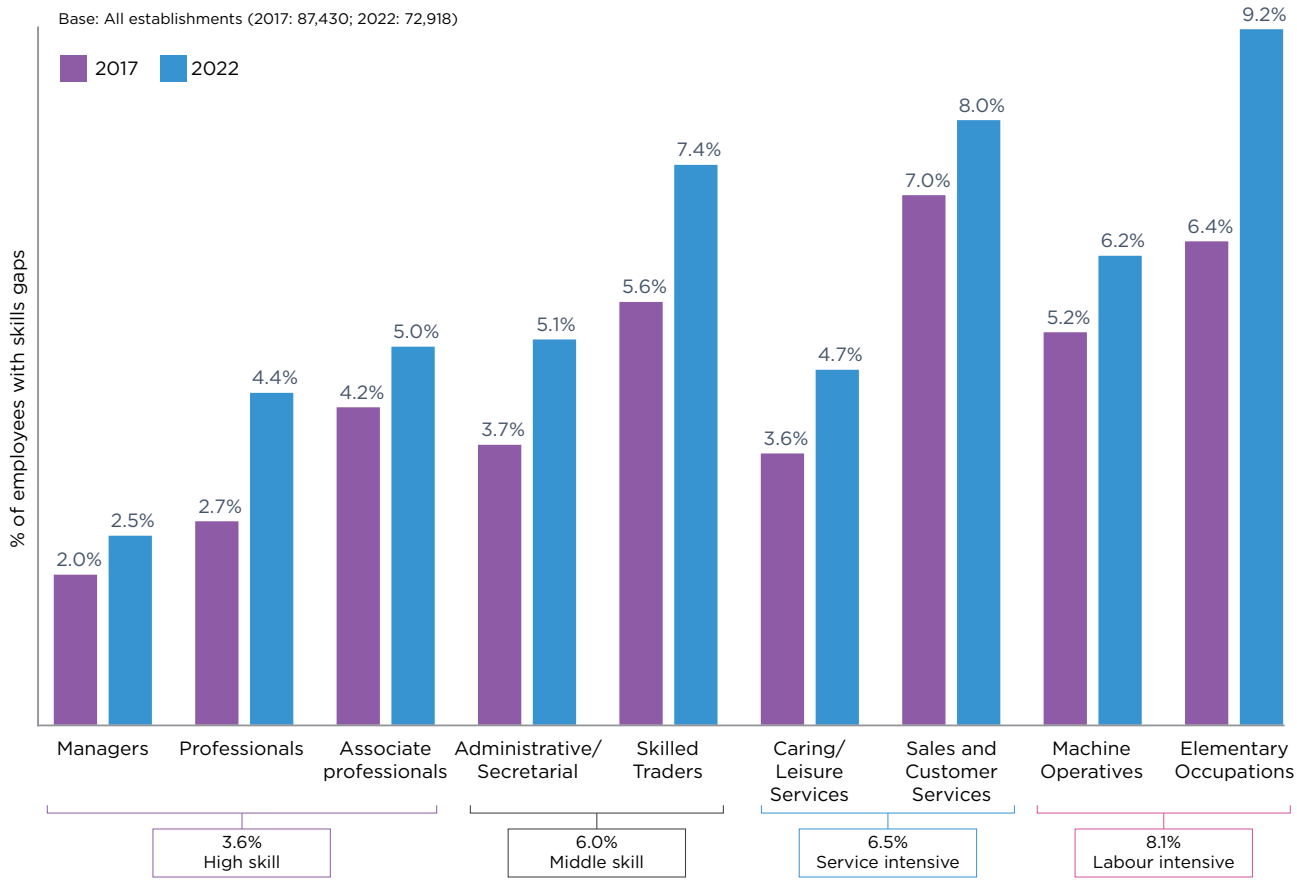


Source: Analysis of NFER's EES survey dataset.

By contrast, workers in mid- and lower-skilled occupations often report behaviours which suggest they have underutilised EES; that is, they possess skills that are not fully used in their current roles. Around 22 per cent of these workers in England, equivalent to 3.4 million people, report substantial underutilisation (Bocock, Del Pozo Segura and Hillary, 2024). This suggests that employers' HR and management practices could play a major role in alleviating the skills shortages they perceive in their workforces, and that many workers in high-risk occupations may also have skills that could help them make lateral moves or upgrades into higher-demand areas of the economy.

Workers' perspectives appear to contrast with employer assessments. Whilst employers also report skills gaps within their current workforce, as shown in Figure 9, they suggest that skills gaps are most prevalent in lower-skilled roles and often relate to transferable skills, including time management, task prioritisation, and emotional regulation (Winterbotham et al., 2018, 2020; IFF Research, 2023). The divergence between employer and worker perceptions points to a systematic misalignment: fully utilising workforce capabilities may require better alignment of expectations, skills assessment, and communication between managers and employees. Addressing these gaps is essential for both improving productivity and enabling workers to access opportunities in expanding occupations.

Figure 9: Proportion of workers in each occupational group that were identified by employers as having skills gaps, in 2017 and 2022.



Source: Reprinted from Employer Skills Survey report, 2022

Individual barriers to reskilling and upskilling

Earlier in this programme, we sought to identify the biggest barriers to reskilling and upskilling. Attendees at a roundtable event suggested that limited time and money are the biggest barriers (Bocock and Hillary, 2024). People, particularly those in lower-skilled, lower-paid jobs, cannot typically afford the costs of retraining, especially given the earnings penalty that a temporary reduction in working hours would entail (Normand et al., 2024). Many workers also lack awareness of growing occupations, the skills and qualifications required, and what support they are already entitled to in order to support them to reskill. Personal identity tied to current careers and limited transport options further constrain opportunities for workers.

Employers

Employers can play a vital role in helping individuals to reskill or upskill. It is therefore concerning that employer investment in training in the UK has declined by almost 20 per cent between 2011 and 2024 (DfE and Skills England, 2025). This trend is not mirrored across most of Europe (Tahir, 2023). Reversing this trend should be a policy priority.

Along with declining investment in training, attendees at the NFER Roundtable event identified limited strategic workforce planning as a key barrier to reskilling and upskilling (Bocock and Hillary, 2024). Whilst many employers project their future skills needs and gaps, others do not have a clear understanding as to how their skill requirements are likely to change, or how they will support their workers in declining areas to gain the skills to meet emerging demands. In addition, many managers and leaders also lack formal training and, consequently, the capability to effectively support workers to develop new skills and fully use their existing skills (CMI and YouGov, 2023). Given that four-fifths of managers move into the role without any formal training (ibid), alongside investment in people, employers need to support their managers' ability to identify, develop and utilise workers' skills.

Government

As private investment in adult training and education has fallen, so too has public investment. Public spending on adult education and apprenticeships fell by 38 per cent in real terms between 2010/11 and 2020/21 (Tahir, 2023). This has contributed to a reduction in the number of adults starting publicly-funded qualifications, which dropped from 5.5 million qualifications in the early 2000s to 1.5 million by 2020 (ibid). Despite the increasingly urgent need to support more workers to improve their skills, the adult education system has been left poorly funded and fragmented, resulting in adults with few qualifications and limited skills being left behind.

The Lifelong Learning Entitlement (LLE) is at the heart of the government's current response to this challenge. The LLE will enable adults to access loans of up to £37,000 for tuition fees from 2026 and extend access to maintenance loans. This is welcome but may not reinvigorate the adult education and skills system on its own. Loan entitlements for nearly all post-18 education routes are already at the levels proposed for the LLE (Sibieta, Tahir and Waltmann, 2022). Moreover, experience suggests that adults are substantially more debt adverse than young people when it comes to taking out loans to fund education. For example, when means-tested grants in England for part-time students were removed in 2012, the number of mature, part-time undergraduate students immediately plummeted, despite a new system of loans becoming available (Callender and Thompson, 2018). Overall, the existing research suggests that the LLE needs to be accompanied by other policy changes to reduce existing financial barriers to the adult skills system.

Interventions for Lifelong Learning Stage 4: Adulthood

There is a need to support more workers in growth occupations to continually upskill, and an even more pressing need to help workers in high-risk occupations to reskill, so that they can successfully transition into growing areas of the labour market. To support workers in high-risk occupations to reskill, our research highlights the importance of:

Supply-side measures that help adults overcome barriers to developing skills.

Demand-side factors that influence employers' demand for, and utilisation of, their employees' skills.

Supporting workers' skill development

Reinvigorating the adult skills system may hold the key to minimising the costs of labour market disruption for workers in high-risk occupations. The government plays a key role in preventing market failure by incentivising employers and employees to invest more of their own resources. Left to their own devices, employers and employees face financial constraints to accessing skills provision and are unlikely to factor in the full societal benefits of skills development. Despite this, public investment in adult education has fallen significantly.

The government should reinvigorate the adult skills system, including through a step change in funding, to promote and reduce the barriers to adults retraining and transitioning from declining occupations into growth sectors. This should include making adult education and skills an explicit policy objective within the Industrial Strategy, the Growth and Skills Levy, the work of Skills England and Local Growth Plans.

Investing in adult skills is not easy given the current fiscal context. Incentives need to be targeted towards enabling more workers in high-risk occupations to reskill and successfully transition.

The government should carefully weigh up the relative costs and benefits of different investment options, ensuring that they stimulate uptake of training and qualifications that are most productive, additional (i.e. lead to education and skills provision that would not have otherwise happened), and targeted (i.e. support more workers in high-risk groups to successfully transition into growing occupations). Skills England can play a crucial role in helping government to identify the most cost-effective investment options.

In this section, we have highlighted many of the key barriers preventing individuals from engaging in adult education.

To tackle these barriers, the government should:

Reduce the direct costs of studying for adults in high-risk occupations. For example, this could involve partially reversing 2012 reforms and offering means-tested, tuition-free study for mature part-time students studying undergraduate qualifications (Callender and Thompson, 2018). The government has set out proposals in the Post-16 White Paper, to introduce targeted means-tested maintenance grants for disadvantaged students (HM Government, 2025), but it will be important to ensure eligibility includes mature students from low-income households. Regional and local government (including Mayoral Combined Authorities) can also reduce the direct costs of adult education by extending eligibility to free courses, as has been done in the West Midlands for Level 3 courses (West Midlands Combined Authority, 2023).

Reduce the earnings penalty associated with a reduction in working hours for adults returning to education or pursuing training outside work. This might involve incentivising employers to offer accredited training and apprenticeships for career changers, providing wage subsidies for employers in priority sectors to hire adult apprentices with low levels of existing qualifications. The government has now proposed offering employers incentives of £3,000 for 30,000 people to start foundation apprenticeships.

Strengthen the 'Right to Request Time Off' so that people can remain employed while retraining during an unpaid career break. There are similar schemes in Austria, Germany and France that help support individuals to maintain their incomes whilst retraining.

Simplify and raise awareness of the existing financial support available to workers to retrain and change careers, whilst increasing access to adult-orientated careers and training guidance and advice.

Expand access to pre-employment training and support for unemployed adults. The government has now committed to doing this through a significant expansion of Sector Based Work Academy Programmes (HM Government, 2025).

Ensure housing and transport policy reflect current and future local skills needs and gaps and support workers to take up jobs in growth occupations.

Government cannot solve this problem alone. It needs to partner with employers and education providers to crowd-in investment and ensure the education infrastructure is ready to equip today's adults and workers with the skills they need for the future. To do this:

The government needs to explicitly encourage employers to invest more in adult skills and recognise organisations that are already investing heavily in this area.

Local Skills Improvement Plans (LSIPs) could set out targets for increasing employer investment in training.

Education providers should create training courses and qualifications that are tailored to meet the needs of working adults and the government should incentivise them to do so. This might, for example, involve developing flexible, modular qualifications; offering a greater variety of short, online courses; and developing flexible validation pathways to higher qualifications that exempt programme credits for adults with relevant skills gained through work, as is being piloted at scale in Sweden through the HVE-flex (Higher Vocational Education) programme (Cedefop, 2022).

Finally, a thriving adult education system requires a strong further education sector. The recommendations put forward earlier for nurturing greater cooperation and collaboration in the tertiary education system would help adult education too (see p.39).

Influencing employers' demand for, and utilisation of, skills

Earlier in this programme, we gathered the missing worker perspective on skills demand, supply and utilisation. Our results suggested that many employers are not fully recognising and utilising the skills of their workers, particularly workers in low- and mid-skilled occupations (Bocock, Del Pozo Segura and Hillary, 2024). Evidence suggests that changes in HR and management practices, together with improvements in working conditions and practices, can also minimise 'skills withdrawal' behaviour. Such behaviour can otherwise materialise over time as a consequence of negative reactions to poor job quality, which results in reduced engagement, lower organisational commitment and reduced work effort (Hurrell, 2016). Employers need to ensure that their HR and management practices enable line managers to accurately assess, utilise and develop their workers' existing skills. As part of this:

Employers should consider what more they can do to align skills expectations and assessments between managers and workers, and minimise skills mismatches and skills withdrawal.

Employers should consider what more they can do to improve managerial ability to identify and utilise the 'latent' EES of their workers.

Employers should consider how they can further build their ability to anticipate changes in their people and skills requirements, redesign job roles, and support workers to move from declining occupations to high-growth areas.

Employers should adopt a skills-based hiring approach in recruitment and draw on a common skills framework to articulate EES requirements.

Public investment to reinvigorate the adult skills system could contribute to a virtuous cycle that stimulates more private investment and results in more adults reskilling and upskilling, a more dynamic labour market, and fewer skills shortages and gaps. This would help those in high-risk occupations stay in work by changing career, whilst improving growth, productivity and living standards across the UK economy.

Meeting the Skills Imperative

The Labour party pledged to deliver 'the highest sustained growth in the G7' and at the same time offer 'good jobs and productivity growth in every part of the country **making everyone, not just a few, better off**' (Labour Party, 2023). Skills have become central to national ambitions across infrastructure, health, defence and technology - underpinning nearly every major announcement since Labour assumed office, from the Industrial Strategy to the recent White Paper on immigration.

The education and skills system has a vital role to play, both in equipping young people for high-productivity, high-skilled, professional occupations, and in helping adults in high-risk occupations to transition into higher-demand areas of the economy. In 2021, our projections suggested more than a million jobs could be lost from declining occupations by 2035 (Scott et al., 2024), but changes since then suggest this figure could be as large as three million if current trends continue. The threats to young people who leave education without the skills and qualifications to access growth occupations may be even greater, as they are likely to find themselves competing for a dwindling number of jobs in low-skill occupations without already having a foothold in the labour market.

Meeting the future skills imperative will require an immense and collective national effort to (a) ensure that more young people leave education with the skills and qualifications to enter growth occupations, (b) support a considerable number of workers in low-skill declining occupations to reskill and successfully transition into growth occupations, and (c) support higher-skilled workers to adapt to change and develop their skills. Mismatches between the job demands of growing occupations and individuals' skills and qualifications are likely to pose major barriers to economic growth, as well as result in increasing inequality.

The scale of the challenge demands an urgent, wide-reaching, large-scale and collective response. We need to build a system of lifelong learning which nurtures the development of individuals' skills - both Essential Employment Skills (EES) and other basic and technical skills - throughout their journey through early childhood, education and work. Young people, especially those from disadvantaged households, will require government, education, employers and families to ensure they are sustained on a path towards acquiring and demonstrating that they have the skills both to access growth occupations and to adapt to further change throughout their life. Workers in declining occupations will require a mix of supply-side measures that help them overcome barriers to developing their skills, and demand-side changes that influence employers' effective utilisation of their existing skills.

Delivering the recommendations outlined in this report will require government to treat skills development as a critical investment in the nation's economic and social infrastructure: an investment that contributes to long-term economic returns and boosts productivity, employment and earnings over the long term. This has the potential to break the vicious cycle (see Figure 4 on p.22), and to create a virtuous cycle in its place (also on p.22): a cycle of higher-skilled business models; higher investment in skills; higher participation rates in further and higher education; fewer barriers to reskilling and upskilling; more workers upgrading into better-paid, higher-skilled jobs; growing dynamism in the labour market; stronger skills pipelines into high-growth sectors; and fewer skills shortages and gaps. This is imperative not just for productivity and economic growth, but also for ensuring that change makes everyone, not just a few, better off.

Annex 1: Labour Market Analysis

Introduction

Much has changed since we produced our employment projections in 2021. The economic effects of the Covid-19 pandemic have continued to unfold, and various global events have had significant economic repercussions, particularly Russia's invasion of Ukraine in 2022 and rises in inflation. The UK has also experienced a change of government, which has affected priorities for public investment in the country (IPPR, 2024), and breakthroughs in generative artificial intelligence (AI) appear to have started to affect jobs and skills requirements on a bigger scale than previously (see Bocock, Scott and Tang, 2025 for a UK technology sector example).

Comparing Labour Market Projections to Outturn

For this final report, we have compared the projections against actual changes in employment between 2021 and 2024 (the latest year for which data is available). Specifically, we compare:

- Percentage changes in the projected number of jobs (including those who are self-employed) in SOC2020 occupations in the UK between 2021 and 2024 in the projections (Wilson et al., 2022).
- Percentage changes in the number of people employed (or self-employed) in SOC2020 occupations in the UK between the January to December 2021 data and January to December 2024 data from the Annual Population Survey statistics (ONS, 2025b).

This is the best way to make this comparison using publicly available data. Outturn data on the number of jobs in SOC2020 occupations is not available, so we have to use outturn data on the number of people employed instead. Whilst there are more jobs in the UK economy than there are people in employment (because some people work in more than one job), the figures are generally similar. We only compare percentage changes in the numbers, rather than net changes, because of this.

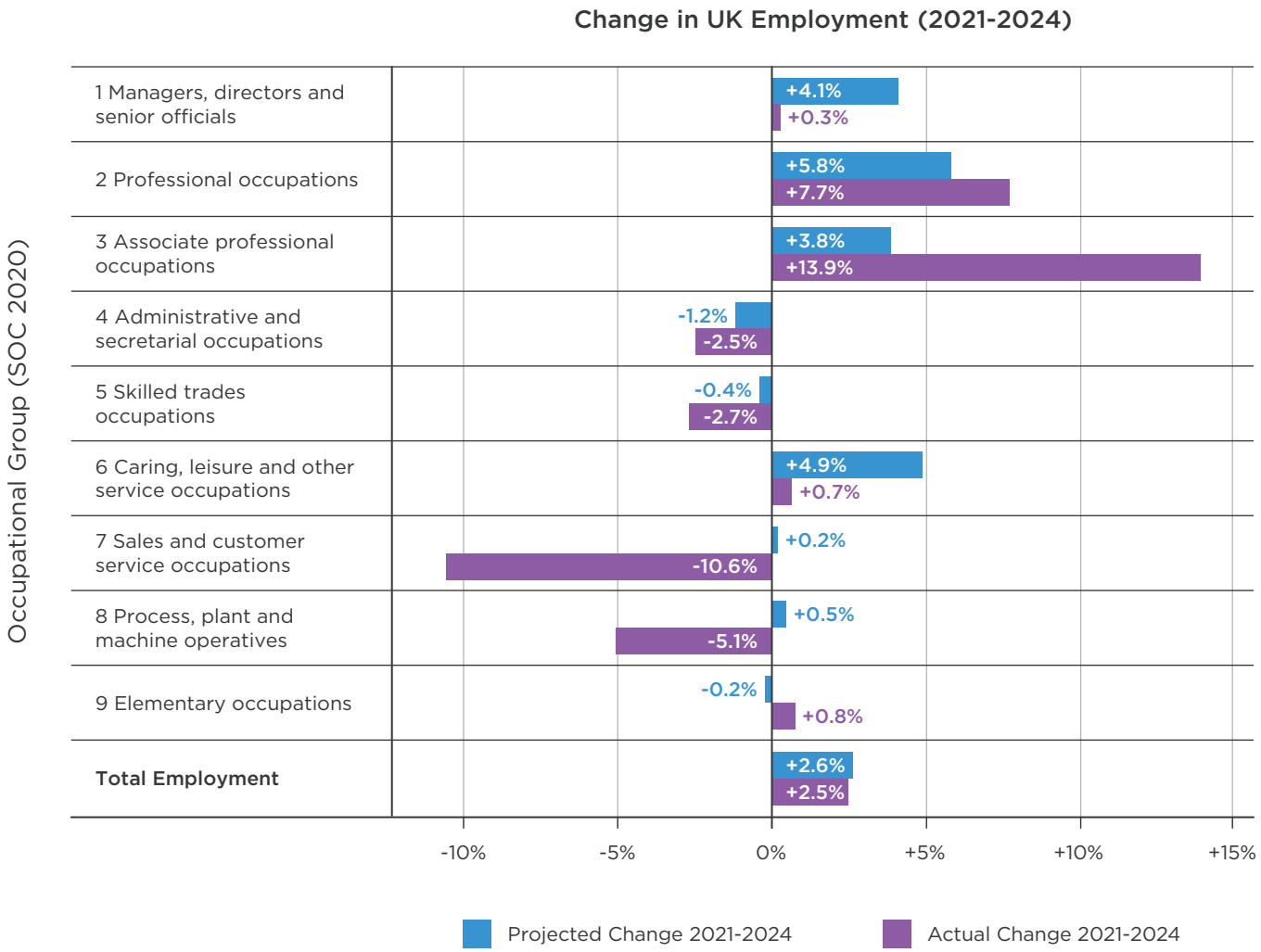
Concerns have been raised recently about the response rate in the Labour Force Survey and consequently the Annual Population Survey (ONS, 2025a), and a resulting fall in quality. Whilst these concerns are important, we think this data remains the best available, given the limited alternatives. Using the annual version of the survey and broad definitions of the occupations means we are maximising the precision of the estimates we present, given existing data.

Within the projections, there were three different scenarios: the Baseline scenario, the technological opportunities scenario, and the Human Centric scenario[11]. We compared these scenarios to the outturn data and selected the one that performed best for this analysis. That was the Human Centric scenario, although the differences between the scenarios is relatively modest compared to the differences between the projections and the outturn data.

Figure 10 shows how the projections and outturn data compare for the nine major occupational groups and UK population in employment (or self-employment). For example, total employment was projected to increase by 2.6 per cent between 2021 and 2024. In the outturn data, this increased by 2.5 per cent, so the projections performed very well here.

11 There was also an interim Automation scenario which only looked at negative effects on employment.

Figure 10: Projected (Human Centric scenario) and actual changes in employment share by occupational group (UK, 2021-2024)[12]



We can also see that, for most major occupational groups, the projections have performed well in forecasting the direction of change. The numbers in professional and, particularly, associate professional roles[13] have increased significantly in three years, as was projected. Conversely, employment in administrative and secretarial occupations has fallen, as projected. The same is true for skilled trades.

For some groups, the projections appear to have performed less well. Examples include sales and customer service workers and process, plant and machinery operatives. In both cases, the projections had these groups increasing in numbers slightly, but the actual data shows employment has fallen significantly over the three-year period. Employment in caring, leisure and other service occupations, as well as the number of managers, director and senior officials, was projected to grow by around four to five per cent but this has not been the case in practice.

12 *The APS is a survey based on a sample of the population and therefore estimates of changes are inherently uncertain. The changes for the following groups are significantly different from 'no change' in a statistical sense (at a 95 per cent confidence level): professionals, associate professionals, sales and customer service occupations, and process, plant and machine operatives. The increase in total employment is also statistically significant.*

13 *The term 'Associate professional' is not widely used outside of labour market research. The Office for National Statistics (ONS) defines associate professionals as 'occupations whose main tasks require experience and knowledge of principles and practices necessary to assume operational responsibility and to give technical support to Professionals and to Managers … (Most Associate Professionals will) have an associated high-level vocational qualification, often involving a substantial period of full-time training or further study. Some additional task-related training is usually provided through a formal period of induction.' Examples include engineering or IT technicians, counsellors, police officers, musicians, legal assistants or clerks, accounts managers, sales managers and housing inspectors (ONS, 2025b).*

The general shape of change in the long-term projections in both Figure 1 and between 2021 and the latest 2024 data in Figure 10, which shows an increase in employment in professional and associate professional occupations and a fall in lower-skilled occupations in areas like sales, customer service and machine operatives, is consistent with the actual pattern observed in UK employment data, which we refer to as 'occupational upgrading'. This has been happening since at least 2000. The latest data suggests this trend is continuing.

Finally, we note that the magnitude of the changes is generally larger than predicted for seven of the nine groups. This means that the composition of the labour market has changed faster than previously projected. Given that the speed of change in the projections will largely have been driven by historical trends, this suggests that labour market change has accelerated between 2021 and 2024, relative to the previous pace of change.

Discussion

The latest available jobs data emphasises the threats facing workers in high-risk occupations and young people who leave education without the qualifications and skills to enter growth occupations.

Figure 10 shows that some low-skill occupations declined particularly sharply between 2021 and 2024, including retail staff, customer service workers and machine operators. Administrative workers and skilled trades were also projected to decline but have done so quicker than expected (although differences for these groups are not statistically significant at the 95 per cent confidence interval level). Overall, employment in the occupations identified as declining occupations in Working Paper 5 (Scott et al., 2024) is estimated to have shrunk by 2.7 per cent between 2021 and 2024, compared to a projected decline of 0.8 per cent in our worst-case scenario.

We previously indicated that more than a million jobs in the UK could disappear from these declining occupations between 2021 and 2035.[14] It is difficult to assess how much the recent data, which suggests that employment in these occupations has fallen by three times as much as forecast to date, should drive us to revise this projection. Over time, the data might revert to the long-term trend, or the recent data could be a sign of new trends emerging. As such, the latest data suggests that anywhere between one and three million jobs in the UK could be lost in these declining occupations between 2021 and 2035. Again, it is important to emphasise that the higher figure here is based on a significant change over a relatively short period and it is far from guaranteed that this pace of change will continue between 2024 and 2035, hence the broad range in potential jobs that might be lost.

Not all of the decline we projected in lower- and mid-skilled occupations is attributable to declining demand. Supply also plays a role. Stakeholders have often told us that there is unmet demand for skilled tradespeople, and suggested that this means this group is likely to grow in future, rather than decline as projected. We reviewed data on average earnings to probe this a little further[15] (ONS, 2024). If supply constraints were a significant factor here, we would expect to see wages rising relatively fast for workers in this group. Between 2021 and 2024, average earnings for skilled tradespeople did rise a little faster than expected, suggesting a shortage of available workers may partially explain the fall in employment for this group.[16] This conclusion is reinforced in research by Skills England, which highlights unmet demand for many skilled trades cited by employers in advanced manufacturing, construction, and the clean energy sector (DfE, 2025c). The latest Employer Skills Survey also suggests that this occupational group has the highest density of skill shortage vacancies (DfE and Skills England, 2025). By contrast, hourly earnings growth has been weak for customer service and retail workers, and administrative and secretarial workers. The latest Employer Skill Survey shows us that these occupations have relatively low levels of skills-related vacancies too (DfE and Skills England, 2025). This all suggests that we can be more confident that the estimated decline in the number of people working in these jobs is directly linked to a fall in demand for these workers.

14 *We previously said this was the case in England, but the finding also applies to the UK.*

15 *We use estimates of gross hourly earnings from ASHE in April 2021 and April 2024, converted into real terms using CPI.*

16 *We use a linear model to look at the relationship between average hourly earnings in 2021 and average hourly earnings growth between 2021 and 2024 across all occupations, modelling expectations of growth for a given occupation. Generally, we find occupations with lower earnings in 2021 have experienced stronger wage growth, which is probably explained by the relatively large real increases in the national minimum/living wage over that time. Earnings growth amongst skill trades has been stronger than our linear model would predict, given wages in that occupation in 2021.*

Earlier in this programme - in Working Paper 5 - we suggested that the caring services may be a rare example of a growing occupation which workers in low-skill, high-risk occupations could potentially transition into (Scott et al., 2024).

Figure 10 suggests that employment in care services has not grown as strongly as predicted. However, this is likely to be - at least in part - a reflection of supply-side shortages. Average hourly earnings in care work increased at a much faster rate in real terms (+4.8 per cent) than the average (+1.1 per cent) across all occupations between 2021 and 2024. This increase will largely be linked to increases in the minimum wage, but, nonetheless, increases for this group were a little larger than our model would predict. This is reinforced by data on rising unmet care demand (Reeves, Islam and Gentry, 2024) as well as the fact that 'Care and Leisure Occupations' have the second highest rate of skill shortage vacancies in 2024 survey data (DfE and Skills England, 2025).

Another occupation we identified as a large, lower-skilled occupation likely to grow was customer service work. This growth has not yet materialised; customer service work has experienced one of the largest falls in employment (-23 per cent), whilst hourly earnings for customer service workers have grown substantially in this time (+6.4 per cent). This increase in pay has been partially driven by increases the minimum wage, but nonetheless, the fact that the increase is substantially above what we predicted could suggest supply constraints are contributing to the decline in the size of this group, as well as demand shifts. Alternatively, technological changes may be reducing the number of customer services staff that employers need, but increasing the job demands on remaining workers whose productivity and wages increase as a result.

Figure 10 also suggests that fewer low-skill occupation groups than we projected have increased their share of UK employment since 2021. Some occupational groups have shrunk particularly sharply. This limits the opportunities for displaced workers to successfully transition into higher-demand areas that require similar levels of skills and qualifications, making it more important that workers in low-skill occupations at risk of losing their jobs can reskill and 'upgrade' into growing occupations.

At the other end of the occupational hierarchy, Figure 10 shows that employment growth in professional and associate professional positions has outpaced our projections. Real earnings growth in professional and associate professional jobs was generally sluggish between 2021 and 2024, which is perhaps counterintuitive given we would expect rising demand in an occupation to be accompanied by strong earnings growth, as employers compete to hire the best candidates. This suggests that the pool of workers seeking these types of roles, and who employers are willing to hire, has expanded, which potentially offers some hope for workers in declining occupations who have 'latent' skills, which are underutilised in their current work and who can convince employers that they can successfully transition.

There has also been more growth in associate professional roles than in professional roles since 2021, contrary to what we projected. In the underlying data, this is driven by the growth in associate professional roles in healthcare, such as nursing associates and allied health professionals. This trend could be attributable to technological developments allowing some associate professionals to perform tasks previously only done by those with higher levels of training. If so, this shift towards job growth being increasingly concentrated in associate professional roles could show up in other occupation groups over the next decade, for similar reasons. The balance of roles between professional and associate professional occupations is likely to vary by industry and is difficult to predict, but it is vital that the education and skills systems offer learning pathways into both.

Finally, as discussed above, the data suggests that the reallocation of labour between occupation groups occurred faster between 2021 and 2024 than the longer-term trend on which the projections were based. Statistics from the ONS reinforce this conclusion: the rate of job-to-job moves was substantially higher between 2021 and 2023 than in earlier years, although it then fell between 2023 and 2024 (ONS, 2025d). This rise in job-to-job moves after 2021 could have been driven by the after-effects of the pandemic, which might suggest we will see a reversion to the longer-term trends on which our employment projections were based. Alternatively, the moves may have been driven by other factors that mean the accelerated rate of change continues in the coming years, for example, the growth in working flexibly from home, or rapid adoption of automation-related technologies in sectors such as retail, customer service and manufacturing. Either way, the sharp decline in many lower- and mid-skilled roles since 2021 is striking, and the economic consequences of these shifts will still be unfolding, for example, unemployment rates have risen slowly over the last few years (Thwaites, Cominetti and Slaughter, 2025).

Annex 2: Qualitative Research with School and College Curriculum Leaders

Introduction

Earlier in this programme, we identified the Essential Employment Skills (EES) which will be in greatest demand across the labour market in 2035. Our research showed that there are already widespread shortages of these skills, and that young people's development of a related set of skills is highly cumulative - meaning a strong early foundation of these skills is vital.

Between June and August 2025, we ran qualitative research with school and college curriculum leaders, plus experts from independent organisations, to explore:

- **How schools and colleges currently support young people to develop EES.**
- **What they would like to see change in the future to support young people to best develop these skills.**
- **What would help them feel clear, supported and incentivised to best develop their students' EES, across different subjects and study programmes.**

The research involved four focus groups with 25 curriculum leaders (12 from schools, seven from school sixth forms, and six from standalone 16-19 providers such as sixth form and general further education (FE) colleges), and two interviews with curriculum leaders referred to us by the Skills Builder Partnership as examples of good practice. Curriculum leaders were a mix of Assistant and Deputy Heads, Heads, and Executive Heads. Following these focus groups and interviews, we facilitated a working session with six senior leaders from national organisations: the Association of Colleges (AoC), the Careers and Enterprise Company (CEC), the Sixth Form Colleges Association (SFCA), the Association of Employment and Learning Providers (AELP), the Edge Foundation and the Skills Builder Partnership. The purpose of this final session was to share what we had heard in the focus groups and co-create the recommendations for government and educators found earlier in this report.

Approaches to developing EES

The focus groups highlighted wide variability in how schools and colleges approach EES development. Some indicated that they integrate EES across the curriculum; some said they offer discrete programmes or equated these skills with enrichment, oracy, or careers education; and others assumed these skills develop 'naturally'. Many school and college curriculum leaders explained their approach was a response to the needs of their students: schools with disadvantaged intakes were notably more likely to comment on the substantial emphasis they placed on EES, whereas particularly advantaged schools tended to think their students developed these skills 'naturally' through out-of-school opportunities. For example, one curriculum leader from a school serving a low-income community commented:

"We work in an area which has quite significant deprivation and unemployment, so we do a lot with our students to try and move their employment skills. We have four pillars at our school...we have ambition, excellence, pride and community and all of those pillars feed into [students'] personal development tracker... which ensures every child has an opportunity, for example for a leadership experience."

By contrast, another curriculum leader said:

"We're .... a little bit of an exam factory at times. Ultimately that is how my pay scale is judged. That is how my performance management is judged... so we've tried to bring those [EES] in a little bit more... but - and this is going to sound awful... - it does feel at times a little bit tick boxy."

Differences also appeared to stem from how leaders conceptualised EES - as skills to be developed through subjects, or character virtues to be woven into the school's ethos and language but 'taught in a very different way', or attributes to be developed discretely outside subject curricula. This highlighted the lack of a consistent approach.

"We refer to things like resilience, communication, critical thinking as character virtues... the way we deliver character, education and schools... is by permeating it, through everything we talk about... it's actually embedded... whether they're in lessons or whether we're appreciating their courtesy when they hold open a door... it's in the culture that we've built."

A small number of teachers did not agree that schools should be focused on cultivating their students' EES. These people tended to say that employers should be responsible for this.

Barriers to developing EES

Across all the focus groups with school and college curriculum leaders, a common complaint was that curriculum overload prevented their school from placing greater emphasis on supporting students to combine subject-specific knowledge with general thinking and socio-emotional skills, and applying them to 'practical real-world scenarios, problems and projects'. Most school curriculum leaders said or implied that they understood the critical importance of disciplinary knowledge in laying the foundations for the development of transferable skills, but they also felt these skills needed to be effortfully learned through the application of knowledge to situations which required young people to plan, organise, problem solve, gather and use information, and communicate and collaborate with others.

Many participants said that they felt the national curriculum lacked an ambition for young people to be able to do this, and that, because educators are "ultimately judged on their results" and the curriculum is 'already too packed', EES are 'squeezed out'. One curriculum leader summarised:

"At the moment, these skills aren't core to what the curriculum wants us to do. They therefore get squeezed out."

Another elaborated:

"We need to ask, 'what do we want our students to leave us with at 16 or 18?' 'What skills do they need for the world of work and how do we measure that?' Because at the moment there isn't enough focus on it [EES]... Schools are exam factories... you might have other things that you say you want to do, but ultimately, we are judged against our results... Deep down, if it's not in the curriculum and assessed then it becomes less important."

One participant summarised the perceived result of this:

"We have students going to employers with qualifications that everyone has, and we're finding the employers want them to have skills they don't have."

Proposed solutions to overcoming the barriers to developing EES

Some participants said that the government would need to start by articulating to the teaching profession that EES are valued as critical components of a good education, with the ambition being that young people can combine knowledge with EES and apply them to 'practical, real-world scenarios'. The feeling was that, until this was clearly articulated as the ambition, EES would continue to be treated as peripheral, with the primary focus being on what gets assessed. For example, one school curriculum leader said:

"[EES] needs to be referenced and explicitly taught and given space [in the curriculum]... it's really important because we're not producing people who have got the skills to go forward into the workplace and do today's jobs, let alone the jobs not even invented yet. We need to make it serious through the national curriculum what we expect in terms of skills development."

Many participants also expressed concerns about whether they had identified the right skills and whether they were developing them in the most effective ways. Several college and school curriculum leaders asked for guidance or advice on how to benchmark and track students' progress or evaluate the impact of their initiatives. They acknowledged that EES are hard to assess, but felt providers would benefit greatly from a common skills framework and 'tools' for benchmarking and tracking student progress against expectations. Some leaders also suggested training for staff.

Some leaders suggested EES should be assessed, in order to create the incentives for providers to emphasise these skills without them being treated as a 'box to tick'. For example, one school leader said:

"Teachers won't veer away from what's assessed. In the English GCSE, they took away speaking and listening...and whilst they still expect teachers to spend time on this, it's now worth nothing, and when everything comes down to the grades your students achieve, it's really hard for me to stand there and say [to my staff] 'I'd like you to push this as a priority' when everybody is thinking 'yeah, but it's not assessed and the grade is what matters'...."

On the other hand, other leaders suggested this was either infeasible because EES 'need to be taught in a different way' (compared to cognitive skills like literacy and numeracy), or because it would merely add to a culture of 'teaching to the test'.

Across the focus groups, leaders also emphasised the importance of both careers education and work experience, and enrichment activities designed to support young people's broader social, personal and educational development. Several research participants also commented on the need for enrichment activities to be integrated into the school day in order to increase their accessibility to disadvantaged children. For example, one leader said:

"We have a lot of vulnerable learners with bad attendance. But they really enjoy enrichment activities and it helps their attendance, so we created a set period for this - they can do extra sport stuff, Duke of Edinburgh award, student leadership stuff. But I agree that it's very hard to find time for this..."

In the working session which followed the focus groups with school and college curriculum leaders, senior leaders from the Careers and Enterprise Company, emphasised that essential skills have already now been embedded in their careers education guidance, resources and training, including the equalex framework for work experience, the Future Skills Questionnaire, and training for school careers leaders.

Some college curriculum leaders also highlighted the importance of formal qualifications centred on transferable skills, whether it was those currently on offer (e.g., EPQ, HPQ, Core Maths), qualifications in the style of those offered in the past (e.g., AS Level Critical Thinking), or those largely seen in the private sector (e.g., IB Core Components). Of these, the EPQ drew the most praise, but some college leaders suggested that EPQs tend to be taken only by high-attaining students who are motivated by university applications, despite alternative formats existing. Most leaders who referenced EPQs also said that delivery was hampered by the fact that staff are often required to supervise EPQs in their own time, without additional pay or protected time. For example, one college leader said:

"I run the EPQ. Project management skills, decision making and problem solving - they are all in the EPQ. But only about a quarter of our cohort do it..."

Recommendations in the 'Lifelong Learning Stage 2: School Years' and 'Lifelong Learning Stage 3: Education to Employment' sections of this report draw on the insights summarised above.

17 *EPQ is the Extended Projected Qualification. HPQ is the Higher Project Qualification. IB is the International Baccalaureate.*

18 *Readers are referred to **The Extended Project Qualification: An Opportunity for All?** - Nuffield Foundation, which published evidence on inequalities in access to the EPQ and good practices in increasing opportunities on 30th October 2025.*

Bibliography

Acemoglu, D. and Restrepo, P. (2020) Unpacking skill bias: automation and new tasks. Working Paper 26681. National Bureau of Economic Research. Available at: https://doi.org/10.3386/w26681.

Ahn, D., Almaatouq, A., Gulabani, M. and Hosanagar, K. (2021) 'Will We Trust What We Don't Understand? Impact of Model Interpretability and Outcome Feedback on Trust in AI'. arXiv. Available at: https://doi.org/10.48550/arXiv.2111.08222.

Allas, T. and Goodman, A. (2025) 'Not yet productive, already disruptive: AI's uneven effects on UK jobs and talent', Not yet productive, already disruptive: AI's uneven effects on UK jobs and talent, July. Available at: https://www.mckinsey.com/uk/our-insights/the-mckinsey-uk-blog/ai-uneven-effects-on-uk-jobs-and-talent

Almeida, L. (2025) 'Number of new UK entry-level jobs has dived since ChatGPT launch', The Guardian, 30 June. Available at: https://www.theguardian.com/business/2025/jun/30/uk-entry-level-jobs-chatgpt-launch-adzuna

Ashwin, P., Hidalgo Bazan, G., Hazelkorn, E., Keep, E., Millward, C., Morris, H., Robson, J., Westwood, A. and Xu, X. (2024) 'Adopting a regional tertiary education, research and innovation system in England: priorities, principles and practicalities', HEPI, 6 November. Available at: https://www.hepi.ac.uk/2024/11/06/adoping-a-regional-tertiary-education-research-and-innovation-system-in-england-priorities-principles-and-practicalities/

Australian Curriculum (2025) General capabilities, Australian Curriculum. Available at: https://www.australiancurriculum.edu.au/help/general-capabilities

Balladares, J. and Kankaraš, M. (2020) Attendance in early childhood education and care programmes and academic proficiencies at age 15. OECD Education Working Papers 214. Available at: https://doi.org/10.1787/f16c7ae5-en.

Bate, A. and Foster, D. (2017) Sure Start (England). Briefing Paper 7257. Available at: https://researchbriefings.files.parliament.uk/documents/CBP-7257/CBP-7257.pdf

Blundell, R., Dias, M.C., Joyce, R. and Keiller, A.N. (2020) What has been happening to career progression? Available at: https://doi.org/10.1920/BN.IFS.2020.BN0301.

Bocock, L., Del Pozo Segura, J.M. and Hillary, J. (2024) Rethinking skills gaps and solutions. Working Paper 4 of *The Skills Imperative 2035: Essential skills for tomorrow's workforce*. Available at: https://www.nfer.ac.uk/media/mmpjeq3p/rethinking_skills_gaps_and_solutions_working_paper_4_of_the_skills_imperative_2035_essential_skills_for_tomorrows_workforce.pdf

Bocock, L., Del Pozo Segura, J.M. and Hillary, J. (2025a) Building foundations: investigating childhood skill development, gaps and solutions. Working Paper 6 technical report. *The Skills Imperative 2035: essential skills for tomorrow's workforce*. Available at: https://www.nfer.ac.uk/media/fvjbm4fy/building_foundations_the_implications_of_research_on_childhood_skill_development_for_addressing_future_skills_needs_in_england_technical_report.pdf

Bocock, L., Del Pozo Segura, J.M. and Hillary, J. (2025b) *The Skills Imperative 2035*: The implications of research on childhood skill development for addressing future skills needs in England. Working Paper 6 of *The Skills Imperative 2035: Essential skills for tomorrow's workforce*. Available at: https://www.nfer.ac.uk/publications/the-skills-imperative-2035-the-implications-of-research-on-childhood-skill-development-for-addressing-future-skills-needs-in-england/

Bocock, L., Scott, M. and Tang, S. (2025) A narrowing pipeline? what changes in UK tech hiring might tell us about future opportunities in the sector. Available at: https://www.nfer.ac.uk/media/eojjh3ks/a-narrowing-pipeline.pdf

Boudon, R. (1974) Education, opportunity and social inequality: changing prospects in western society. New York: NY: John Wiley and Sons.

Brown, E.R., Groom, M., Zhang, K. and Angell, S. (2023) World class: what England can learn from global experience to make early years policy work for disadvantaged children. Available at: https://www.suttontrust.com/wp-content/uploads/2023/07/A-Fair-Start-%E2%80%93-World-Class-Global-Learnings-For-England-On-Early-Years-Policy.pdf

Callender, C. and Thompson, J. (2018) The lost part-timers. The decline of part-time undergraduate higher education in England. Available at: https://www.suttontrust.com/wp-content/uploads/2019/12/The-Lost-Part-Timers-Final.pdf

Camden, B. (2024) 'Replace GCSE maths resits with foundation course, says OECD', FE Week, 5 November. Available at: https://feweek.co.uk/replace-gcse-maths-resits-with-new-foundation-course-says-oecd/

Cardim-Dias, J., Jiménez, E. and Zuccollo, J. (2025) Closing the workforce quality gap. Available at: https://epi.org.uk/wp-content/uploads/2025/04/EPI-Report-workforce-quality-gap.pdf

Carneiro, P., Cattan, S., Conti, G., Crawford, C., Farquharson, C. and Ridpath, N. (2025) The short- and medium-term effects of Sure Start on children's outcomes. Available at: https://ifs.org.uk/sites/default/files/2025-05/IFS%20Report.%20The%20short-%20and%20medium-term%20effects%20of%20Sure%20Start%20on%20children%E2%80%99s%20outcomes.pdf

Carneiro, P., Cattan, S. and Ridpath, N. (2024) Sure Start greatly improved disadvantaged children's GCSE results, Institute for Fiscal Studies. Available at: https://ifs.org.uk/news/sure-start-greatly-improved-disadvantaged-childrens-gcse-results

Cavalglia, C., McNally, S. and Ventura, G. (2022) The recent evolution of apprenticeships: apprenticeship pathways and participation since 2015. Available at: https://www.suttontrust.com/wp-content/uploads/2022/12/The-recent-evolution-of-apprenticeships.pdf

CBI (2024) Opportunity in growth: the 2024 CBI/Pertemps employment trends survey. Available at: https://www.cbi.org.uk/media/sppluv0o/cbi-pertemps-ets-report-2024.pdf

CBI/Pearson (2017) 'Helping the UK Thrive: CBI/Pearson Education and Skills Survey 2017'. Pearson. Available at: https://www.cbi.org.uk/media/1341/helping-the-uk-to-thrive-tess-2017.pdf.

Cedefop (2022) Vocational education and training in Europe - Austria: system description. Available at: https://www.cedefop.europa.eu/en/print/pdf/node/144692

Cedefop (2025) Tracking vocational education reform across Europe, CEDEFOP. Available at: https://www.cedefop.europa.eu/en/news/tracking-vocational-education-reform-across-europe

Chan, A. and Ravenscroft, T. (2024) Essential skills at scale. Available at: https://cdn.prod.website-files.com/5a86b2cd68b41700017162ca/668d32936c0fe70521ea7ede_Essential%20Skills%20at%20Scale.pdf

Chanfreau, J., Tanner, E., Callanan, M., Laing, K., Skipp, A. and Todd, L. (2016) Out of school activities during primary school and KS2 attainment. Working paper 2016/1. Available at: https://www.nuffieldfoundation.org/wp-content/uploads/2016/04/Working-paper-Out-of-school-activities-during-primary-school-and-KS2-attainment.pdf

Chantler-Hicks, L. (2025) '£22.5m announced for after-school clubs to help "isolated" kids', Schools Week, 6 August. Available at: https://schoolsweek.co.uk/22-5m-funding-for-after-school-clubs-to-tackle-worrying-trend-of-children-glued-to-screens-says-pm/

Choung, H., David, P. and Ross, A. (2022) 'Trust in AI and its role in the acceptance of AI technologies', International Journal of Human–Computer Interaction, 39(9), pp. 1727–1739. Available at: https://doi.org/10.1080/10447318.2022.2050543.

CMI and YouGov (2023) Taking responsibility: why UK PLC needs better managers. Available at: https://www.managers.org.uk/knowledge-and-insights/research/better-management-report-take-responsibility-take-action/

Cominetti, N., Costa, R., Eyles, A., Moev, T. and Ventura, G. (2022) Changing jobs? Change in the UK labour market and the role of worker mobility, The Economy 2030 Inquiry. Available at: https://economy2030.resolutionfoundation.org/wp-content/uploads/2022/01/Changing-jobs.pdf

Conti, G., Poupakis, S., Sandner, M. and Kliem, S. (2021) 'The effects of home visiting on mother-child interactions: evidence from a randomized trial using dynamic micro-level data', Child Abuse & Neglect, 115, p. 105021. Available at: https://doi.org/10.1016/j.chiabu.2021.105021.

Crowley, L. (2024) The changing face of the youth labour market. Available at: https://www.cipd.org/globalassets/media/knowledge/knowledge-hub/reports/2024-pdfs/8735-changing-face-of-the-youth-labour-market-web.pdf

Curriculum and Assessment Review (2025) Building a world-class curriculum for all: Final Report. DfE (2025c) Skills England: Sector evidence at: https://assets.publishing.service.gov.uk/media/6863f18b3464d9c0ad609ddf/Skills_England_-_sector_evidence_on_the_growth_and_skills_offer.pdf.

DfE and Skills England (2025) Employer Skills Survey: 2024, GOV.UK. Available at: https://explore-education-statistics.service.gov.uk/find-statistics/employer-skills-survey/2024

Dickerson, A., Rossi, G., Bocock, L., Hillary, J. and Simcock, D. (2023) An analysis of the demand for skills in the labour market in 2035. Working Paper 3 of The Skills Imperative 2035: Essential skills for tomorrow's workforce. Available at: https://www.nfer.ac.uk/media/utwf2grb/the_skills_imperative_2035_working_paper_3_an_analysis_of_the_demand_for_skills_in_the_labour_market_in_2035.pdf

Donnelly, M., Lažetić, P., Sandoval-Hernandez, A., Kumar, K. and Whewall, S. (2019) An unequal playing field: extra-Curricular activities, soft skills and social mobility. Available at: https://assets.publishing.service.gov.uk/media/5d307b8de5274a14e9f6bc20/An_Unequal_Playing_Field_report.pdf

Drayton, E. and Farquharson, C. (2023) 'Early years spending update: Budget reforms and beyond', IFS Report R274 [Preprint]. Available at: https://ifs.org.uk/sites/default/files/2023-09/IFS-R274-Early-years-spending-update-Budget-reforms-and-beyond.pdf

Drayton, E. and Farquharson, C. (2025) Childcare funding rates largely protected in real terms - with a big uplift for disadvantage premium, Institute for Fiscal Studies. Available at: https://ifs.org.uk/articles/childcare-funding-rates-largely-protected-real-terms-big-uplift-disadvantage-premium

Edwards, B. (2025) Anthropic chief says AI could surpass "almost all humans at almost everything" shortly after 2027, Ars Technica. Available at: https://arstechnica.com/ai/2025/01/anthropic-chief-says-ai-could-surpass-almost-all-humans-at-almost-everything-shortly-after-2027/

Employment and Social Development Canada (2021) Canada country background report – quality in early childhood education and care. Available at: https://www.canada.ca/content/dam/esdc-edsc/documents/programs/early-learning-child-care/reports/2021-canada-country-background-quality/Canada%20Country%20Background%20Report%20-%20Quality%20in%20Early%20Childhood%20Education%20and%20Care.pdf

Farquharson, C. (2023) Why take-up of the two-year-old offer has really fallen, Institute for Fiscal Studies. Available at: https://ifs.org.uk/articles/why-take-two-year-old-offer-has-really-fallen

Figueira, A.I., Rosa, A.P., Policarpo, D., Figueiredo, I.L., Salguiero, L., Pereira, M., Salgueiro, M.N., Soutenho, O., Meireles, P. and Tomas, S. (2021) Education guidelines for the world of work. Available at: https://cidadania.dge.mec.pt/sites/default/files/pdfs/refmundo-trabalho-en.pdf

Flemons, L. and Worth, J. (2025) The Early Years Workforce in England 2025. Available at: https://www.nfer.ac.uk/media/4uwi4cs5/the_early_years_workforce_in_england_2025.pdf

Healey, Z. (2024) Reinventing work experience, The Careers and Enterprise Company. Available at: https://www.careersandenterprise.co.uk/news/reinventing-work-experience-zoe-healey-industry-and-work-experience-lead/

Hingley, S., Edwards-Hughes, E., Lane, W., Man, C., Thornton, A. and Coleman, N. (2022) Parent, pupil and learner panel: June wave. Available at: https://assets.publishing.service.gov.uk/media/639219408fa8f53baa1f3f5f/PPLP_report_rw4_june.pdf

HM Government (2025) 'Post-16 Education and Skills'. Available at: https://assets.publishing.service.gov.uk/media/68f518ee06e6515f7914c7ce/Post-16_Education_and_Skills_white_paper_Accessible_Version.pdf.

House of Commons Education Committee (2023) Support for childcare and the early years. Fifth Report of Session 2022–23. HC 969. Available at: https://committees.parliament.uk/publications/41066/documents/200023/default/

Hurrell, S.A. (2016) 'Rethinking the soft skills deficit blame game: employers, skills withdrawal and the reporting of soft skills gaps', Human Relations, 69(3), pp. 605–628. Available at: https://doi.org/10.1177/0018726715591636.

IFF Research (2023) Employer skills survey 2022. Available at: https://assets.publishing.service.gov.uk/media/65855506fc07f3000d8d46bd/Employer_skills_survey_2022_research_report.pdf

IPPR (2024) Budget puts Starmer on course to be the highest investing PM since the 1970's, IPPR finds, IPPR. Available at: https://www.ippr.org/media-office/budget-puts-starmer-on-course-to-be-the-highest-investing-pm-since-the-1970s-ippr-finds

Jackson, M. (2013) Determined to succeed? Performance versus choice in educational attainment. Redwood City; CA: Stanford University Press. Available at: https://www.sup.org/books/sociology/determined-succeed

Jeong, J., Franchett, E.E., Oliveira, C.V.R. de, Rehmani, K. and Yousafzai, A.K. (2021) 'Parenting interventions to promote early child development in the first three years of life: a global systematic review and meta-analysis', PLOS Medicine, 18(5), p. e1003602. Available at: https://doi.org/10.1371/journal.pmed.1003602.

Jiménez, E., Tuckett, S., Hunt, E. and Robinson, D. (2025) Breaking down the gap, Education Policy Institute. Available at: https://epi.org.uk/publications-and-research/breaking-down-the-gap/

Kaput, M. (2025) A new forecast predicts AGI could arrive by 2027 (and it's raising eyebrows), Marketing AI Institute. Available at: https://www.marketingaiinstitute.com/blog/ai-2027

Kondo, K. (2025) Projected timeline for achieving artificial general intelligence: trajectory analysis and expert forecasts, Linked in. Available at: https://www.linkedin.com/pulse/projected-timeline-achieving-artificial-general-trajectory-ken-kondo-b6nsc

Labour Party (2023) 5 missions for a better Britain: secure the highest sustained growth in the G7. Available at: https://labour.org.uk/wp-content/uploads/2023/09/Mission-Economy.pdf

Labour Party (2024) Change: Labour party manifesto 2024. Available at: https://labour.org.uk/wp-content/uploads/2024/06/Labour-Party-manifesto-2024.pdf

Lehrplan21 (2016) Interdisciplinary skills, Lehrplan21. Available at: https://v-ef.lehrplan.ch/index.php?code=e|200|3

Levanon, G., Sigelman, M., Mamertino, M., de Zeeuw, M. and Guilford, G. (2025) No country for young grads. Available at: https://static1.squarespace.com/static/6197797102be715f55c0e0a1/t/6889055d25352c5b3f28c202/1753810269213/No+Country+for+Young+Grads+V_Final7.29.25+%281%29.pdf

Lucas, M., Bocock, L., Del Pozo Segura, J.M. and Hillary, J. (2025) International comparisons: investigating cross-country differences in young people's skill development and identifying factors associated with high-performance. Working paper 7 of *The Skills Imperative 2035: essential skills for tomorrow's workforce*. Available at: https://www.nfer.ac.uk/media/azmhp2ud/skills-imperative-international-comparisons-main-report.pdf

McIntosh, S., Rossi, G., Bocock, L. and Hillary, J. (2025) 'Education Pathways, Skills Development and Occupational Outcomes. Working paper 8 of *The Skills Imperative 2035: Essential skills for tomorrow's workforce*'. Available at: https://www.nfer.ac.uk/publications/skills-imperative-2035-education-pathways-skills-development-and-occupational-outcomes/

Mckend, L. (2024) Talent and hiring trends in the United Kingdom: insights for 2024. Available at: https://www.linkedin.com/pulse/talent-hiring-trends-united-kingdom-insights-2024-luke-mckend-g1zve

NAO (2020) 'Supporting disadvantaged families through free early education and childcare entitlements in England', 13 March. Available at: https://www.nao.org.uk/press-releases/supporting-disadvantaged-families-through-free-early-education-and-childcare-entitlements-in-england/

Normand, O., Egglestone, C., Manetti, L. and Jones, E. (2024) Adult participation in learning survey 2024. Available at: https://learningandwork.org.uk/wp-content/uploads/2024/11/Adult_Participation_in_Learning_Survey_2024-2.pdf

Nowak, C. and Heinrichs, N. (2008) 'A comprehensive meta-analysis of Triple P-Positive Parenting Program using hierarchical linear modeling: effectiveness and moderating variables', Clinical Child and Family Psychology Review, 11(3), pp. 114–144. Available at: https://doi.org/10.1007/s10567-008-0033-0.

OECD (2023) Education at a Glance 2023: OECD Indicators. OECD. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/09/education-at-a-glance-2023_581c9602/e13bef63-en.pdf

OECD (2024) Education at a Glance 2024 - Country notes: United Kingdom. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/09/education-at-a-glance-2024-country-notes_532eb29d/united-kingdom_618cbed0/c3bad31e-en.pdf

OECD (2025) 'Education at a Glance 2025'. Available at: https://www.oecd.org/en/publications/2025/09/education-at-a-glance-2025_c58fc9ae.html.

ONS (2024) Earnings and hours worked, age group by occupation by two-digit SOC: ASHE Table 20, ONS. Available at: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/agegroupbyoccupation2digitsocashetable20

ONS (2025a) Labour Force Survey performance and quality monitoring report: April to June 2025 - Office for National Statistics. Available at: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/labourforcesurveyperformanceandqualitymonitoringreportaprriltojune2025

ONS (2025b) Nomis, official census and labour market statistics; annual population survey / labour force survey, ONS. Available at: https://www.nomisweb.co.uk/sources/aps

ONS (2025c) SOC 2020 Volume 1: structure and descriptions of unit groups, ONS. Available at: https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2020/soc2020volume1structureanddescriptionsofunitgroups

ONS (2025d) 'X02: Labour Force Survey flows estimates'. Available at: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/labourforcesurveyflowsestimatesx02

Pillay, T. (2025) How OpenAI's Sam Altman is thinking about AGI and superintelligence in 2025, TIME. Available at: https://time.com/7205596/sam-altman-superintelligence-agi/

Platform for Education 2032 (2016) Ons onderwijs2032 Eindadvies. Available at: https://newsroom.didactiefonline.nl/uploads/PDF/eindadvies-platform-onderwijs2032-ons-onderwijs2032.pdf

Prime Minister's Office (2025) Prime Minister unveils reforms to transform further and higher education. Available at: https://www.gov.uk/government/news/prime-minister-unveils-reforms-to-transform-further-and-higher-education.

Reeves, C., Islam, A. and Gentry, T. (2024) The state of health and care of older people in England 2024. Available at: https://www.ageuk.org.uk/siteassets/documents/reports-and-publications/reports-and-briefings/health--wellbeing/state-of-health-and-care/state_of_health_and_social_care_24.pdf

Robinson, D. (2024) Access to extra-curricular provision and the association with outcomes. Available at: https://epi.org.uk/wp-content/uploads/2024/02/EC-and-outcomes-final-1.pdf

Robling, M., Lugg-Widger, F., Cannings-John, R., Sanders, J., Angel, L., Channon, S., Fitzsimmons, D., Hood, K., Kenkre, J., Moody, G., Owen-Jones, E., Pockett, R., Segrott, J. and Slater, T. (2021) The Family Nurse Partnership to reduce maltreatment and improve child health and development in young children: the BB:2–6 routine data-linkage follow-up to earlier RCT. Available at: https://doi.org/10.3310/phr09020.

Rose, S. (2025) Demis Hassabis on our AI future: 'It'll be 10 times bigger than the Industrial Revolution – and maybe 10 times faster', The Guardian. Available at: https://www.theguardian.com/technology/2025/aug/04/demis-hassabis-ai-future-10-times-bigger-than-industrial-revolution-and-10-times-faster

Scott, M., Bocock, L., Del Pozo Segura, J.M. and Hillary, J. (2024) Shifting sands: anticipating changes in the future labour market and supporting the workers at greatest risk. . Working Paper 5 of *The Skills Imperative 2035: Essential skills for tomorrow's workforce*. Available at: https://www.nfer.ac.uk/media/ravpsgdt/shifting_sands_working_paper_5_of_the_skills_imperative_2035_essential_skills_for_tomorrows_workforce.pdf

Sibieta, L., Tahir, I. and Waltmann, B. (2022) Adult education: the past, present and future. Available at: https://ifs.org.uk/sites/default/files/output_url_files/BN344-Adult-education-past-present-and-future.pdf

Singla, A., Sukharevsky, A., Yee, L., Chui, M. and Hall, B. (2025) The state of AI: how organizations are rewiring to capture value. Global survey, McKinsey & Company. Available at: https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai

Social Mobility Commission (2016) Social inequalities and post-16 choices, GOV.UK. Available at: https://www.gov.uk/government/news/social-inequalities-and-post-16-choices

Social Mobility Commission (2021) The road not taken – review of literature and survey evidence (HTML), GOV.UK. Available at: https://www.gov.uk/government/publications/the-road-not-taken-drivers-of-course-selection/the-road-not-taken-review-of-literature-and-survey-evidence-html

Taggart, E. (2025) 'Graduates change career plans as AI upends jobs market', The Telegraph, 3 August. Available at: https://www.telegraph.co.uk/business/2025/08/03/graduates-change-career-plans-ai-upends-jobs-market/

Tahir, I. (2023) Investment in training and skills. Available at: https://doi.org/10.1920/re.ifs.2023.0277.

The Sutton Trust (2018) 'University aspirations 2018'. Available at: https://www.suttontrust.com/wp-content/uploads/2019/12/AspirationsPolling2018-Tables.pdf

The Sutton Trust (2019) Social mobility in Great Britain: state of the nation 2018 to 2019. Available at: https://www.gov.uk/government/publications/social-mobility-in-great-britain-state-of-the-nation-2018-to-2019

Thompson, N.C., Greenewald, K., Lee, K. and Manso, G.F. (2022) 'The Computational Limits of Deep Learning'. arXiv. Available at: https://arxiv.org/pdf/2007.05558

Thwaites, G., Cominetti, N. and Slaughter, H. (2025) Labour market outlook q3 2025. Available at: https://www.resolutionfoundation.org/publications/labour-market-outlook-q3-2025/

Treasury Select Committee (2018) Childcare policy and its influence on the economy: Treasury Select Committee inquiry, UK Parliament. Available at: https://committees.parliament.uk/writtenevidence/86783/html/

Übellacker, T. (2025) Making sense of AI limitations: how individual perceptions shape organizational readiness for AI adoption, ARXIV. Available at: https://arxiv.org/html/2502.15870v1

UK Government (2025) The UK's modern industrial strategy. CP 1337. Available at: https://assets.publishing.service.gov.uk/media/68595e56db8e139f95652dc6/industrial_strategy_policy_paper.pdf

West Midlands Combined Authority (2023) 'Free job skills training given green light for people earning £30k or less', West Midlands Combined Authority, 5 July. Available at: https://www.wmca.org.uk/news/free-job-skills-training-given-green-light-for-people-earning-30k-or-less/

Wilson, R., Bosworth, D., Bosworth, L., Cardenas-Rubio, J., Day, R., Patel, S., Bui, H., Lin, X., Seymour, D., Thoung, C. and Hillary, J. (2022) *The Skills Imperative 2035*: occupational outlook – long-run employment prospects for the UK. Working Paper 2: headline report. Available at: https://www.nfer.ac.uk/media/ybkcqvuz/the_skills_imperative_2035_working_paper_2_headline_report.pdf

Winterbotham, M., Kik, G., Selner, S., Menys, R., Stroud, S. and Whittaker, S. (2020) Employer skills survey 2019: skills needs. Research report. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936489/ESS_2019_Skills_Needs_Report_Nov20.pdf

Winterbotham, M., Vivian, D., Kik, G., Hewitt, J.H., Tweddle, M., Downing, C., Thomson, D., Morrice, N. and Stroud, S. (2018) Employer skills survey 2017. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746493/ESS_2017_UK_Report_Controlled_v06.00.pdf

Wu, H., Guo, Y., Yang, Y., Zhao, L. and Guo, C. (2021) 'A meta-analysis of the longitudinal relationship between academic self-concept and academic achievement', Educational Psychology Review, 33(4), pp. 1749–1778. Available at: https://doi.org/10.1007/s10648-021-09600-1.

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