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International comparisons:

Implications for England of research on high-performing education systems

Working paper 7 Summary Report, from The Skills Imperative 2035: Essential skills for tomorrow's workforce

Megan Lucas, Luke Bocock, Dr Juan Manuel del Pozo Segura and Jude Hillary, National Foundation for Educational Research

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The Skills Imperative 2035

Contents

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Glossary

Term	Our definition
Cognitive skills	Mental processing abilities, underpinned by language and literacy skills (which equip people to process information and communicate effectively) and numeracy skills (which underpin decision-making and the ability to interpret complex data).
Socio-emotional skills	Abilities to identify and regulate emotions and use them in decision-making for social situations.
Self-management skills	Abilities to establish and achieve goals by controlling and productively organising thoughts and behaviours.
Socio-emotional index score	Aggregate scores calculated based on young people's scores in PISA 2022 for assertiveness, co-operation, curiosity, emotional control, empathy, persistence and stress resistance (OECD, 2024c). These are calculated for the subset of PISA 2022 countries that gathered data on young people's social and emotional skills.
Numeracy skills	Abilities - as measured in the Survey of Adult Skills (PIAAC) - to access, use, and reason critically with mathematical content, information and ideas represented in multiple ways in order to engage in and manage the mathematical demands of a range of situations in adult life (Educational Testing Service, 2024).
Literacy skills	Abilities - as measured in the Survey of Adult Skills (PIAAC) – to access, understand, evaluate and reflect on written texts in order to achieve one's goals, to develop one's knowledge and potential and to participate in society (Educational Testing Service, 2024).
Problem solving skills	In PISA 2015, collaborative problem solving measured pupils' ability to solve a problem by sharing the knowledge, skills and effort with others to reach a solution (OECD, 2017c). PIAAC 2011/12 measured adults' abilities to understand, evaluate and use information in technology-rich environments (OECD, 2012), and PIAAC 2022/23 focused on adaptive problem solving, assessing the cognitive and metacognitive processes adults use when solving problems (Educational Testing Service, 2024).
Essential Employment Skills (EES)	A set of six skills identified earlier in The Skills Imperative 2035 as especially vital to the future workforce (Dickerson et al., 2023). These skills are a mix of cognitive skills (problem solving and decision making; information literacy; creative thinking), socio-emotional skills (collaboration; communication) and self-management skills (organising, planning and prioritising).

Executive summary

Previous research for The Skills Imperative 2035 indicates that the structure of the labour market is likely to continue to change – slowly, but steadily and inexorably – impacting on the jobs that are available and the skills needed to do these jobs (Taylor et al., 2022; Wilson et al., 2022). Job growth will be concentrated in professional occupations. Demand for lower-skilled workers is projected to decrease whilst demand for higher-skilled workers will increase. This presents challenges, both for adult workers already in the labour market, and young people yet to enter the labour market. In Working Paper 5, we examined the implications for adult workers, whereas in Working Paper 6 and this paper (Working Paper 7) we have been exploring the implications of labour market changes for young people. In Working Paper 3, we identified a set of transferable 'Essential Employment Skills' (EES)[1] –including socio-emotional skills, cognitive skills and self-management skills - that will be especially vital across the future labour market, particularly in growth occupations, and in Working Paper 4 we reported that deficiencies in these skills are already widespread and likely to grow. It is crucial that young people leave the education system with the EES, and qualifications, required to enter, or progress into, growing occupations. In this Summary Report (and Working Paper 7, which accompanies it), we investigate cross-country differences in young people's cognitive, socio-emotional and self-management skills, in line with the hypothesis that young people's levels of these skills are likely to be closely related with their EES in early adulthood. We identify education system factors associated with better skills outcomes and draw out implications for policy makers and education system leaders in England.

We address the following Research Questions (RQs):

RQ1. In which countries do young people have higher skills levels and lower skills inequalities than England, making them good candidates for England to learn from?

RQ2. What are the common distinguishing features of education systems that are identified as 'high performing' on the basis of their young people's cognitive skill development?

RQ3. In what ways do countries identified as 'high-performing', based on their young people's skill development, effectively combine and implement these common features?

1 *The EES identified in Working Paper 3 were: Collaboration; communication; creative thinking; information literacy; organising, planning & prioritising; problem solving & decision making.*

The focus of our research is on education in England, but the lessons we draw will carry implications for other countries, particularly other UK nations. Consequently, where data is available for the UK, we make use of this. We make clear throughout when we have analysed data for UK and where we have analysed data for England.

We answer the RQs above by (a) using international large-scale assessment data to compare countries based on their young people's average skill levels, skills inequalities and skill development across a number of domains; (b) reviewing the existing cross-country comparative evidence base to identify common features of education systems that perform relatively highly on one or more of our skills outcomes; and (c) examining how these features are adopted, implemented and combined in seven case-study countries.

The key findings from our research, in relation to each RQ are:

RQ1: In which countries do young people have higher skills levels and lower skills inequalities than England, making them good candidates for England to learn from?

1. Young people in England typically have worse socio-emotional skills[2] at the end of lower secondary school (age 15/16) than the OECD average, and inequalities[3] in these skills are also greater in England than any other country in our dataset of 31 countries.
2. Young people in the UK/England[4] typically have better maths, reading and science skills than the OECD average, but inequalities in these skills are marginally greater in the UK/England and they have not narrowed over the past decade.
3. Whilst numeracy and literacy skill development in England, between the ages of 15/16 and early 20s, used to be worse than the average across countries participating in the Survey of Adult Skills (PIAAC), this appears to have improved considerably over the past 10-15 years and is now above average.
4. The countries identified as high performing on the basis of their young people's cognitive skills at age 15/16 differ from the countries whose young people have highest socio-emotional scores. Relatedly, the countries with the best post-16 cognitive skill development differ from those with the highest cognitive skills at age 15/16.

2 *Based on children's socio-emotional index scores, which are generated from scores for their assertiveness, co-operation, curiosity, emotional control, empathy, persistence and stress resistance.*

3 *Skills inequalities are calculated as the difference between the median and tenth percentile of the distribution of standardised scores of all pupils in each country (see Working Paper 7 for more details and a justification for this approach).*

4 *Based on analysis of PISA 2022 (England only), and analysis of PISA 2018 (England, Scotland, Wales and Northern Ireland).*

RQ2: What are the common distinguishing features of education systems that are identified as 'high performing' on the basis of their young people's cognitive skill development?

5. Attendance at 'Early Childhood Education and Care' (ECEC) settings with a high-quality workforce and standard of provision benefits pupils' outcomes later in life.
6. Compulsory participation in maths and literacy across all upper secondary[5] education pathways helps to reduce skills inequalities in these two domains.
7. Tracking[6] contributes to greater inequalities in post-16 skills development and lower average skill levels for pupils from lower socio-economic backgrounds. However, this can be offset by other features of a country's education system, including greater curriculum standardisation across tracks.
8. Systems that direct a greater share of funding to vocational pathways are characterised by higher rates of participation in vocational programmes, which correspond with higher skill levels and lower skills inequalities, particularly in the context of tracked systems.
9. Making socio-emotional skills explicit within the curriculum and competency development frameworks may support improved social and emotional development
10. Some broader contextual factors moderate the impact of education system features on young people's skill development, for example demographic characteristics impact pupils' outcomes and embed inequalities before children enter the education system and as they progress through it.

RQ3: In what ways do countries identified as 'high-performing', based on their young people's skill development, effectively combine and implement these common features?

11. High performing countries tend to have more coherent education systems underpinned by an implicit vision and set of values for education which are aligned with the socio-cultural and economic context in which they operate.
12. High performing education systems make trade-offs to successfully develop some skills, sometimes at the expense of developing other skills.

5 *Refers to the stage of education for 16-19 year olds that follows GCSEs and prepares students for entry to Higher Education or employment.*

6 *Tracking refers to the practice of sorting pupils into different types of education or curriculum pathways (Bol et al., 2014; Heisig and Solga, 2015; Strello et al., 2021; Bodovski et al., 2024).*

Based on the key findings listed above, we propose a number of policy considerations for the government in England, as well as making recommendations for further research:

Implications for education up to the end of lower secondary education:

Recommendation 1:

Government should explore what more it could do to incentivise and support schools to promote the development of children's socio-emotional skills (like communication and collaborating with others), as well as related self-management skills (like planning and organisation) and cognitive skills (like problem solving), as critical parts of a good education. This could include exploring whether and how the development of EES can be strengthened as part of teaching and delivering the curriculum.

Recommendation 2:

Given evidence suggests attending ECEC settings with a high-quality workforce has a positive impact on children's early skill development - coupled with the significant expansions in childcare entitlements for working parents which are estimated to require an additional 40,000 early years educators - the government should create a clear Early Years workforce strategy for (a) attracting and retaining sufficient early years staff, (b) ensuring early years educators are appropriately qualified, and (c) ensuring adequate access to professional development.

Recommendation 3:

Government should consider the focus of early years funding, and how to increase the incentivises for high quality ECEC settings to prioritise access to funded places for disadvantaged children.

Implications for upper secondary and higher vocational education:

Recommendation 4:

The new post-16 skills strategy should be explicit about the government's overall vision, strategy and plans for post-16 education in England, with clarity about the contribution that each pathway makes to this vision and coherent progression routes within and between pathways.

Recommendation 5:

The government should set an ambition to raise post-16 participation rates in numeracy and literacy, to be achieved either by increasing the breadth of levels and options for studying these subjects or by making participation compulsory in these subjects. Coupled with this, the government should integrate the development of EES - including socio-emotional (e.g. communication), self-management (e.g. planning and organising), and cognitive skills (e.g. problem solving) – across all post-16 programmes.

Recommendation 6:

Government should ensure all vocational education and training courses and qualifications offer clear progression routes into the labour market, higher education and further education.

Recommendation 7:

Government should identify, promote and incentivise co-investment and co-design of post-16 qualifications between employers, government and education providers.

Recommendation 8:

Government should consider introducing targeted funding for disadvantaged pupils in 16-19 education.

Implications for further research:

Recommendation 9:

The Organisation for Economic Cooperation and Development (OECD) and International Association for the Evaluation of Educational Achievement (IEA) should consider integrating EES measures into international large-scale surveys of young people and adults' skills, including PISA, PIAAC, TIMMS and PIRLS.

Recommendation 10:

Further research is needed to identify the different configurations of characteristics that are present in high-performing, and improving, education systems.

Recommendation 11:

Further research is needed to identify and then promote case studies of effective collaboration,

1. Introduction and purpose of this paper

The Skills Imperative 2035 is a five-year strategic research programme, funded by the Nuffield Foundation, which is investigating future skills needs, skills supply and skill development, with a particular focus on the 'Essential Employment Skills' (EES) that are projected to be most vital across the labour market in 2035.

Previous research for The Skills Imperative 2035 indicates that the structure of the labour market is likely to continue to change – slowly, but steadily and inexorably – impacting on the jobs that are available (Taylor et al., 2022; Wilson et al., 2022). This change is, first and foremost, driven by advancements in technology, which displace some jobs (because tasks are reallocated from humans to machines) and create or change other jobs to manage the new forms of technology (Carney, 2018; Costa et al., 2024). Demand for lower-skilled workers is projected to decrease whilst demand for higher-skilled workers will increase. Our analysis suggests that more than a million jobs could disappear from declining, lower-skilled occupations in the coming decade (Scott et al., 2024). These changes present opportunities and threats, both for adults in the workforce and for young people yet to join the labour market. In Working Paper 5 of The Skills Imperative 2035, we identified the workers at highest risk of being displaced and discussed the barriers to them successfully transitioning in the labour market (Scott et al., 2024). In this phase, we discuss the implications of changes in jobs and skills requirements for young people.

For highly skilled young people, job growth in professional occupations creates more opportunities for well-paying work. However, declining opportunities in low-skilled occupations also carry a threat for young people who leave the education system without the skills and qualifications to enter growth areas. Our previous research for The Skills Imperative 2035 suggests it will be especially vital they possess sufficient EES (Dickerson et al., 2023), but EES deficiencies are already widespread in the labour market (Bocock et al., 2024). There is a need for more young people to leave the education system with the skills (including EES) and qualifications required to enter growing occupations.

Consequently, in the last stage of The Skills Imperative 2035 we focused on identifying the factors that are most predictive of young people's cognitive and behavioural outcomes as they progress through childhood, with our hypothesis being that these outcomes are antecedents for EES in young adulthood (Bocock, Del Pozo Segura and Hillary, 2025a). Our research reaffirmed that skills development is highly cumulative, with inequalities in children's cognitive and behavioural outcomes becoming more entrenched as they get older. Differences in children's material, emotional and educational environments at home sow the seeds of these inequalities, which can then be further compounded by differences in the performance[7] of schools they attend. Addressing future skills gaps is likely to require a systematic approach that addresses the structural and behavioural influences on children's development from the early years, both at home and at school.

In this Working Paper, we investigate cross-country differences in young people's cognitive, socio-emotional and self-management skills and identify education system factors associated with better skills outcomes. In International comparisons: Investigating cross-country differences in young people's skill development and identifying factors associated with high-performance (the Working Paper that accompanies this Summary Report) we use data from International Large Scale Assessments (ILSAs) to compare countries across a range of measures of young people's cognitive, socio-emotional and self-management skills. Based on these comparisons, we identify countries that are relatively high-performing on at least one of our skills measures, identify common features associated with higher skills outcomes in those countries and examine how these features are combined and implemented in seven 'high performing' countries. In this paper, intended for policy makers and education sector leaders, we explore the implications of our research for how future skills needs might be met in England, particularly the growing demand for EES.

7 *Where school performance is approximated from the average progress that pupils' in the school make in Key Stage assessments.*

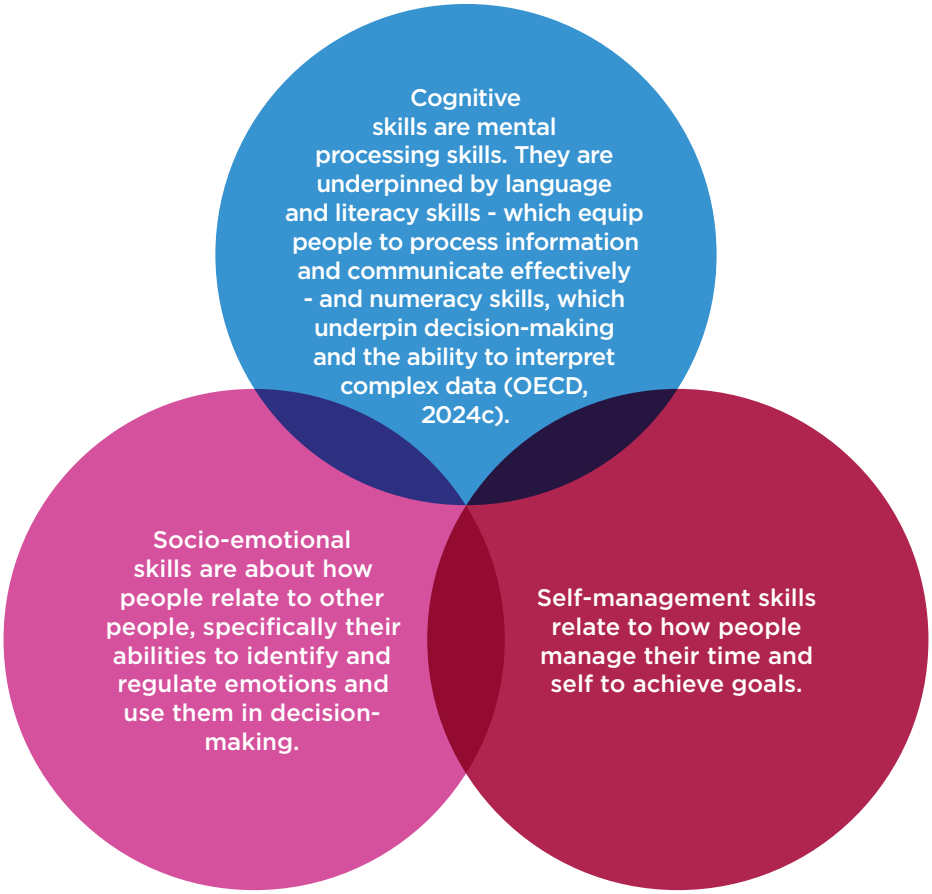
2. Conceptualising and categorising 'skills'

The primary focus of The Skills Imperative 2035 research programme concerns the future demand for and supply of EES, which are a set of transferable skills projected to be the most heavily utilised skills across the labour market in 2035. However, internationally comparable data on five of these six transferable skills (the exception being problem solving and decision making) is not collected. Our focus in this stage of the programme is, therefore, instead on the factors which explain cross-country variation across a broader set of related cognitive and socio-emotional skills, in line with our hypothesis that young people's cognitive and socio-emotional skills are antecedents for their EES in early adulthood. These EES then, in turn, are likely to have a significant bearing on young people's ability to enter, or progress into, growing, predominantly professional, occupations

Skills are part of a holistic concept of competency that includes cognitive skills, socio emotional skills, self-management skills (and physical and practical skills). To illustrate the relationship between these attributes and EES, we revisit the working model for conceptualising and categorising skills we put forward in Working Paper 6, shown in Figure 1 below. This model is intended to help readers relate the findings from our research into cross-country variation in skill development to future skills needs and skills supply in England, particularly the growing demand for EES.

Our model draws inspiration from Bloom's taxonomy, a framework developed in the 1950s and revised in the 1990s that classifies learning and development into domains, with levels of complexity within each domain that represent a continuum from basic recall of facts / knowledge to higher-order thinking skills such as evaluating and creating (Anderson et al., 2001). Unlike Bloom's taxonomy, we break each domain down into sub-domains. We detail the data sources for measuring people's skills in each sub-domain that we make use of in this study (Working Paper 7) and the last report (Working Paper 6) from The Skills Imperative 2035. We highlight the skills measures that we utilise in this paper.

Our model comprises three distinct but inter-related domains – cognitive skills, socio-emotional skills and self-management skills – which are developed around a set of relatively more stable, constant character traits (values, behaviours and attitudes)[8]:



8 *Psychomotor skills – which require physical as well as mental processes – are not covered in our model*

The distinctions between these three skill domains are not clear-cut, and development in one can complement development in the others. Existing research reaffirms that young people's socio-emotional skills, cognitive skills, self-management skills and transferable 'essential skills' are inter-related and evolve jointly over time, although the complex web of causal relationships between these attributes is extremely difficult to unpick.

There is considerable evidence that socio-emotional skills, including emotional intelligence and behaviour control, are related to cognitive skills, including those measured through academic attainment (Welsh et al., 2001; Payton et al., 2008; Gutman and Schoon, 2013; Duckworth et al., 2019; Sánchez-Álvarez, Berrios Martos and Extremera, 2020). For example, a meta-analysis of the relationship between emotional intelligence and academic performance reaffirms that outcomes across these domains are correlated; whilst correlation is weak for self-assessed emotional intelligence it is much stronger when emotional intelligence is measured through performance-based assessment (Sánchez-Álvarez, Berrios Martos and Extremera, 2020). There is also considerable evidence that conscientiousness / diligence, and resilience / grit are associated with cognitive performance (Mammadov, 2022; O'Connell and Marks, 2022; Gutman and Schoon, 2013). Combined with that, there is evidence that socio-emotional skills and other attributes such as conscientiousness are related to essential skills, akin to our EES, and predict success in school, the labour market and life (e.g. Heckman and Kautz, 2012; Kashefpakdel and Ravenscroft, 2021). This wealth of evidence supports our hypothesis that young people's literacy, numeracy and problem solving skills, as measured in PISA and PIACC, are likely to be closely associated with their EES in young adulthood. We make recommendations for further research in this area. We will also return to examining the relationships between EES and cognitive skills in a subsequent report for this research programme.

Figure 1: Working model for categorising skills into domains and sub-domains

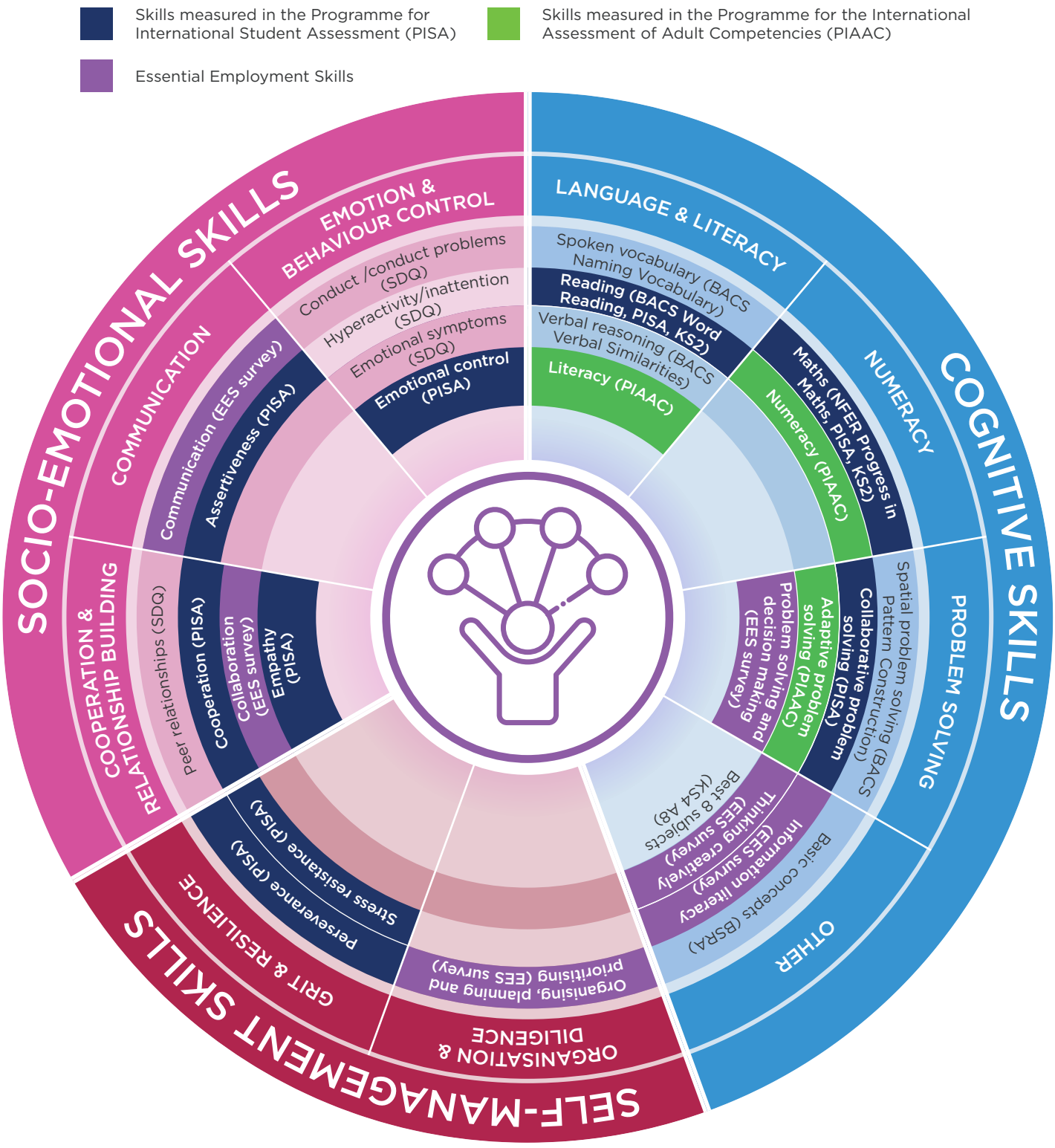


Figure 1 above illustrates how we conceptualise the six EES, which is as a bundle of skills spanning all three domains, including: Socio-emotional skills (1. Communication; and 2. Collaboration), Self-management skills (3. Organising, planning and prioritising) and Cognitive skills (4. Problem solving and decision making; 5. Information literacy; and 6. Creative thinking). In this stage of The Skills Imperative 2035, we identify and examine high-performing countries based on their young people's cognitive, socio-emotional and self-management skills at age 15/16 and their cognitive skill development between the ages of 15/16 and 20-24, in line with the hypothesis that these skills are likely to be highly correlated with people's EES in early adulthood. Figure 1 above also highlights the measures of children's cognitive, socio-emotional and self-management skills that we use from PISA and PIAAC.

3. Background context on our research into high-performing education systems

3.1 Gaps in the existing literature

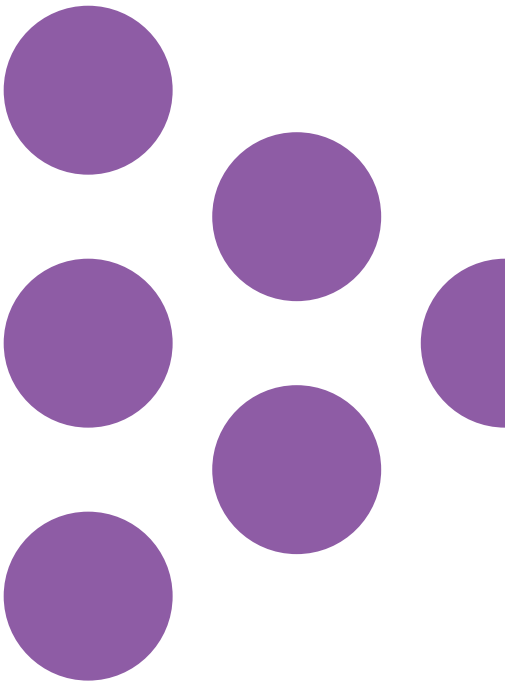
Most education system leaders are keen to learn from other 'high performing' systems beyond their borders, given education systems, despite their differences, share some common objectives and grapple with some similar challenges. However, important gaps in the international, cross-country evidence base have, arguably, led to national and international institutions focusing on too narrow a range of cognitive outcomes, placing too great a focus on identifying 'best practice', and cherry picking features that appear to work effectively elsewhere. The positive effects of this may be limited without an in-depth understanding of the common features associated with high-performance across the existing literature, the inter-relationships between these features, how they can be combined differently, and how their effects are moderated by the contexts in which they operate.

ILSA data has already been widely used to compare children's average literacy, language and numeracy skills in primary and secondary school. However, prior research has tended to ignore inequalities in skills outcomes and changes in skills outcomes over time, and, more importantly, comparisons of children's non-cognitive skills – such as their socio-emotional skills – are almost entirely absent from the literature. This is largely because ILSAs have not collected data on socio-emotional skills before PISA 2022. Earlier research for The Skills Imperative 2035, which clearly identifies growing demand for a set of EES that will be vitally important in the future labour market, suggests that it is crucial international comparisons consider a broad mix of cognitive, socio-emotional and self-management skills.

Moreover, research into the factors associated with variation in average skills outcomes during primary and secondary school has tended to focus either on the relationship between individual characteristics - particularly socio-economic status - and average skill levels (e.g. (Chmielewski and Reardon, 2016), or has focused on the relationship between skill levels and one particular feature of the education system, for example teacher selection and professional development (e.g. OECD, 2017d), teacher pay (e.g. Dolton and Marcenaro-Gutierrez, 2011), teacher cognitive skills (e.g. Hanushek, Piopiunik and Wiederhold, 2019), stratification into vocational and academic tracks and the prevalence of vocational programmes (e.g. Heisig and Solga, 2015), or education funding (e.g. Vegas and Coffin, 2015). Minimal attention has been applied to scrutinising the quality of this existing evidence and pooling the findings from across high-quality studies to assess the level of agreement on which factors, for example teacher quality and assessment and accountability structures, are important and which appear unimportant. Even more importantly, minimal attention has been paid to the inter-relationships between features, the different ways in which high-performing countries adopt and enact the common features that distinguish them, or to the trade-offs and compromises they make (either explicitly or implicitly) to achieve high-performance on a specific measure(s). Nor has there been a focus on the moderating role of contextual (societal, cultural and economics) factors.

Whilst ILSA data has also been used to compare countries' post-16 skill development outcomes, focusing on the period between the end of lower secondary education and participation in higher education / the labour market, research in this area is sparse. Notable exceptions to this include several studies by Green and colleagues at UCL Institute of Education, who have developed a typology of education system types and quantitatively examined whether some system types are associated with better skills outcomes than others (Green and Pensiero, 2016; Pensiero and Green, 2018). However, there are no papers that pull together the findings from across the few studies that do exist, summarising the different education system characteristics that are associated with post-16 skill development outcomes, and, as above, there is very little research on the ways in which these features are combined and implemented. Furthermore, most research comparing post-16 skill development across countries has relied on data from 15/16 year olds in PISA 2006 and the same birth cohort in PIAAC 2011/12; it is now possible, as of December 2024, to update this analysis using data from the second PIAAC cycle.

The consequence of these gaps in the existing literature may be a tendency towards 'policy borrowing', in which countries lift features from one high-performing system and apply them to very different education systems that function in different societal, economic and cultural contexts. These are unlikely to always have the desired results because education systems need to be understood as systems, with sufficient consideration for the contexts in which they operate, as well as the interdependencies and complexities that exist within large, evolving systems (Montouri, 2011).



3.2 How we extend the existing evidence base on high-performing education systems

In Working Paper 7 (which accompanies this Summary Report), we conduct quantitative analysis of ILSA data from PISA and PIAAC, including PISA 2018 and PIAAC Cycle 2 (2022/23), to compare countries' performance on a range of different measures of young people's cognitive, socio-emotional and self-management skills. We also distil the common features associated with high-performance from a review of the existing cross-country comparative literature evidence base and create case studies of seven countries identified as high performing on one or more of our skills measures, examining how features are combined and implemented in these countries and the trade-offs being made.

We extend the existing evidence by:

1. **Comparing the performance of England/UK[9] to international comparator countries based on young people's average skill levels and skills inequalities at age 15/16, including socio-emotional skills recorded for the first time in PISA 2022.**
2. **Comparing England to international comparator countries based on young adults' skills development between the ages of 15/16 and 20-24, including for the first time using data from, PISA 2018 together with PIAAC 2022/23.**
3. **Reviewing the existing literature, assessing it for agreement in terms of the results reported, and distilling the common distinguishing features associated with high-performing education systems**
4. **Creating case studies of high-performing education systems which consider the interdependencies and complexities that exist between different education system features and broader contextual factors**
5. **Relating the findings of our research on high-performing education systems to earlier research from The Skills Imperative 2035 about future skills needs and gaps in England.**

9 *To compare the performance of 15/16 year olds, we utilise data from PISA 2022 (in which England was the only home nation that participated) and PISA 2018, 2015 and 2012 (in which Wales, Scotland and Northern Ireland also participated).*

We address the following research questions (RQs):	We answer each RQ using a different method:
1. In which countries do young people have higher skills levels and lower skills inequalities than England, making them good candidates for England to learn from? a. How do average skill levels and skills inequalities in England / the UK[10] at age 15/16 compare to OECD averages across a range of cognitive, socio-emotional and self-management skills? b. How does numeracy and literacy skill development in England between the ages of 15/16 and 20-24 compare to other similarly developed countries that have participated in PIAAC? c. How have these comparisons changed over time? d. What countries are the 'highest performers', and therefore candidates for England to learn from?	**RQ1:** Analysis of quantitative data from ILSAs on numeracy, literacy, science and problem solving skills at age 15/16 and on numeracy and literacy skill development between the ages of 15/16 and 20-24, to compare average skill levels and skills inequalities in England to other countries, and to identify high performing countries.
2. What are the common distinguishing features of education systems that are identified as 'high performing' on the basis of their young people's cognitive skill development? a. What system and contextual features have been identified in the existing literature as contributing to cross-country variation in average skills levels and skills inequalities? b. Which are the common features of education system that are relatively high-performing in terms of their young people's skill development? c. Which contextual factors may moderate the effects of these features on skills development?	**RQ2:** A review of existing cross-country comparative evidence, focussing on large-scale academic studies that identify common features of education systems which perform relatively highly in terms of young people's skill development
3. In what ways do countries identified as 'high-performing', based on their young people's skill development, effectively combine and implement these common features? a. What key success factors contribute to their relative success? b. What are the trade-offs / compromises that they are making?	**RQ3:** Case studies of seven countries identified as high performing on different skills outcomes. We examine how countries adopt and enact common features associated with high performance, the trade-offs entailed, and the wider contextual factors that may be contributing to their performance.

The focus of our research is on education in England, however the lessons we draw will carry implications for other countries, particularly other UK nations, and, consequently, where data on the UK is published, we make use of this. We make clear throughout when we have analysed data for UK and where we have analysed data for England.

10 *Analysis of PISA 2022 data compares England to international comparators, whereas analysis of PISA 2018, 2015 and 2012 compares the UK to international comparators. This is because England was the only home nation that participated in PISA 2022, but all four home nations participated in PISA 2018, 2015 and 2012.*

3.3 Skills measured in PISA and PIAAC data and used in this study

Given we are interested in the antecedents of EES in young adulthood, and EES have not been measured in internationally comparable data, we examine children's broader development, across the **cognitive, socio-emotional and self-management** domains in the skills model shown earlier in Figure 1.

To identify high-performing countries, we analyse data in the following domains and sub-domains:

Socio-emotional skills (at age 15/16):

PISA data on the assertiveness, co-operation, curiosity, emotional control, empathy, persistence and stress resistance of children aged 15/16, collected from a subset of countries that participated in PISA 2022. These skills encompass self-management skills and socio-emotional skills in our model (see Figure 1). These skills were measured through a combination of student questionnaires and performance tasks designed to evaluate how students apply skills in real-life scenarios.

Maths, reading and science skills (at age 15/16):

PISA data from tests of children's cognitive skills, which measure students' understanding of concepts and written texts, their ability to apply mathematical / scientific reasoning and knowledge, and their ability to think critically about what they read. Language and literacy skills underpin people's cognitive processing skills, and numeracy skills underpin decision-making and the ability to interpret complex data (OECD, 2024a). Transferable skills like problem-solving and information literacy are widely embedded in mathematics curricula.

Numeracy and literacy skill development (between the age of 15/16 and 20-24):

We use data from cognitive tests in PISA and PIAAC to approximate, for each country, young people's skill development between the ages of 15/16 and 20-24. To do this, we examine the changes in skills between the birth-cohort of students who participated in PISA 2006 at age 15/16 and 20-24 year olds in PIAAC 2011/12, given that the latter sample is likely to include young adults who were 15/16 in 2006. For the same reasons, we also examine changes in skills outcomes between 15/16 year-olds in PISA 2018 and 20-24 year olds in PIAAC 2022/23.

Adaptive / collaborative problem solving skills at ages 15/16 and 16-24:

PISA and PIAAC data on people's problem solving skills, at 15/16 for collaborative problem solving (measured in PISA 2015) and 20-24 in adaptive problem solving (measured in PIAAC 2011/12 and PIAAC 2022/23).

As explained earlier, our hypothesis is that outcomes in the above skill domains relate to people's EES in young adulthood, which earlier research for The Skills Imperative 2035 suggests will be vital for young people in the future labour market.

3.3 Case study countries

Case study countries were selected on the basis that they meet one of the following criteria:

1. **Higher average cognitive skill levels and lower inequalities than England at age 15/16 (in at least two of: reading, science, maths).**

2. **Higher average socio-emotional skill levels and lower skills inequalities than England at age 15/16**

3. **Historically[11], better improvements in average numeracy and literacy skills and skills inequalities between the ages of 15/16 and 20-24 when compared to England.**

These criteria were identified based on a comparison of average skills levels and skills inequalities in UK / England relative to other countries. The same analysis was also used to identify the highest-performing education systems, which were taken as the best candidates for England to learn from.

Our seven case study countries are:

- Japan
- Estonia
- Switzerland
- Sweden
- Canada
- Portugal
- Austria

Portugal and Switzerland were selected because they have the highest average socio-emotional skill levels of any country from which this data was recorded in PISA 2022. Estonia and Canada were selected on the basis of their pre-16 cognitive outcomes. Japan was selected on the basis of both its pre- and post-16 cognitive outcomes, and Sweden and Austria were selected on their basis of their young people's post-16 cognitive development. These countries all differ from England in a variety of ways (e.g. size and culture) and none is universally high performing across all the skills outcome measures we analysed.

11 *Due to the timing of case study data collection, case study countries were selected based on our initial analysis of the relative differences in mean standardised score and levels of skills inequalities at age 15/16 in PISA 2006 compared to 20-24 year olds in PIAAC 2011/12, whereas analysis of PISA 2018 and PIAAC 2022/23 data was completed later.*

4. Key findings from our research into high-performing education system

The key findings from our research, in relation to each RQ are:

RQ1: In which countries do young people have higher skills levels and lower skills inequalities than England, making them good candidates for England to learn from?

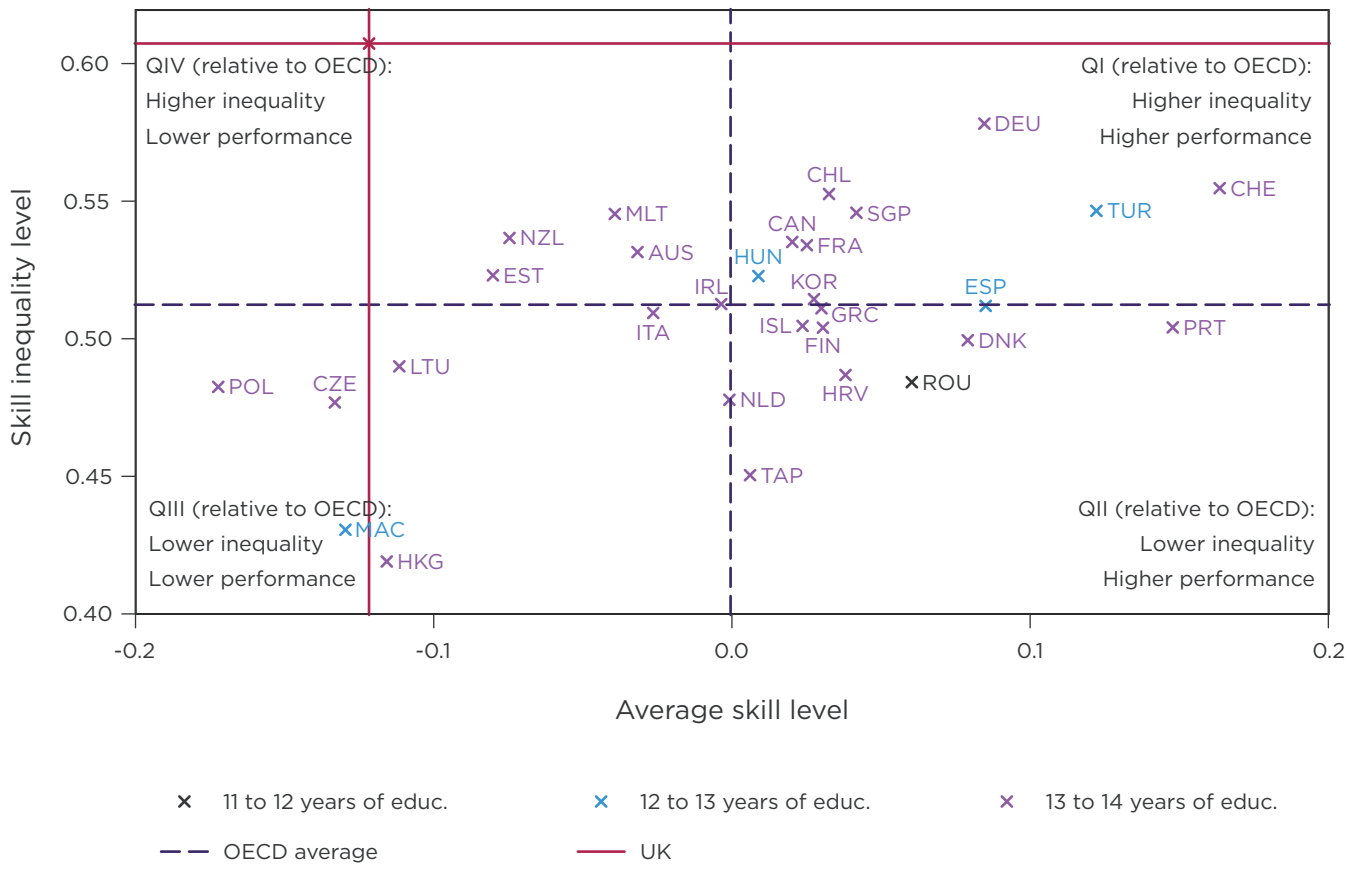
1. Young people in England typically have worse socio-emotional skills[12] at the end of lower secondary school (age 15/16) than the OECD average, and inequalities[13] in these skills are also greater in England than any other country in our data.

The average socio-emotional skills of 15/16 year olds in England are well below the OECD average, as shown in Figure 1, which plots countries' average skill levels on the x-axis against their level of skill inequality on the y-axis (see Working Paper 7 for further detail on the measures and analyses conducted). England ranks in the bottom ten countries (of 31 countries that measured socio-emotional skills in PISA 2022) on young people's average socio-emotional skills, based on a composite measure of their curiosity, perseverance, emotional control, stress resistance, empathy and co-operation. Inequalities in children's socio-emotional skills are also higher in England than any other country in our data, which appears to be driven by large inequalities in children's emotional control, stress resistance, assertiveness and perseverance. Other research has shown that socio-emotional skills are related to 'essential skills' (akin to our EES) and predict success in school, the labour market and life (e.g. Heckman and Kautz, 2012; Kashefpakdel and Ravenscroft, 2021). The relatively poor socio-emotional skills of 15/16 year olds in the UK may, therefore, be an indication that young people have lower EES when they leave education than their peers across the OECD, meaning they are not being sufficiently equipped with the skills projected to be in greatest demand across the future labour market.

12 *Based on children's socio-emotional index scores, which are generated from scores for their assertiveness, co-operation, curiosity, emotional control, empathy, persistence and stress resistance, which are derived from their responses to statements about their behaviours and feelings.*

13 *Skills inequalities are calculated as the difference between the median and bottom tenth percentile of the distribution of standardised scores of all pupils in each country (see Working Paper 7 for more details and a justification for this approach).*

Figure 1: Mean socio-emotional skill score by level of skill inequality amongst pupils aged 15/16 in PISA 2022 by country



2. Young people in the UK/England[14] typically have better maths, reading and science skills than the OECD average, but inequalities in these skills are marginally greater in the UK and they have not narrowed relative to the change in skills inequalities in other countries over the same time period.

While the average reading, maths and science skill levels of young people in the UK at age 15/16 are above the 75th percentile (of countries that participated in PISA 2022), and higher than the OECD average, skills inequalities across these domains are also marginally higher than the OECD average. Furthermore, our analysis suggests that skills inequalities in reading, mathematics or science among 15-16-year-olds have not narrowed between 2012 and 2022.

14 Based on analysis of PISA 2022 (England only) and PISA 2022 (England, Scotland, Wales and Northern Ireland).

3. Whilst numeracy and literacy skill development in England, between the ages of 15/16 and early 20s, used to be worse than the average across countries participating in the Survey of Adult Skills (PIAAC), this appears to have improved considerably over the past 10-15 years and is now above average

Data from the first cycle of PIAAC (collected in 2011/12) indicated that adults aged 20-24 in England typically had lower numeracy and literacy skill levels than the OECD average. Even more concerningly, comparisons between the average skill levels of 15/16 year olds in 2006 and 20-24 year olds in 2011/12 suggested numeracy and literacy skill development between these ages was relatively poor in England and inequalities in these skills also widened. Recent data, however, suggests young adults' literacy and numeracy skill development has improved significantly over the past 10-15 years. This is highlighted in Figure 2 below, which shows the development in young people's average skill levels, and change in skills inequalities, between 15/16 year olds in PISA 2018 and similar birth cohorts aged 20-24 in PIAAC 2022/23, by country. This chart suggests that post-16 literacy and numeracy skill development in England is now better than the all-country average, and skills inequalities. This improvement could be a consequence, in part, of increasing participation rates in upper secondary and tertiary education over the past 15-20 years and/or policies that have made English and maths a compulsory requirement to age 18 for those without good GCSE passes at age 15/16. However, alternatively, other confounding factors may explain part or all of the improvement.

Figure 2: The relative differences in mean standardised score and level of skills inequalities at age 15/16 in PISA 2018 compared to age 20-24 in PIAAC 2022/23, by country

Note: Purple dotted line is drawn at value = 0, which is very close to the average across all countries in the sample. Red line represents England (UK)

4. The countries identified as high performing on the basis of their young people's cognitive skills at age 15/16 differ from the countries whose young people have highest socio-emotional scores. Relatedly, the countries with the best post-16 cognitive skill development differ from those with the highest cognitive skills at age 15/16.

At the country level, average socio-emotional skills are not significantly associated with average levels of reading, maths or science skills at age 15/16. Even at the individual level, socio-emotional skills and cognitive skills are only weakly correlated. This suggests the determinants of skill development vary by domain (although there is no suggestion that development in one area comes at the expense of the other).

Relatedly, the countries identified as high performing based on young people's post-16 skills development differ from those that are highest performing in terms of cognitive or socio-emotional outcomes at age 15/16 (although there are some exceptions to this rule). This suggests that the education system features which contribute to improved skills outcomes at the end of secondary school may differ from the features which contribute to improved post-16 skills outcomes.

RQ2: What are the common distinguishing features of education systems that are identified as 'high performing' on the basis of their young people's cognitive skill development?

5. Attendance at 'Early Childhood Education and Care' (ECEC) settings with a high-quality workforce and standard of provision benefits pupils' outcomes later in life.

The existing cross-country comparative literature suggests that attending ECEC in the Early Years (EY) may be associated with improved cognitive skills at age 15/16, particularly where ECEC settings have a high-quality workforce (i.e. requiring staff to hold higher education qualifications) because this has the effect of raising the quality of provision (Balladares and Kankaraš, 2020; Brown et al., 2023). For example, in Estonia, where cognitive skills at age 15/16 are high, ECEC teachers must hold a bachelor's degree and pre-school education settings offer a standardised, formal curriculum delivered by qualified teachers. In addition, attendance fees for pre-school institutions are capped at 20 per cent of the minimum wage, reducing the socio-economic gap in access to high-quality ECEC. Access to high-quality ECEC may be similarly important for children's early development of socio-emotional and self-management skills.

6. Compulsory provision of maths and literacy across all upper secondary education pathways helps to reduce skills inequalities in these domains.

Our review of existing evidence indicates that making the study of maths and literacy compulsory across all upper secondary education programmes is associated with significantly reduced skills inequalities and improved average skill levels in these domains (Green and Pensiero, 2016; Pensiero and Green, 2018). Even without making these subjects compulsory, studies suggest that increasing the proportion of young people studying numeracy and literacy throughout upper secondary education may also help to reduce skills inequalities in numeracy and literacy. Other research by the OECD also suggests that offering students a wide range of different maths and numeracy levels and options may also better appeal to the varied interests, needs and aspirations of students, supporting participation rates and therefore better equity of outcomes (OECD, 2024c).

It may be that making EES a compulsory component of all post-16 study programmes would have a similar effect on the development of these skills. It may be beneficial for subjects to emphasise the development of specific EES in the curriculum, cross-referencing where in the curriculum these specific skills should be developed. This could ensure that EES form a compulsory component of all post-16 programmes

7. Tracking[15] contributes to greater inequalities in post-16 skills development and lower outcomes for pupils from lower socio-economic backgrounds. However, this can be offset by other features of a country's education system, including greater curriculum standardisation across tracks.

There is a clear consensus across the literature that tracking pupils into academic and vocational pathways generally increases outcome inequalities and attainment gaps between disadvantage pupils and their more affluent peers, primarily by magnifying the effect of socio-economic status (SES) on pupils' outcomes (Bol et al., 2014; Heisig and Solga, 2015; Strello et al., 2021; Bodovski et al., 2024). However, these negative effects of tracking can be partially offset if countries have high levels of participation in vocational education and greater standardisation in the curriculum across different tracks during upper-secondary education. Given this finding, greater curriculum standardisation in the integration of EES across vocational and academic tracks might also have the potential to attenuate the relationship between SES and pupils' outcomes.

8. Systems that direct a greater share of funding to vocational pathways are characterised by higher rates of participation in vocational programmes, which correspond with higher cognitive skill levels and lower skills inequalities, particularly in the context of tracked systems.

Systems that give equal priority to vocational and academic pathways are characterised by higher rates of participation in vocational education programmes, (Heisig and Solga, 2015; Green and Pensiero, 2016; Pensiero and Green, 2018; Green and Kaye, 2022). For example, in Austria, about 70 per cent of each age cohort enters a VET programme during upper secondary education, with over half of these young adults starting apprenticeship training. Employers are highly invested in the provision and design of these programmes. This highlights the importance of creating high-quality vocational education and training routes that offer good outcomes for participating students and are highly regarded by employers.

9. Making socio-emotional skills explicit within the curriculum and competency development frameworks may support improved social and emotional development.

Cross-country comparisons of young people's socio-emotional skills are absent from the existing literature, and very few studies have compared countries based on their approaches to integrating socio-emotional skills into the curriculum, teaching and learning or assessment, with a recent study by researchers at Sheffield Hallam University being a notable exception (Sheffield Hallam University, 2025). However, case study evidence suggests that the countries with the highest average socio-emotional skill levels at age 15/16 make the development of these skills an explicit priority within their educational objectives and curriculum frameworks. For example, in Switzerland, socio-emotional skills are explicitly covered in the curriculum frameworks for primary and lower secondary education in each language region throughout there are national guidelines for the assessment of these skills (OECD, 2015c). For example, Curriculum 21 – which is a framework that has been implemented across the German-speaking cantons (which make up the majority of Swiss cantons) - explicitly outlines 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 from pre-school to the end of secondary education have been published to support schools to develop these non-cognitive skills (Figueira et al., 2021). While we have not looked in detail at how this curriculum intent is enacted, making these skills explicit in the curriculum may be a useful step towards promoting and supporting their development across the country.

15 *Tracking refers to the practice of sorting pupils into different types of education or curriculum pathways (Bol et al., 2014; Heisig and Solga, 2015; Strello et al., 2021; Bodovski et al., 2024).*

10. Some broader contextual factors moderate the impact of education system features on young people's skill development, for example demographic characteristics impact pupils' outcomes and embed inequalities before children enter the education system and as they progress through it.

Evidence shows that students from higher SES backgrounds typically have higher reading, maths and science outcomes, though the SES gradient in scores varies between countries (Chiu and McBride-Chang, 2010; Bol et al., 2014; Chiu, 2015; Dräger et al., 2023; Münch and Wieczorek, 2023; Bodovski et al., 2024). Furthermore, SES gradients observed at age 6-8, when most pupils have entered primary education, persist largely unchanged to those observed at age 15 (Dräger et al., 2023). There is, however, some evidence that cultural context may modify the relationship between SES and students' outcomes. In more egalitarian countries (where society tends to teach members to view, value and act toward one another as equals, such as Norway), the positive association between SES and literacy outcomes was found to be stronger compared to more hierarchical countries (where society promotes clear, fixed hierarchical roles and teaching citizens to obey authority, such as Albania). In collectivist countries (where society tends to favour group interests over individual interests, such as South Korea), the impact of SES and household composition on literacy outcomes was weaker compared to individualist countries (where society favours individual interests over group interests, such as Australia and England) (Chiu and McBride-Chang, 2010). Overall, it is important that national and local skills strategies fit the demographic and socio-economic context in which they are implemented

RQ3: In what ways do countries identified as 'high-performing', based on their young people's skill development, effectively combine and implement these common features?

11. High performing countries tend to have more coherent education systems underpinned by an implicit vision and set of values for education which are aligned with the socio-cultural and economic context in which they operate.

Countries with relatively strong skills outcomes typically have more coherent education systems. Our case study evidence suggests that system coherence is underpinned by an implicit vision and set of values for education in the country, which are closely aligned with the socio-cultural and economic context. For example, Austria places vocational education at the heart of their vision for the education system, underpinned by a long-lasting strong social contract between employers and young people and high regard for vocational programmes and qualifications, which are designed to meet the needs of employers. Similarly, the Japanese education system reflects the wider socio-cultural expectations of equity and homogeneity within Japanese society and the premium placed on achieving a tertiary level education. This helps minimise the fragmentation within the education system by providing a clear set of guiding principles and parameters the system must align with and within which the system must operate.

12. High performing education systems make trade-offs to successfully develop some skills, sometimes at the expense of developing other skills.

None of the 'high-performing' countries we identify through our quantitative analysis perform highly across all outcome measures, even despite the fact all seven adopt most of the features identified in the wider literature as being associated with improved skills development and lower inequalities. Our case study evidence highlights that education systems need to be understood as 'systems', comprised of interrelated and interdependent features that evolve over time. Changes intended to improve outcomes in one area often involve compromises in another area. For example, improving numeracy and literacy development might involve narrowing the curriculum, as is the case in the Japanese upper secondary education system, with subjects like the arts and humanities given less emphasis. These trade-offs reaffirm the importance of having a clear vision, values and priorities for each phase of young people's education.

5. The implications of our research on high-performing education systems for addressing future skills needs and gaps in England

5.1 Conclusion

Over the next ten to 15 years, significant changes are expected in the jobs market, both in terms of the jobs available and the skills needed to do these jobs. It is vital that young people are equipped to enter growing, predominantly professional, occupations, which tend to require higher level qualifications and higher skill levels, including EES.

Based on our quantitative analysis of ILSA data, we identify three objectives for England:

1. Increasing the average socio-emotional skill levels of 15/16 year olds and narrowing inequalities in these skills.

Young people in England typically have worse socio-emotional skills at the end of lower secondary school than their peers in other OECD countries, and inequalities in these skills are also greater in England than any other country in our data.

2. Narrowing cognitive skills inequalities at age 15/16 (in reading, science, maths).

Whilst young people in England / the UK typically have better maths, reading and science skills than their OECD peers, skills inequalities are also marginally greater and they have not been narrowing.

3. Continuing to build on the progress made in supporting the post-16 numeracy and literacy skill development of young adults.

Post-16 numeracy and literacy skill development in England appears to have improved considerably in the past 10-15 years, but from a low base, and there remains room for further improvement.

There is considerable evidence that socio-emotional skills, cognitive skills and essential skills are related to one another, as previously outlined in Section 2. This suggests that achieving the three objectives above would help ensure that more young people leave education equipped with the skills, including EES, required to enter, or progress into, growth areas of the labour market, which are predominantly professional occupations.

Through our research on high-performing education systems, we identify countries that might be good candidates to learn from in one or more of these three areas, and through our literature review and case studies we identify implications for various features of the education system in England. Based on our key findings, we propose a number of policy considerations for the government in England, which should be considered collectively, as well as making recommendations for further research.

5.2 Recommendations

We present implications for education up to the end of lower secondary education, followed by implications for upper secondary and higher education.

Implications for education up to the end of lower secondary education:

Recommendation 1:

Government should explore what more it could do to incentivise and support schools to promote the development of children's socio-emotional skills (like communication and collaborating with others), as well as related self-management skills (like planning and organisation) and cognitive skills (like problem solving), as critical parts of a good education. This could include exploring whether and how the development of EES can be strengthened as part of teaching and delivering the curriculum.

Our analysis clearly shows that young people in England typically have worse socio-emotional skills at the end of lower secondary school than their peers in other OECD countries, and inequalities in these skills are greater. The PSHE curriculum refers to students' socio-emotional skills, and the new Ofsted framework (consultation ongoing at the time of writing) places greater emphasis on social and emotional wellbeing, but development of these skills - or related self-management skills (like planning and organisation) and cognitive skills (like problem solving) – are not heavily referenced in the National Curriculum.

By contrast, both of the case study countries selected on the basis of their young people's average socio-emotional skills amongst 15/16 year olds make the development of these skills a more explicit priority within their educational objectives and curriculum frameworks. This may result in increased focus being placed on these skills, although we cannot rule out that other factors explain these countries' relative success. Given EES - which includes socio-emotional skills - will be especially vital across the labour market in 2035, government should explore what more it could do to incentivise and support schools to develop children's socio-emotional, and related self-management and cognitive skills.

This could, for example, include exploring options as to whether and how embedding standards and competencies into curriculum guidance might be possible, whilst protecting core knowledge and avoiding unintended consequences. Producing guidance and teaching materials to support schools in developing these skills may also be impactful. Government should also consider developing a single framework that can be used by schools for benchmarking and tracking young people's progress in developing these skills, or alternatively adopting an existing framework[16]. This could outline age-related expectations for essential skills / EES and provide guidance on assessing each skill at each age, for example through assessing underpinning knowledge of the essential skill, observing the skill in action, and building a portfolio of learner evidence.

16 *The Skills Builder Universal Framework is one notable example of such a framework and is already promoted as a tool by the Institute for Apprenticeship and Technical Education (IfATE) and the Careers and Enterprise Company (CEC) amongst others.*

Recommendation 2:

Given evidence suggests attending ECEC settings with a high-quality workforce has a positive impact on children's early skill development - coupled with the significant expansions in childcare entitlements for working parents which are estimated to require an additional 40,000 early years educators - the government should create a clear Early Years workforce strategy for (a) attracting and retaining sufficient early years staff, (b) ensuring early years educators are appropriately qualified, and (c) ensuring adequate access to professional development.

(a) Attracting and retaining sufficient early years staff

Research on high-performing education systems suggests that attending ECEC settings with a high-quality workforce and standard of provision has a positive impact on children's early base of skills. Earlier research from The Skills Imperative 2035 showed that significant skills inequalities are evident in the early years and become more entrenched as children get older (Bocock, Del Pozo Segura and Hillary, 2025b). Building a high-quality workforce in the Early Years sector is key for underpinning a high standard of provision for young children, but difficulties recruiting staff and the high level of turnover are obvious barriers to achieving this (Owston, Jones and Stanley, 2024). Recruitment to Early Years Teacher (EYT) courses has dropped dramatically and many early years settings cite insufficient funds to recruit and retain higher qualified staff (Pascal, Bertram and Cole-Albäck, 2020). These recruitment and retention challenges are likely to be exacerbated by significant expansions in childcare entitlements for working parents (Public Accounts Committee, 2024) which are estimated to require an additional 84,500 places for children by September 2025 and additional 40,000 members of staff (Public Accounts Committee, 2024). The DfE is already responding to this challenge, but in a piecemeal way. The hourly funding rates uplift for 25/26, £75 million expansion grant to support new childcare places in high-demand areas, and 'Do Something Big' recruitment campaign (DfE, 2024) are a welcome start. However, there remains no long-term recruitment and retention strategy for the early years workforce, or for addressing low pay concerns, which are frequently cited as a key barrier to both attracting and retaining staff (Haux et al., 2022; Owston, Jones and Stanley, 2024). Currently, the Department for Education's (DfE) Teacher Recruitment and Retention Strategy only includes teachers in schools and colleges; the government should extend the scope of this strategy to the Early Years sector and consider longer term measures for attracting and retaining a growing workforce, whilst avoiding dilution in quality.

(b) Ensuring early years educators are appropriately qualified

More highly qualified early years educators are associated with better child outcomes, particularly amongst children from low-income families, in all likelihood because they are able to provide a higher standard of provision to children (Brown et al., 2023). In Estonia, ECEC teachers must hold a bachelor's degree (OECD, 2020, p. 202), and, 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). This might help explain why Estonia and Canada perform highly in terms of young people's cognitive skill outcomes at age 15/16. By contrast, in England, more qualified and experienced staff are leaving the sector due to poor salaries and conditions (Social Mobility Commission, 2020), which is leading to a downward trend in the number of staff reporting Level 3 (A Level equivalent) as their highest qualification (Pascal, Bertram and Cole-Albäck, 2020). The government should consider how to reverse this trend, such as through a programme similar to the Graduate Leader Fund, which distributed financial support to providers between 2007 and 2011 to employ graduates and led to a significant increase in the number of early years educators holding a degree (Bonetti, 2020).

(c) Ensuring adequate access to professional development

A lack of funding to support the ongoing training and development of existing staff is another key barrier preventing early year settings from building a high quality workforce (Haux et al., 2022; Owston, Jones and Stanley, 2024). As part of its mission to Breakdown Barriers to Opportunity, Labour committed to' work in partnership with the sector, reforming training and support for the workforce to drive up standards...We will work towards a stronger early years system, beginning with offering sustained professional development' (Prime Minister's Office, 2025). However, the government has yet to detail how it will increase access to sustained professional development. One opportunity is to capitalise on the additional £15m of funding for schools to make space for nursery provision, which has the potential to support greater sharing of expertise from schools into nurseries. Evidence suggests increased teacher involvement (particularly of early years specialists) can raise the quality of preschool teaching and learning and support staff development (Pinnington, 2024).

Achieving these objectives is likely to require higher investment in the early years but, between 2015 and 2021, public spending on ECEC in the UK relative to GDP decreased by 13 per cent. By contrast, on average across the OECD public spending on ECEC increased by nine per cent over this period (OECD, 2024b).

Recommendation 3:

Government should consider the focus of early years funding, and how to increase the incentivises for high quality ECEC settings to prioritise access to funded places for disadvantaged children.

The UK has made minimal progress in narrowing skills inequalities at age 15/16 over the past decade. Earlier research from The Skills Imperative 2035 showed that skills inequalities have their roots in the early years (Bocock, Del Pozo Segura and Hillary, 2025b). Evidence reviewed for this study suggests that ECEC attendance alone does not reduce the gap in outcomes between advantaged and disadvantaged pupils in the early years, possibly because pupils from more affluent families are likely to access higher quality ECEC provision than pupils from disadvantaged families (Balladares and Kankaraš, 2020). However, ECEC can help to narrow inequalities where disadvantaged families are targeted for high-quality ECEC provision and disadvantaged families are incentivised to enrol their children in ECEC (Brown et al., 2023). But at present, in the UK, children aged two or younger are less likely to participate in childcare if they come from a family in the bottom income tertile than the top tertile (32 per cent compared to 59 per cent), and this participation gap is notably larger than the OECD average (27 percentage points compared to 19 percentage points) (OECD, 2024b). The expansion of childcare entitlements could increase competition for funded places and reduce the average quality of provision, potentially further disadvantaging children from poorer families.

The Early Pupil Premium (EYPP) plays an important role in incentivising high quality ECEC settings to prioritise access for disadvantaged children. Whilst the annual EYPP funding rate will rise in 25/26 from £388 to £570, this comes after freezes between 2017/18 and 2021/22, against a backdrop of high levels of inflation and rising costs, and the increase this year will only restore EYPP to its 2017/18 value (Drayton and Farquharson, 2025). The proportion of the Early Years national funding formula for all 3- and 4-year-olds that is allocated based on the number of children registered for free school meals (FSM) will remain lower than the proportion of schools' national funding formula allocated for FSM eligible pupils. Moreover, EYPP is only a relatively small part of early years funding, which has become less targeted towards disadvantaged children over time. As reported by IFS, this is because the share of 2-year-olds eligible for early education targeted at disadvantaged children has fallen from 38% a decade ago to 27% in 2022–23. Furthermore, new childcare entitlements are restricted to working parents, which means that the poorest third of families are unlikely to benefit from any increased access to high-quality ECEC. The government should consider the focus of early years funding, and whether eligibility for funded childcare places could be extended to families taking steps towards getting back into work.

Implications for upper secondary and higher vocational education:

Recommendation 4:

The new post-16 skills strategy should be explicit about the government's overall vision, strategy and plans for post-16 education in England, with clarity about the contribution that each pathway makes to this vision and coherent progression routes within and between pathways.

Our case studies show that countries with relatively strong skills outcomes typically have a coherent set of clear, well-defined and stable post-16 pathways for students, with clear progression pathways from intermediate VET courses onto higher level VET courses and/or Higher Education. By contrast, in England, there is uncertainty about the long-term future of BTECs, the long-term ambition for T-Levels and their scalability is unclear, Level 2 bridging courses such as traineeships and the T-Level foundation year have had low uptake and struggled to facilitate progression onto Level 3 courses, apprenticeship starts for young people have plummeted without a clear policy response, and very few young people on Level 3 vocational courses subsequently progress onto higher level VET courses at Levels 4 and 5 (such as Higher National Diplomas and Certificates).

When considered collectively, these challenges suggest there is a need to clarify the overall vision for post-16 education, including the purpose and strategy for each post-16 education pathway. The focus of this strategy should be on preparing young people for the future labour market, including the jobs that are projected to exist and the skills that will be needed to do these jobs. Our research suggests that greater clarity and coherence may support national efforts to ensure young people leave the education system with the skills typically required to enter, or progress into, growth occupations. Given this, the government's commitment to publish a post-16 skills strategy in 2025 is welcome. This should clarify the principles, values and parameters that underpin the government's vision for post-16 education, the function of each pathway, how this is reflected in funding allocations and how young people will be equipped with the skills that will be most vital in the future labour market, including EES. This strategy also needs to be accompanied by clear plans for delivery, so that the vision becomes reality.

Recommendation 5:

The government should set an ambition to raise post-16 participation rates in numeracy and literacy, to be achieved either by increasing the breadth of levels and options for studying these subjects or by making participation compulsory in these subjects. Coupled with this, the government should integrate the development of EES - including socio-emotional (e.g. communication), self-management (e.g. planning and organising), and cognitive skills (e.g. problem solving) – across all post-16 programmes.

Our case studies show that countries with relatively strong skills outcomes typically have a coherent Language and literacy skills underpin people's cognitive processing skills, and numeracy skills underpin decision-making and the ability to interpret complex data (OECD, 2024c). Other transferable skills, represented in our EES, are also likely to have a significant bearing on young adults' ability to enter, or progress into, growth occupations in the future.

Across the literature reviewed for this study, there is consistent evidence that the compulsory provision of numeracy and literacy throughout upper secondary education, across all education routes (including vocational pathways), helps to reduce skills inequalities in these domains (Green and Pensiero, 2016; Pensiero and Green, 2018). Improvements in England over the past 10-15 years in post-16 numeracy and literacy skill development may be at least partly attributable to 'condition of funding' rules which stipulate students who have not achieved good passes at GCSE in maths and English must continue to study these subjects to 18, although we cannot rule out that the improvements are due to other changes, for example in young people's demographic factors, or instability in our post-16 skills development measure.

Nevertheless, whilst there have been significant improvements over the past 10-15 years, the UK still appears to be an outlier among high performing countries in not requiring the study

of maths and language until age 18 for all pupils during upper secondary education (DfE, 2023). Currently, under 'condition of funding' rules, only students without a grade 4 or above in maths and English at GCSE are required to continue studying these subjects. Amongst this group, students who achieve a grade 3 must continue to study GCSEs, whilst students with lower than a grade 3 (who make up a similar proportion of resit students) can take qualifications at level 2 or below (an allowance that was introduced in 2019/20). The overwhelming majority of resit students with a grade 2 or below at GCSE are entered into GCSEs, as opposed to other lower-level qualifications, despite GCSE resit pass rates amongst this group being extremely low, whilst pass rates are much higher in alternative English and maths courses such as Functional Skills Qualifications (FSQs). Moreover, disadvantaged students are less likely to pass GCSE English and maths than their non-disadvantaged peers, whereas gaps are smaller in alternative qualifications. The current resit policy is not working for learners that fell two or more grades short of a strong pass at age 16, particularly disadvantaged learners. At the moment, there are strong incentives for colleges to apply blanket policies of enrolling all students onto GCSE resits regardless of their prior grades in these subjects (for example because GCSEs can bump students into higher funding bands and because colleges have incentives to maximise their progress scores). The government should consider what more it can do support colleges, for example by providing additional funding to deliver the new minimum teaching hour requirements in GCSE maths and English resits. They should also ensure colleges are sufficiently incentivised to enrol all students onto the most appropriate qualifications for them.

The government should also consider how it can boost participation rates in numeracy and literacy qualifications amongst students that that did achieve good passes at GCSE, regardless of the post-16 pathway they follow. One option would be to make the study of maths and literacy compulsory for pupils. Our case studies highlight there are a breadth of ways in which this could be operationalised, with content and teaching potentially varying by pathway / programme. An alternative approach would be to offer students who achieved strong passes in maths and English a wider range of options and levels of study to appeal to students' varied interests, needs and aspirations; in most OECD countries at least half of students study maths beyond the age of 16 (compared to around 20 per cent in England), but in many of these countries participation rates are high because choices are broad, rather than because maths is compulsory (Camden, 2024). Whilst the government has introduced the Core Maths qualification (equivalent to an AS level) and it has gained popularity since its introduction, take-up remains low[17]. According to NFER's 2020 evaluation report on the Advanced Maths Support Programme (AMSP), 59 per cent of schools and colleges think increasing participation in Core Maths is not a priority (Walker et al., 2020), with concerns raised about university recognition, and funding, timetabling and staffing requirements frequently cited as key barriers for colleges offering and delivering the qualification. The government should consider whether and how these barriers might be effectively addressed, including the funding levels that might be required and policy changes that might be required to strengthen the supply and quality of maths teachers in the FE workforce.

The government should also consider the post-16 options and levels that are open to students, particularly students with a strong pass in GCSE English but who have chosen not to study AS or A-level English. Again, it is vital to remember that efforts to raise post-16 participation rates in English need to be accompanied by the pre-requisite levels of funding and a stable pipeline of appropriately highly qualified teachers.

At the same time as considering how to drive up participation rates in maths and English, the government should also consider how it could promote the explicit integration of EES into all post-16 study programmes. This could include breaking EES down into competencies and cross-referencing them in the curriculum, and providing teachers with guidance and tools for developing those skills through the curriculum in their discipline. The Curriculum and Assessment Review's interim report recognises that children and young people need to be equipped with essential skills as well as knowledge (DfE, 2025). It now needs to provide further detail as to how EES should be embedded across the curriculum, complementing a knowledge rich curriculum whilst ensuring that all young people acquire the skills projected to be most widely and heavily utilised across the future labour market.

17 *For example, in summer 2022 there were approximately 12,000 entries for Core Maths compared to 90,000 entries for A level Mathematics.*

Recommendation 6:

Government should ensure all vocational education and training courses and qualifications offer clear progression routes into the labour market, higher education and further education.

Evidence reviewed for this paper suggests that greater equity in the regard for vocational and academic pathways is associated with higher average skills outcomes and lower skills inequalities in numeracy and literacy. These skills underpin people's cognitive processing skills, decision-making and ability to interpret data, and are likely to be correlated with their EES in adulthood (a hypothesis we will test in the next stage of this research programme). Whilst the evidence is ambiguous on how to achieve greater equity between vocational and academic pathways, our case study evidence provides some clues as to what may help. Here we discuss those aspects and their implications for policy and practice in England:

(a) Ensuring there are clear progression pathways from intermediate VET courses onto higher level VET courses and/or Higher Education.

For example, in Austria, pupils who complete 3-4 year school-based VET courses are able to progress to higher level VET courses or sit the progress to higher education (Cedefop, 2022a). By contrast, in England, most universities and a significant minority of colleges do not offer higher-level VET courses (at Levels 4-5) and relatively few young people progress onto Higher Technical Qualifications (HTQs) at these levels, in contrast to countries such as Austria and Switzerland where HTQs are part of an established pathway straddling the divide between 16-19 education and university. This is despite recent evidence published by IFS which suggests the average earnings associated with certain HTQs are higher than the average earnings associated with a degree at age 30 (Tahir and Field, 2022).

Whilst the government has approved over 150 Higher Technical qualifications (HTQs) at Levels 4-5, coherent pathways to, and from, these qualifications are lacking. Learners who do not want to, or who are not ready to, progress to university, require clear pathways through different levels and forms of tertiary education, particularly from Level 3 qualifications (equivalent to BTECs and T-Levels) to Level 4-5 vocational qualifications (equivalent to HNDs and HNCs), and from Level 4-5 qualifications to Level 6 degrees in vocational disciplines.

The government has recognised this challenge and has invested in the establishment of Institutes of Technology to deliver HTQs, and is introducing the Lifelong Loan Entitlement (LLE) which should reduce financial barriers to accessing these qualifications (including maintenance loans), but it is too early to judge the success of these policy changes and there are opportunities to go further in the meantime. This could include allowing employers to fund Higher Technical Qualifications as part of the expanded Growth and Skills Levy, and galvanising greater cooperation and collaboration (including credit transfer arrangements) between linked colleges and universities and federations of merged institutions in the tertiary education system. Experts have recommended that, to promote coordination in the tertiary education system, LSIPs in Mayoral Combined Authority areas could be developed into regional commissioning boards that agree on priorities for the investment of funding pooled across a region from MCA funding pots, the OfS higher education strategic priorities grant, and an element of UKRI funding (Ashwin et al., 2024). This has the potential to facilitate greater collaboration, binding schools, colleges and universities behind coherent learner pathways through different levels and forms of tertiary education, including onto HTQs and from HTQs onto degrees.

(b) Ensuring there are effective and established bridging programmes onto all vocational qualifications (particularly Level 3 qualifications).

For example, in Sweden, students who do not have the passing grades in Swedish, English, Maths and five additional compulsory subjects typically needed for entry to all upper secondary education programmes can access one of four established bridging programmes to help them achieve these requirements (Cedefop, 2022b). In England, bridging programmes are less well defined and established. Whilst the government introduced a T-level transition programme (TLTP) - now renamed T-Level foundation year - in 2020/21, just 15 per cent of the 915 students who took the TLTP in 2020/21 progressed to a T Level, falling to 8 per cent in the subsequent year's cohort of 3,578 young people, and recent research suggests more than one in four of those who do progress from the TLTP to a T-level withdraw in their first year

(Robinson, Maris and Khandekar, 2024). The government should revisit the TLTP and ensure that it better prepares students for entry to T-Levels, as well as considering offering smaller T-levels for those who withdraw in the first year. The government should also revisit the bridging courses that are available into Level 3 vocational courses. The government stopped funding the national traineeship program (designed as a bridging programme into level 3 VET courses or employment) in 2023; whilst this was a response to low take-up, it is important to also note that starts spiked in 2021/22, in response to the government providing incentive payments to employers of £1,000 per trainee. This may indicate that the government should consider re-introducing a bridging programme at Level 2 but better incentivising employers to offer work placements from the start.

(c) Increasing the base rate of funding for VET courses.

In 2016, upper-secondary vocational education funding was 23 per cent less per student than academic education and lower than the OECD average at $9,440 per student compared to $10,900 per student (Robinson and Dominguez-Reig, 2020). This may be a barrier to vocational and academic qualifications being held in equal regard in England. This suggests that government should consider rebalancing the base rate of funding for VET and academic courses at the same levels.

(d) Fostering closer collaboration between education providers and employers and worker representative bodies.

For example, in Austria, employers often set and carry out the assignments required as part of VET programmes (Cedefop, 2022a). Austrian Chambers of Commerce and Labour both play key roles in the vocational education and training (VET) system, including managing apprenticeship programs, providing career guidance and forecasting skills needs to ensure that training programmes meet employer needs. In England, employers play a key role in developing apprenticeship standards and assessing apprentices, but are typically less involved in the design, delivery and assessment of students on classroom-based vocational qualifications. Unions and other worker representative bodies rarely play a major role. The government should consider how it can increase colleges' capacity to engage employers and worker representative bodies around sector or subject areas, to ensure all vocational education and training, including classroom-based vocational qualifications, are responsive to industry demand and skills employers require.

Recommendation 7:

Government should consider introducing targeted funding for disadvantaged pupils in 16-19 education.

The Government should consider introducing targeted funding for disadvantaged students in 16-19 education to build on the success over the past 10-15 years in improving post-16 numeracy and literacy development and reducing skills inequalities. This has been recommended by Education Policy Institute (Hunt, 2024). Research shows that vocational education in the UK is funded at a lower rate than academic education, at 23 per cent less per student in 2016 (Robinson and Dominguez-Reig, 2020), and the attainment gap between disadvantaged pupils and their peers widens throughout 16-19 education (Tuckett, Robinson and Bunting, 2021; Tuckett et al., 2024). Introducing funding for disadvantaged pupils in this phase of education may help settings offer additional support to disadvantaged pupils and improve their skills development (Hunt, 2024). This is likely to ensure that more young people leave education with the skills - including numeracy, literacy and EES - to enter growing, predominantly professional, occupations.

Implications for further research:

Recommendation 8:

The Organisation for Economic Cooperation and Development (OECD) and International Association for the Evaluation of Educational Achievement (IEA) should consider integrating EES measures into international large-scale surveys of young people and adults' skills, including PISA, PIAAC, TIMMS and PIRLS.

Further research is needed to better understand the EES of young people and adults in England relative to their peers in comparator countries, as well as to understand the factors associated with higher average EES and lower skills inequalities, the configurations of features associated with higher-performance and how these features can be effectively implemented. This research should be informed by analysis of internationally comparable data on young people's EES / essential skills. This could involve incorporating new measures into ILSAs, such as PISA and PIAAC. This would help researchers identify the best candidates for England to learn from in this area. Very little is currently known about which models, approaches and pedagogies for developing EES are most effective, and how this varies by social, cultural and economic context.

Recommendation 9:

Further research is needed to identify the different configurations of characteristics that are present in high-performing education systems.

Further research is needed to better understand the configurations of features which are associated with high-performance, and how these configurations vary depending on countries' socio, cultural and economic context. This could, for example, involve systematically scoring countries based on the presence or absence of a range of different factors and analysing whether certain configurations of features are more prevalent in countries identified as high performing, and examining how this varies by country context.

It is now possible to compare the skills development of two cohorts of young people between the ages of 15/16 and 19-22 because data from two rounds of PIAAC have been published. This makes it possible to examine the development of the PISA 2006 cohort (15/16 year olds in 2006 who are 20-22 in PIAAC 2011/12) and the development of the PISA 2018 cohort (15/16 year olds in 2018 who are aged 19-21 in PIAAC 2022/23. This makes it possible to identify countries that have significantly improved the skills development of their young people over the past 10-15 years. Research into the features associated with positive trajectories has the potential to highlight policy initiatives and innovations that may support improvements in post-16 skill development.

Recommendation 10:

Further research is needed to identify and then promote case studies of effective collaboration, co-investment and co-design of post-16 qualifications between employers, government and education providers.

Our case study evidence highlights the importance of collaboration between employers, education providers and government in the design, delivery and funding of post-16 qualifications. Employers play a vital role in defining qualifications and forms of assessment, providing work-based learning and equipment, engaging in teacher training and development, and in evaluating examinations of students. This may support efforts to raise participation rates in VET courses, improve the esteem of these courses and prepare young people with the EES that employers are looking for. However, there is a shortage of evidence on effective models for cultivating co-design and co-investment or, for example, whether regulated forms of cooperation governed by policy are necessary or stronger partnerships can be achieved through informal practices. Further research is needed to identify case studies of effective, sustained collaboration involving co-design, co-investment and co-delivery between employers, education providers and government. This should inform a system-wide approach to galvanising collaboration on a much greater scale.

Recommendation 11:

Further research into whether and how the countries with the highest socio-emotional skills amongst young people differ in terms of how they include these skills in the curriculum and how they teach these skills.

Our analysis clearly shows that young people in the UK typically have worse socio-emotional skills at the end of lower secondary school than their peers in other OECD countries, and inequalities in these skills are greater. Both of the case study countries which were selected because they have the highest average socio-emotional skills amongst 15/16 year olds make the development of these skills a more explicit priority within their educational objectives and curriculum frameworks. However, further research is needed into how these countries – and other countries with high socio-emotional skills – differ in how specifically they include socio-emotional skills in the curriculum, their teaching and learning approaches, the level of professional autonomy they give to educators to develop these skills and their approach to careers guidance and engaging employers in the provision of work experience and work placements.

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