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Building Foundations:

The implications of research on childhood skill development for addressing future skills needs in England

Working Paper 6 from The Skills Imperative 2035: Essential skills for tomorrow's workforce

Luke Bocock, Dr Juan Manuel Del Pozo Segura and Jude Hillary,
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The Skills Imperative 2035

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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). The technological changes are further compounded by demographic and environmental changes. Their effect is to reduce demand for lower-skilled workers whilst increasing demand for higher-skilled workers. Our analysis suggests that more than a million jobs in lower-skilled occupations could disappear from declining occupations in the coming decade (Scott et al., 2024). These changes present opportunities and threats to adult workers and to young people yet to join the labour market.

In the last stage of The Skills Imperative 2035, we identified the workers at highest risk of being displaced from the labour market due to projected changes in employment (Scott et al., 2024). Although England has experienced significant shifts in the labour market before without this resulting in high levels of unemployment (ONS, 2024), there are two key reasons to believe that large-scale job displacement is more likely in the future. First, relatively few lower-skilled occupations are projected to grow, whereas substantial growth is projected in professional occupations; this makes it harder to absorb displaced, lower-skilled workers into other jobs in growing sectors with similar or lower skills profiles. Second, there are significant mismatches between the skills and qualifications of workers in lower-skilled occupations and the job demands of growing occupations, which makes it more challenging for displaced workers to successfully move into growing, predominantly professional, jobs without first reskilling or upskilling.

Changes in employment also present opportunities and threats 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. Consequently, more young people need to leave the education system with the skills and qualifications required to enter growing professional and service sector occupations. Given we identified a set of EES in previous research for The Skills Imperative 2035 which will be especially vital in the future labour market (Dickerson et al., 2023), and evidence that EES deficiencies are already widespread in the labour market (Bocock et al, 2024), it is crucial that young people are equipped with a good base of these skills before they look to enter the workforce. Consequently, our focus in this stage of The Skills Imperative 2035 is on young people's skill development up to the end of childhood.

In Building Foundations: Investigating childhood skill development, gaps and solutions, (the Technical Report that accompanies this paper) we identify 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 this summary paper, we explore the implications of this research for how future skills needs in the labour market might be met, particularly the growing demand for EES. This paper is intended for policy makers and education sector leaders and considers the implications of our research into childhood skills development and gaps for the policy and practice changes required to meet future skills needs in England.

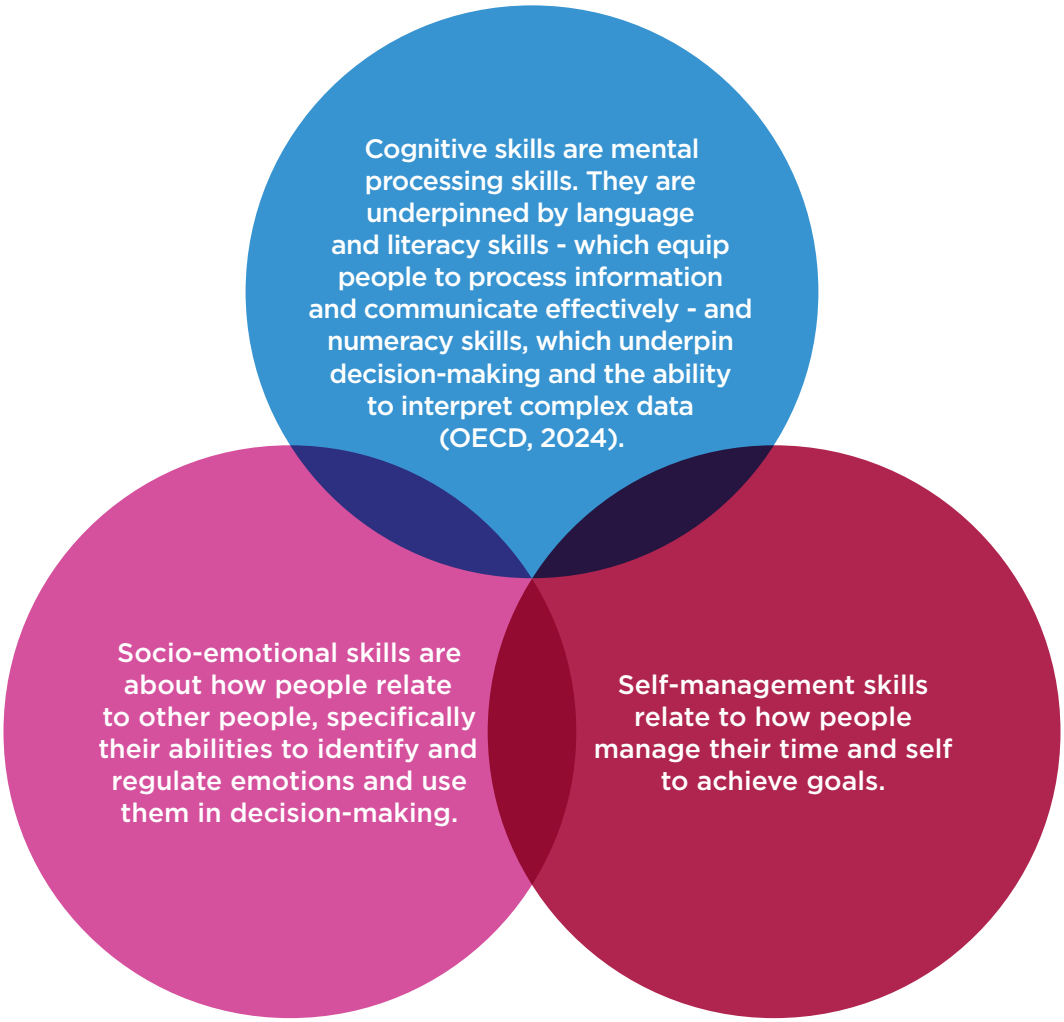
2. Research design and methodology

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, data on these skills is not measured in any publicly available cohort or longitudinal datasets. Our focus in this stage of the programme is, therefore, instead on examining the factors associated with children's development across a broader set of related cognitive and behavioural attributes, in line with the hypothesis that children's cognitive skills and socio-emotional behaviours 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

To illustrate the relationship between these attributes and EES, we outline a working model for conceptualising skills and categorising them into domains and sub-domains, shown in Figure 1 below. This model is intended to help readers relate the findings from our research into childhood 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 and in a forthcoming report for The Skills Imperative 2035.

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)[1]:



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

The distinctions between our 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, 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 the cautious inferences we make from our analysis of children's cognitive and behavioural development to future skills needs and skills supply in England, particularly in relation to growing demands for EES. Our recommendations for policy and practice are supplemented with 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.

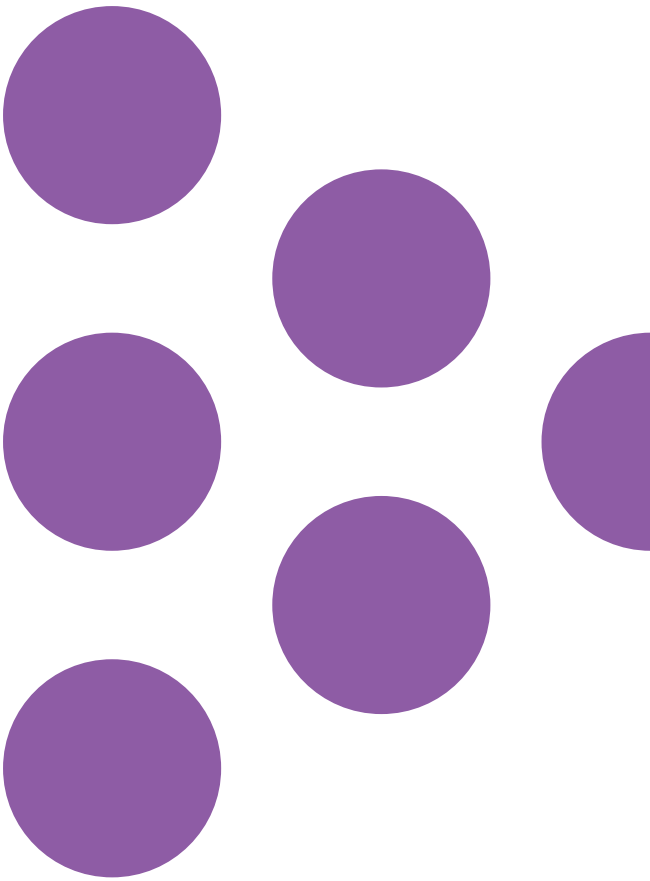


Figure 1: Working model for categorising skills into domains and sub-domains

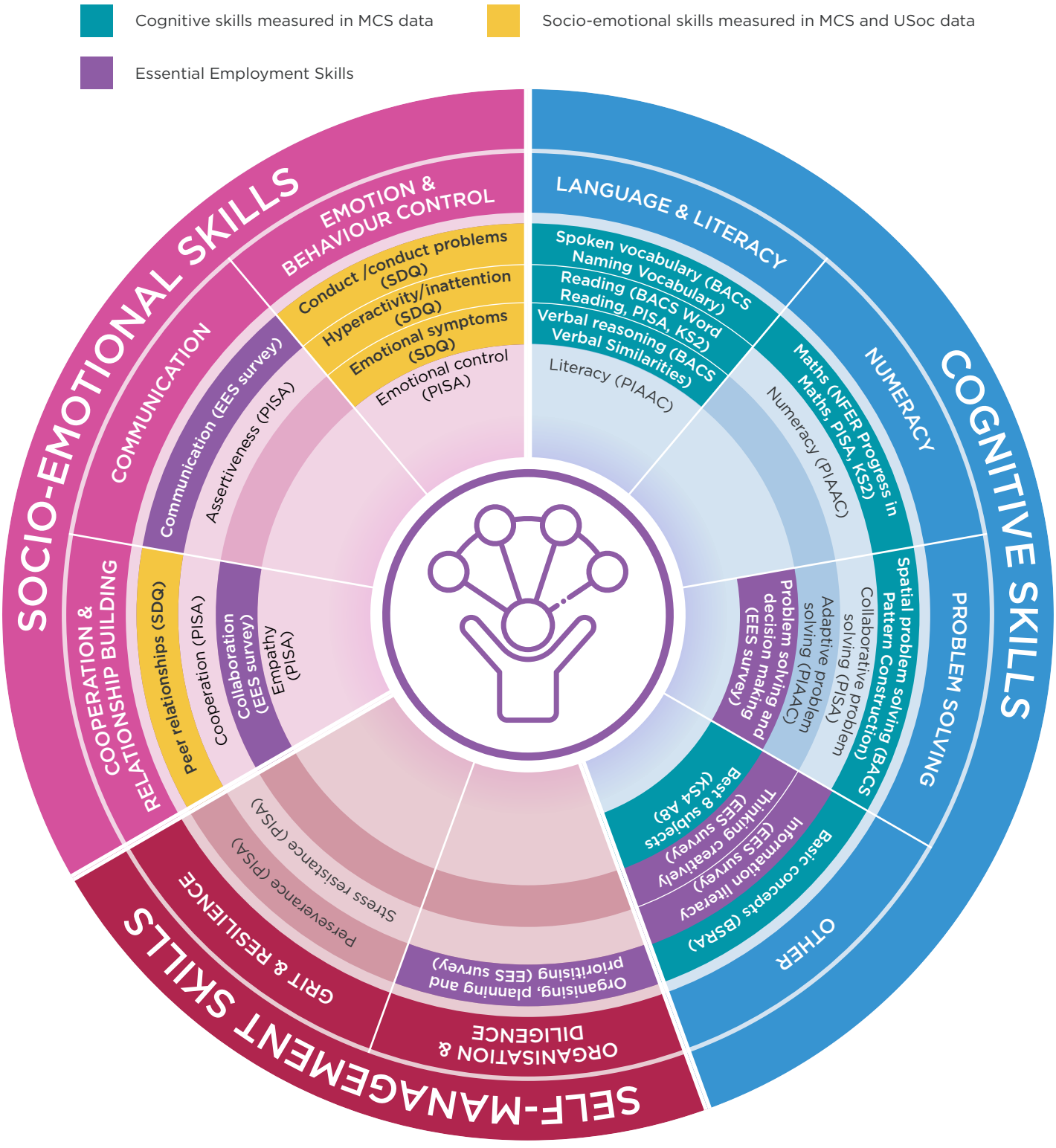


Figure 1 above illustrates how we conceptualise the six EES, which is as a bundle of skills spanning all three domains, including: Socio-emotional skills (1. Communication; and 2. Collaboration), Self-management skills (3. Organising, planning and prioritising) and Cognitive skills (4. Problem solving and decision making; 5. Information literacy; and 6. Creative thinking). We examine children's development across a broader set of cognitive and behavioural attributes in two of our three domains because we hypothesise that children's cognitive skills and socio-emotional behaviours are antecedents for their EES in early adulthood. Figure 1 above also highlights the measures of children's cognitive and socio-emotional skills that are available in data from the Millennium Cohort Study (MCS) and Understanding Society (USoc).

3. Background context on our research into childhood skill development and gaps

3.1 What was already well established

It is well established in the literature that young people's surrounding environment, school settings, broader cultural values and relationships affect their skill development (e.g. Bronfenbrenner, 1986). It is also firmly established that children from poorer backgrounds typically grow up in home environments that are less supportive of their educational and emotional development, and that these differences are likely to account for a considerable share of the socio-economic gap in developmental outcomes (e.g. Cattan, Fitzsimons, et al., 2022; Sibieta, Tahir and Waltmann, 2022; Major et al., 2024). Early childhood home environments are therefore likely to play an important role in determining how equipped young people are to enter, or progress into, growth areas of the labour market when they come to leave education and look for a job.

The existing literature also establishes that socio-economic inequalities in young people's developmental outcomes widen as they progress through school (e.g. Feinstein, 2003). However, the interplay between home and school background factors, and the relative importance of these different factors for young people's development is less well understood. In this report we seek to build on the current knowledge base by examining the effects of both home- and school-related factors on young people's developmental outcomes. This enables us to explain considerably more of the variation in young people's outcomes than previous research on skill development. Unfortunately, we are not able to examine the effects of teaching and curriculum differences on young people's development due to limitations in the datasets we use for our analysis.

The literature also highlights that, alongside genetic factors, children's home backgrounds have a pervasive and long-term impact on their skill development (e.g. Cattan, Fitzsimons, et al., 2022). For example, young people's socio-economic status has been shown to have an enduring impact on their skill development throughout childhood (e.g. Sibieta, Tahir and Waltmann, 2022). One reason for this is that young people's skills levels earlier in life have a strong bearing on skill levels later in life, a concept sometimes referred to in the literature as 'skills beget skills' (e.g. Dickerson and Popli, 2016; Hernández-Alava and Popli, 2017). We contribute to the understanding of how 'skills beget skills' by following children's development to the end of childhood, breaking down childhood into four age-related 'Development Stages' (DSs) and comparing the extent to which children's outcomes in each stage are predicted by their outcomes in the previous stage. We also compare the relative importance of different home and school background factors within and between DSs.

The literature also suggests that cognitive and behavioural outcomes evolve jointly over time, which suggests that children from disadvantaged backgrounds are likely to be doubly disadvantaged: poorer behavioural outcomes may lead to poorer cognitive outcomes (and vice versa). We contribute to the knowledge base about how cognitive and behavioural outcomes interrelate by comparing the effects of home and school background factors on both cognitive and behavioural outcomes within each DS.

3.2 How we extend the current evidence base on childhood skill development

In the Technical Report that accompanies this paper - Building Foundations: Investigating childhood skill development and gaps - we conduct analysis drawing on nationally representative birth cohorts and longitudinal studies, principally the Millennium Cohort Study (MCS) (University College London et al., 2021) linked to data on the same individuals from the National Pupil Database (NPD). We also utilise data from the Understanding Society (USoc) study, a household-level study which contains data on the behavioural outcomes and home environments of five and eight year-olds between 2011 and 2022; this additional data source enables us to explore changes in young people's development.

We extend the current evidence base by:

1. Investigating the factors that are associated with young people's cognitive and behavioural development up to age 17[2].

2. Extending the set of factors considered, principally by investigating the impact of school- as well as home-background factors on young people's cognitive and behavioural development, including differences in school demographics, performance and type (Gorard, 2007), as well as young people's school attendance (Di Pietro, 2023).

3. Comparing the relative importance of different home- and school-background factors within and between four different age-related 'Development Stages', examining how the importance of specific factors changes as children get older.

4. Examining the impact of home and school background factors on young people's development across a broad range of outcomes, including their performance in national examinations, their performance in a range of (non-high stakes) cognitive assessments, and their behavioural difficulties.

5. Examining changes in young people's average behavioural outcomes between successive cohorts.

6. Simulating the effects of improving different aspects of young people's home and school environment on their cognitive and behavioural outcomes.

2 *In Working Paper 8 of The Skills Imperative 2035, we will explore the relationships between people's EES and cognitive skill levels in adulthood and their educational pathways and attainment after the age of 16.*

Datasets used in this study

Our analysis draws on nationally representative birth cohort and longitudinal studies:

Millennium Cohort Study (MCS), enriched with data from the National Pupil Database (NPD):

The MCS is a UK-wide cohort study that tracks young people born between September 2000 and January 2002. We bring together seven waves which track young people from around nine months old to 17 years old. The MCS contains a rich set of variables on the young people taking part in the study and their families. We further enrich this dataset with data on participants' educational attainment and the characteristics of their schools from the National Pupil Database (NPD), which contains data on all pupils in state schools in England.

Understanding Society (USoc):

As the MCS is a cohort study, it does not enable us to identify how the outcomes and environments of young people of the same age have changed over time. Consequently, we also analyse data from USoc –a household-level study which collects data annually from participating households - to examine how the social, emotional and behavioural difficulties and home environments of five and eight year olds changed between 2011 and 2022.

3.3 Childhood development outcomes in our data

Given we are interested in the antecedents of EES in young adulthood, we examine children's broader development, principally across the cognitive and socio-emotional domains in the skills model shown in Figure 1.

Cognitive outcomes:

These are measures of children's performance in tests of their **cognitive skills**. We use both (a) children's performance in tests administered to the MCS cohort, and (b) their attainment in Key Stage tests. Performance in these tests is used as a proxy for their skill levels. The cognitive skills tests completed by the MCS cohort differ at each age, covering a wide range of cognitive abilities including their knowledge and understanding of basic concepts including colours, letters, numbers and shapes (at age 3), their spoken vocabulary (at age 3), their ability to read words (at age 7), their spatial problem solving (at age 7), their mathematical abilities (at age 7) and their verbal reasoning (at age 11/12). Key stage 1 and 2 measures are based on children's performance in maths, reading and writing, whilst Key Stage 4 is based on students' performance across 8 subjects (Attainment 8).

Behavioural outcomes:

These are measures of children's social, emotional and behavioural difficulties, which we treat as the absence of **socio-emotional skills**. These are based on the emotional and behavioural difficulties reported by children's parents using the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 2001). The SDQ is an emotional and behavioural screening questionnaire for children and young people with five subscales each comprised of five items measuring; emotional symptoms, conduct problems, hyperactivity / inattention, peer relationship problems and prosocial behaviour. In our analysis, we follow the standard practice of using the Total Difficulty scores calculated for the MCS cohort and USoc cohorts from four of the five subscales (all except prosocial behaviour).

As explained earlier, our hypothesis is that children's cognitive and behavioural outcomes are antecedents for their Essential Employment Skills (EES), which earlier research for The Skills Imperative 2035 suggests will be vital for young people in the future labour market.

Children's Developmental Stages (DSs)

In our research, we group the seven waves of MCS data collection into four key developmental stages (DSs). Table 1 below shows which age range each DS corresponds with and maps these to Key Stages. It is important to note that these DSs do not map one-to-one to Key Stages because MCS waves do not map neatly to Key Stages.

Breaking down childhood into four phases allows us to investigate how children's developmental outcomes evolve between DSs and the factors associated with young people's outcomes at the end of each DS.

Table 1: DSs studied in our research

DSs	Age Range	Key Stages
DS1	0 - 3/4 years	EYFS
DS2	3/4 - 7/8 years	Spans EYFS, KS1 & KS2
DS3	7/8 - 11/12 years	Key Stage 2 & start of KS3
DS4	11/12 - 16/17 years	Key Stage 3 & 4 & start of KS5

3.4 Key findings from our research into childhood skills development and gaps

The key findings from our research are:

1. Skills development is highly cumulative and, as children get older, inequalities in their cognitive and behavioural outcomes become more entrenched. This reinforces the case for intervening at an early age to support young people at risk of falling behind, whilst still appreciating that there remains considerable scope to influence young people's outcomes at an older age.

Children's behavioural and cognitive outcomes at younger ages are predictive of their outcomes in the same domains at older ages. For example, a 1 standard deviation (SD) increase in our measure of children's behavioural outcomes at age 11/12 equates to a 0.5 SD increase in their behavioural outcomes at age 17 on average, and a 1 SD increase in KS2 attainment corresponds with a 0.7 SD increase in KS4 attainment. The effect of children's prior outcomes on their outcomes at age 17 is more than three times larger than any other home and school background factor in our models.

Our analysis also shows that, as children get older, inequalities in their cognitive and behavioural outcomes become more entrenched and harder to impact. Our analysis shows that children's cognitive and behavioural outcomes at age 3/4 explain around a fifth of the variation in their outcomes at age 7/8, but, by the time young people are 16/17, nearly half of the variation in their KS4 outcomes and nearly a third of the variation in their behavioural outcomes is explained by their outcomes at a younger age. On one level, these findings reinforce the case for intervening at an early age to support young people at risk of falling behind. However, on another level, they also show that there does remain considerable scope to influence young people's outcomes at an older age, given that over half of the variation in their KS4 outcomes and over two-thirds of the variation in their behavioural outcomes at age 16/17 are not explained by differences in their outcomes at younger ages.

2. Children who exhibit behavioural difficulties are more likely to have lower cognitive outcomes later in childhood (and, to a lesser extent, the reverse is also true).

Young people's cognitive outcomes and behavioural difficulties (particularly hyperactivity and conduct problems) are negatively related to one another, suggesting these outcomes may evolve jointly over time. Children with greater behavioural difficulties appear to have worse cognitive outcomes later on. The reverse is also true, but to a lesser extent. This is consistent with previous research which has shown socio-emotional skills play a significant role in helping to develop future cognitive skills (Major et al., 2024). It suggests that children whose families and schools are less able to support their behavioural development are likely to experience a 'double disadvantage' as they grow up in that their behavioural difficulties may also affect their cognitive development. Our analysis shows that nearly a fifth of the variation in young people's cognitive outcomes at the end of secondary school can be explained by differences in their behavioural outcomes at an earlier age. This reinforces the case for holistic approaches to supporting children's development.

Our analysis also suggests that some aspects of children's home and school backgrounds explain much more of the variance in their behavioural outcomes (e.g. their parents' use of discipline), whilst other factors explain much more of the variation in their cognitive outcomes (e.g. the average performance of pupils in their school, and the effort their parents invest in nurturing their early learning at home). As a result, policies to tackle socio-economic deprivation, support parents to stimulate their children's early learning at home and raise standards in low-performing schools may have the biggest effect on children's cognitive development, whereas policies to support mothers' mental health and to support parents to establish a strong attachment and routines with their child(ren) may have a greater impact on children's behavioural outcomes.

3. Differences in children's material, emotional and educational environments at home influence not just their starting points when they enter school but also their progress through every stage of primary and secondary education.

Our analysis reaffirms that a large share of the variation in children's early outcomes relates to differences in their home environments. Children's material, emotional and educational environments at home explain nearly 30 percent of the variation in their behavioural outcomes and over 10 percent of the variation in their cognitive outcomes at age 3/4. The effects of differences in children's home environment are enduring and persistent. Furthermore, our analysis shows that substantial shares of the variation in children's cognitive and behavioural outcomes in all Development Stages up to age 17 are related to inequalities in their home environment. Whilst our analysis suggests the effects of children's upbringing on their behavioural development may diminish over time, perhaps because parents exert less influence as children become more independent, even at age 16/17, differences in children's home upbringing up to that age still explain around 15 per cent of the variation in their behavioural and cognitive outcomes. And - given we only observe some aspects of children's home upbringing – these figures are likely to be underestimates. The existing literature provides numerous clues as to why the effects of children's upbringing persist, for example because of differences in attitudes to school, perceptions of academic ability, occupational and university aspirations and peer behaviour throughout school (e.g. The Sutton Trust, 2018, 2019; Wu et al., 2021).

This suggests that policy efforts to equip all young people with the skills and qualifications to enter growing occupations may need to address inequalities in children's emotional and educational environments at home in the early years (and even inequalities in maternal pre- and neo-natal behaviours as well). Ensuring every child gets a good start is fundamental for building the foundations to address future skills needs. Ensuring all children have a solid foundation of skills early in life is likely to be a more effective strategy than allowing inequalities to establish and widen and then trying to redress this later on.

4. Differences in school performance (based on the average progress pupils make in a school) can compound inequalities in children's cognitive and behavioural outcomes that predate their start at school.

Differences in school performance (based on the average progress pupils make in a school) can compound the effects of early inequalities in children's home environments before they start school. Unsurprisingly, young people's cognitive outcomes are positively associated with the average progress made by pupils across their primary and secondary schools (both Maths and English Value-Added at primary school, and Progress 8 at secondary school), even after netting out the effects of a much broader range of differences in their home backgrounds than are accounted for in school value-added measures. Our analysis also shows that the relationship between school performance and children's cognitive outcomes is stronger when we use measures of children's Key Stage attainment than when we use measures of children's performance in (non-high stakes) tests administered as part of the MCS (measuring things like their vocabulary, verbal reasoning and maths skills). This potentially reflects the incentives for schools to teach what is assessed in national examinations.

Our analysis also suggests that differences in pupil composition between schools are not, generally, significantly related to young people's cognitive or behavioural outcomes.

We also find that children who are more frequently absent from school are more likely to have behavioural difficulties and achieve lower cognitive outcomes on average. This reflects the findings of other recent research which has shown absences have significant negative impacts on national exam performance and future employment prospects (Dräger et al , 2024). The relationship between absences and children's outcomes holds even after netting out the effects of differences in a broad range of individual characteristics, home background factors and personality traits (i.e. after accounting for a broader range of confounders than have been accounted for previously). We do not know the cause of this relationship, it may reflect the effect of missing school on children's behavioural development, and/or children's behavioural difficulties may affect their school attendance, and/or other factors such as health challenges may account for both poor attendance and the emergence of behavioural difficulties.

5. Children's extra-curricular engagement is positively associated with their behavioural and cognitive development between the ages of 8 and 17, but it is well documented that children from disadvantaged backgrounds have less access to these opportunities.

Our analysis suggests that children that engage more frequently in extra-curricular activities such as sport, music and exercise between the ages of 7/8 and 11/12 are less likely to have behavioural difficulties at age 11/12 (although this is not true at earlier or later ages). This might suggest that extra-curricular engagement affects children's socio-emotional development and self-confidence in the second half of primary school.

Our analysis suggests that greater engagement in extra-curricular activities between the ages of 11/12 and 16/17 is also positively related to children's cognitive outcomes at age 16/17 (although this positive relationship is not evident at earlier ages). Our research also shows that children who engage more frequently in extracurricular activities are, on average, more open, conscientious and extravert. Therefore, one potential explanation for the relationship between extra-curricular engagement and cognitive development is that activities like sport and music promote the development of traits like conscientiousness, which support their cognitive development in secondary school. Alternatively, young people's personality traits may impact both their participation in extra-curricular activities and their cognitive development, or other confounding factors may be attributable for the relationships observed in our data.

Counter-intuitively, our analysis suggests that greater engagement in extra-curricular activities between the ages of 3/4 and 7/8 is associated with slightly lower cognitive outcomes at age 7/8, after netting out the effects of differences in children's home and school environments. There may be other confounding factors for which we do not have data that explain this result.

6. 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.

Relatively little is known about the optimal balance between policies to address socio-economic disadvantage, interventions aimed at directly supporting families and improving children's home environments or health, and interventions aimed at improving schools.

Consequently, we simulate the effects of improving different aspects of young people's home and school environments and examine the corresponding changes in young people's average behavioural and cognitive outcomes at age 17. We compare the effects of improvements in four 'policy areas', each of which relate to different aspects of children's material, emotional and education backgrounds; (1) improving the average household incomes of the poorest families; (2) improving family support for disadvantaged families; (3) improving health support for disadvantaged families; and (4) improving average secondary school performance amongst the lowest performing secondary schools. We do not simulate the effects of specific policies in each of these areas, nor do we consider the relative costs of creating the improvements in each of these four areas. Readers are referred to the accompanying Technical Report for more details on our methodology. Our results suggest that improving family support for disadvantaged families results in the biggest increase in children's behavioural outcomes, and improving average secondary school performance amongst the lowest performing secondary schools corresponds with the largest effect on children's cognitive outcomes.

However, we also see that, across all four policy areas, a 10 percentile increase in the set of variables related to any one policy area is only associated with a modest change in children's cognitive and behavioural outcomes. This demonstrates that none is a 'silver bullet' and highlights the importance of a multi-pronged policy response. Substantial improvements in young people's outcomes are likely to require a systematic response that successfully influences a range of factors related to young people's home and school environments over a sustained period.

4. The implications of our research findings for addressing future skills needs and gaps

Improving young people's behavioural and cognitive outcomes at age 17 is likely to prepare more young people to enter growing (and higher productivity) occupations, which are predominantly higher-skilled and higher-paying professional occupations (Wilson et al., 2022). Ensuring all young people build an early base of cognitive and behavioural skills will ensure that more young people leave education equipped to enter, and progress into, the sectors and occupations that will drive future growth in productivity and living standards.

Building this base of skills in childhood is likely to be more effective than waiting for imbalances between skills supply and demand to arise later and then trying to address them, although there remains significant scope to influence young people's development as they grow up. Our analysis clearly shows that a very large share of the variation in young people's cognitive and behavioural outcomes is attributable to differences in their outcomes at an earlier age. By the time young people are 16/17, nearly half of the variation in their KS4 outcomes and nearly a third of the variation in their behavioural outcomes are explained by differences in the same outcomes at a younger age. Even as early as age 7/8, nearly a quarter of the variation in children's cognitive and behavioural outcomes is explained by differences in their outcomes at age 3/4. Sustained support for disadvantaged children, from an early age, is likely to be vital for closing gaps in children's outcomes at the end of childhood, ensuring young people leave education with the skills to enter, or progress into, growth occupations.

Children's home environment lays the foundations for their cognitive and behavioural development in the early years, but schools then build on these foundations. Differences in school effectiveness (based on the average progress pupils make across the school, during both primary and secondary school) explain a significant share of the variation in young people's cognitive outcomes by age 16/17. This highlights the continued importance of focusing on raising school standards, particularly amongst low-performing schools serving disadvantaged communities.

Our simulations suggest that substantial increases in young people's average cognitive and behavioural outcomes are likely to require a holistic package of policies that can successfully affect a range of factors related to their home and school environment over a sustained period. The consequence of inaction is likely to be that an increasing number of young people leave education without the skills and qualifications needed to enter growing occupations, inequalities amongst new entrants to the labour market widen, and skills shortages continue to constrain national efforts to stimulate growth.

Based on the findings from our research, we discuss the action that government, educators and education researchers can take to address these challenges. We illustrate what each might entail in practice, and how it would build on current government policy and Labour's mission to Break Down Barriers to Opportunity.

Government should:

Recommendation 1: Government should create a clearer narrative linking their growth strategy with their mission to break down barriers to opportunity.

Young people's skill development is often seen as the responsibility of the post-16 education system, with input from employers. For example, the previous government's 'Skills for Jobs' white paper laid out reforms to the post-16 education system but made minimal reference to what happens before 16. Similarly, the primary focus of Skills England appears to be on the post-16 skills pipelines into the eight growth sectors prioritised in the Industrial Strategy. The government has set out its mission to Break Down Barriers to Opportunity, but the links between this and meeting future skills needs in the labour market are not clearly articulated.

Employer-reported skills gaps suggest many employers are not convinced that the education system is producing young adults with strong EES (IFF Research, 2023). Our own research suggests these skills gaps are likely to become increasingly acute between now and 2035 (Bocock, Del Pozo Segura and Hillary, 2024). Our research, together with the existing literature, clearly shows that cognitive and behavioural outcomes are highly cumulative; children's early base of cognitive and non-cognitive skills predict their outcomes in the same domains at the end of childhood. The education system, together with families, plays a key role in influencing children's base of skills as they move towards entering the workforce.

To deliver future skills needs and grow the economy, the government needs to adopt a 'cradle to grave' approach to skills development, promoting the development of a broad mix of cognitive, behavioural and technical / discipline-specific knowledge and skills, starting from the early years. This will set more young people on a path towards having the skills and knowledge required to enter growth occupations. This is likely to be more cost effective than waiting for skills inequalities to become entrenched and then trying to rectify them later through post-16 education and adult training (Carneiro and Heckman, 2003).

A future-orientated skills strategy would tackle the multiple sources of early inequalities in children's skill development across a broad range of outcomes, both at school and in their emotional, material and educational environment at home.

Recommendation 2: 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), self-management skills (like planning and organisation), and cognitive skills (like problem solving) as critical parts of a good education. This could include exploring how the development of EES can be strengthened in the curriculum and in the delivery of the curriculum.

Through the Curriculum and Assessment Review team, Government should explore whether and how more emphasis could be placed on the development of EES, as crucial in their own right and as conducive to the activation and application of subject-specific knowledge. For example, this could include embedding standards and competencies into curriculum guidance. This may include producing guidance and teaching materials to support schools in developing these skills. The 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 validating and adopting an existing framework[3].A future-orientated skills strategy would tackle the multiple sources of

3 *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.*

early inequalities in children's skill development across a broad range of outcomes, both at school and in their emotional, material and educational environment at home.

Recommendation 3: Government should consider how to expand access to holistic family support programmes for disadvantaged families that have been rigorously evaluated and proven to be effective.

Our research reaffirms the crucial role that children's material, emotional and educational environment at home play in their cognitive and behavioural development. By expanding access to effective family support programmes, government can help equip more young people with the breadth of essential / transferable skills required in the workplace.

There are many examples of robustly evaluated family support programmes that have been shown to raise the levels of age-relevant skills amongst disadvantaged children, across all stages of childhood. These include approaches that support parents' health behaviours and/or children's school readiness in the early years, as well as programmes that improve parents' interactions with their children and children's behaviour once children have started school (e.g. (Nowak and Heinrichs, 2008; Day et al., 2012; Conti et al., 2021; Jeong et al., 2021; Robling et al., 2021). The government should consider how best to expand access to evidence based family programmes for disadvantaged families.

Evidence of the impact of holistic family programmes in England on children's educational and health outcomes has also been mounting in recent years. Most notably, evaluations of the effects of Sure Start have highlighted short-term impacts on children's home environments and emotional development (Melhuish, Belsky and Leyland, 2010), significant reductions in children's hospitalisations up to age 15 (Cattan, Conti, et al., 2022) and improved educational achievement of children at least up until the end of GCSEs, with far larger effects for those from the poorest backgrounds (Carneiro, Cattan and Ridpath, 2024). The government should consider the feasibility of expanding access to Sure Start children's centres, as well as Family Hubs which build on the Sure start legacy. Our research, coupled with the evidence outlined above, emphasise the importance of supporting parents in disadvantaged areas to develop the home environment, particularly when children are in the early years.

Recommendation 4: Government should continue to invest in piloting, evaluating and scaling effective school improvement programmes, and also models for addressing pupil absence.

Our research suggests that other ways to raise the average skills with which young people leave education are through policies and interventions that raise standards in schools where pupils progress is typically weakest, and/or initiatives that tackle school absence.

The government has recently set out its plans for school accountability reform, with the default recourse continuing to the 'structural intervention' for schools put in 'special measures', and 600 'stuck schools' to each receive up to £100k of 'targeted intervention'. To ensure this money is effectively spent, it is crucial that government and other research funders continue to invest in robust, long-term evaluations of the effects of school improvement programmes and packages of support. They could focus on established programmes that have demonstrated early promise, for example Teach First' programme (Lucas et al., 2022). There is some evidence – from the evaluation of The Teaching and Leadership Innovation Fund (2018-20) – that high-quality professional development for teachers and school leaders in under-performing schools in disadvantaged areas can contribute to positive changes in whole-school teaching and leadership practices (Straw et al., 2022). However, it is not known whether this translates into improved outcomes for students. The government and other research funders should evaluate the long-term effects of school improvement and teacher professional development programmes on young people's behavioural and cognitive outcomes. One example of this is the Teaching improvement through data and evaluation (TIDE) project recently commissioned by Nuffield Foundation, which will draw together data from the National Institute of Teaching's founding trusts to explore how different approaches to teacher training, classroom practice, and professional development impact pupil attainment.

Relatedly, research by NFER shows that England's school system is facing a substantial and growing challenge in ensuring there are sufficient numbers of teachers employed in schools, with lower-

performing schools facing more acute shortages (McLean, Worth and Smith, 2024). Whilst current initiatives, such as bursaries, make a positive difference, more fundamental changes are needed to ensure there is an adequate supply of teachers that is equitably distributed across the system.

Our research also confirms that school absence is significantly associated with young people's developmental outcomes. This builds on prior research which has shown absence in early secondary school explains a fifth of the disadvantage gap in pupils' academic progress (e.g. Cook, Shaw and Morris, 2020). This is already an area of focus for the DfE. A first year evaluation of the Attendance Mentors programme commissioned by the DfE found that the programme resulted in increased attendance and mental health, amongst other benefits (York Consulting LLP, 2024). The government and other research funders should continue to invest in robustly evaluating initiatives aimed at tackling absences and commit to scaling-up the interventions that appear to be most promising.

Recommendation 5: Government should support more disadvantaged young people to access extra-curricular activities more frequently between the ages of 7/8 and 16/17, for example by providing additional funding to schools with disadvantaged intakes to extend the school day or by introducing a national extra-curricular bursary scheme.

Engaging more frequently in extra-curricular activities is positively associated with children's behavioural and cognitive development between the ages of 7/8 and 16/17. There is also substantial evidence that extra-curricular activities can help young people develop EES, particularly socio-emotional skills like collaboration and communication (Donnelly et al., 2019). Our research suggests that increased engagement in extra-curricular activities corresponds with improved cognitive development during secondary school. Previous research has also shown young people who attend clubs for hobbies, arts and music are more likely to progress to higher education, and students who attend sports clubs are more likely to be in employment or education in their early twenties (Robinson, 2024). Combining these findings together with previous findings from The Skills Imperative 2035, it follows that increasing access to extra-curricular activities between the ages of 7/8 and 16/17 could help ensure more young people leave education with the breadth of skills required to enter, or progress into, growth occupations.

However, not all young people are equally able to access such activities. These activities usually have both direct and indirect costs for parents and for schools, where they are often included as part of an extended school day. There is evidence of a direct link between household income and participation in extra-curricular activities such as sports clubs, and clubs for hobbies, arts and music (Donnelly et al., 2019; Robinson, 2024). Access to extra-curricular activities also varies by geography (Robinson, 2024).

Our research adds weight to the need for government to support schools to improve extra-curricular participation rates. This has been previously recommended by the Social Mobility Commission, who have advocated for a national extra-curricular bursary scheme for disadvantaged families (Donnelly et al., 2019). Major et al also suggest implementing low-cost equalising policies, such as guaranteed

Schools, supported by government, should:

Recommendation 6: All schools should explicitly support the development of essential / transferable skills as critical for a good education, and conducive to the activation and application of knowledge. These skills should include socio-emotional skills (like communication and collaboration) self-management skills (like planning and organising) and cognitive skills (like problem solving).

Schools should formally promote the development of a broad range of cognitive and behavioural outcomes as a critical part of a good education. There is clear evidence that high quality education right from the early years can impact the development of essential / transferable skills (Ofsted, 2024). Evidence in this paper suggests skills gaps in the early years are predictive of skills gaps at the end of childhood.

Schools would benefit from access to a clear model or framework they can use to develop students' EES within and beyond the curriculum,

benchmark their students' skills and track their progress against a set of standards. The government should consider either developing a single framework that can be used by all schools to monitor children's skill development, or adopting an existing framework such as The Skills Builder Universal Framework. Teachers could benefit from a consistent framework and tools for supporting the teaching and measurement of these skills, as well as from support to utilise these tools effectively in their teachingA future-orientated skills strategy would tackle the multiple sources of early inequalities in children's skill development across a broad range of outcomes, both at school and in their emotional, material and educational environment at home.

Education researchers and research funders should:

Recommendation 7: Researchers, with government support, should incorporate measures of a broader range of socio-emotional skills (like communication and collaboration), self-management skills (like planning and organising) and cognitive skills (like problem solving) into cohort and longitudinal data collections and programme and policy interventions.

Further research is needed to inform a better understanding of how children's behavioural difficulties (as measured by the SDQ) and cognitive outcomes support the development of a broader range of essential / transferable skills – including socio-emotional, self-management and cognitive skills - throughout childhood. This could involve incorporating a broader mix of age-appropriate measures of children's essential / transferable skills into cohort and longitudinal data collections such as the Millennium Cohort Study and Understanding Society (UK Household Longitudinal Study). This should start with the next waves of data collection for the MCS and Growing Up in Scotland, as well as data collection for the Education & Outcomes Panel Study (EOPS).

Similarly, a broader range of outcome measures should be incorporated into evaluations of education interventions and family support programmes. There are a vast range of education interventions and strategies that have been shown to effectively improve children's attainment, but far less is known about how these interventions and choices impact children's essential / transferable skills. Many family support initiatives and tools have been shown to effectively improve parents' interactions with their children and children's behavioural difficulties and cognitive outcomes, but it is unclear whether they also support the development of children's broader essential / transferable skills. Cohort and longitudinal data collections and evaluations of programmes and policies could draw from the measures in NFER's EES Survey and/or develop other age-appropriate measures.

This would help the government and schools understand what changes in policy and practice could support young people's EES development. Previous evidence suggests that programmes which teach EES can be effective remedial interventions (Kautz et al., 2014) because they can prepare young people better for the workplace and substitute for the support and information that may be lacking at home. However, very little is known about which models, approaches and pedagogies for developing EES are most effective, or the extent to which schools can substitute for gaps in parental attachment and learning support at home.

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