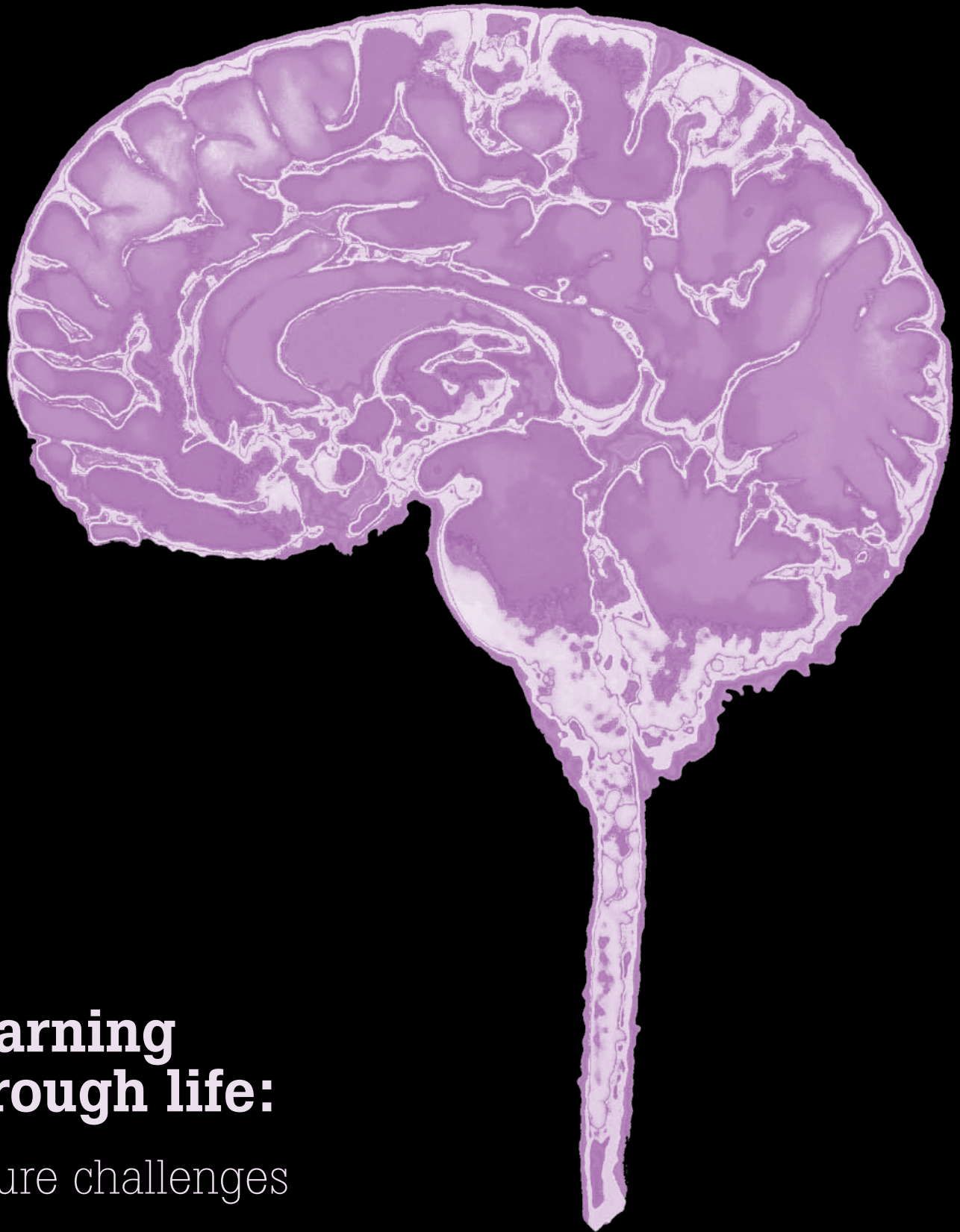




Government  
Office for  
**Science**

 Foresight



# Learning through life:

Future challenges

MENTAL CAPITAL AND WELLBEING PROJECT

# **Mental Capital and Wellbeing: Making the most of ourselves in the 21st century**

## **Learning through life: Future challenges**

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Ricardo Sabates

### **This report is intended for:**

Policy makers and a wide range of professionals and researchers whose interests relate to learning through life. The report focuses on the UK but is also relevant to the interests of other countries.

**This report should be cited as:**

Feinstein, L., Vorhaus, J., and Sabates, R. (2008)  
Foresight Mental Capital and Wellbeing Project.  
Learning through life: Future challenges.  
The Government Office for Science, London

The authors and the Government Office for Science would like to thank the many experts from around the world who contributed to the work of this report. In particular: Professor Maria Slowey for her advice in the peer review process; the authors of the commissioned supporting papers; Professor John Field from the Project's Science Co-ordination Team; the firm shiftN who worked on the futures and systems aspects; and the large number of individuals and organisations and parts of Government who freely contributed advice and assistance, and who generously allowed their research results to be used.

*The Foresight Programme is run by the UK Government Office for Science under the direction of the Chief Scientific Adviser to HM Government. Foresight strengthens strategic policy-making in government by embedding a futures approach.*



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# Executive summary

The aim of the Foresight Project on Mental Capital<sup>1</sup> and Wellbeing<sup>2</sup> ([www.foresight.gov.uk](http://www.foresight.gov.uk)) is to advise the Government how to achieve the best possible mental development and mental wellbeing for everyone in the UK in the future.

The starting point of the Project was to generate a vision for the size and nature of future challenges associated with mental capital and wellbeing, and to assess how the situation might change over the next 20 years, using the baseline assumption that existing policies and expenditure remain unchanged. To make the analysis tractable, the work was divided into five broad areas:

- Mental capital through life
- Learning through life
- Mental health
- Wellbeing and work, and
- Learning difficulties.

This report presents the findings from “Learning through life”. It begins by introducing the evolving challenge of “learning through life”, and the strategic issues that policy makers need to consider. In particular, it considers important concepts that underpin subsequent chapters, notably: the central importance of the “disposition to learn”; the meaning of learning; and its changing nature through life. In Chapter 2 the evidence for motivation for learning at the level of the individual and family is explored. In addition, contrasting models for motivation relating to economic rationality and expectancy-value are presented.

The importance of “learning through life” is explored further in chapters 3 and 4. These consider its central role in unlocking a wide range of benefits, both for the individual and for society. Chapter 5 then considers important factors that could affect “learning through life” over the next 20 years. It shows that as these factors, or “drivers of change”, evolve in size and influence, they could cause substantial changes in the provision and uptake of learning, and could have a large impact on the size and nature of the resulting benefits.

Finally, the report concludes by drawing upon the foregoing analysis to identify important challenges for policy. Here it is found that, while the Project has looked ahead 20 years, many of the issues raised have substantial commonality with today’s problems and issues. Also, other issues require strategic choices to be considered now, in order to meet future requirements. Options for addressing the challenges identified

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- 1 Mental capital refers to the totality of an individual’s cognitive and emotional resources, including their cognitive capability, flexibility and efficiency of learning, emotional intelligence (e.g. empathy and social cognition), and resilience in the face of stress. The extent of an individual’s resources reflects his/her basic endowment (genes and early biological programming), and their experiences and education, which take place throughout the lifecourse.
  - 2 “Wellbeing” throughout this report refers to “mental wellbeing”. Mental wellbeing is a dynamic state in which the individual is able to develop their potential, work productively and creatively, build strong and positive relationships with others, and contribute to their community. It is enhanced when an individual is able to fulfil their personal and social goals and achieve a sense of purpose in society.



are presently the subject of further analysis within the Foresight Project, and will be presented in the final report.

### The key findings:

- The UK is faced with a basic skills problem, with more than one-third of all adults having no basic qualifications on leaving school. Nearly 7 million people have serious problems with handling numbers and 5 million are functionally illiterate. The job market is changing so quickly that, within the next 15-20 years, there is likely to be very little employment available for such individuals.
- Adults with low skill are less likely than professional and non-manual workers to participate in adult learning programmes. This unequal distribution of participation in learning mirrors the experiences of UK children. Progress in school achievement is heavily influenced by family background as measured by social and economic status. These gaps in cognitive development show up clearly before age 3 years.
- Differences between ethnic groups in learning participation and achievement, in the face of increased migration to the UK, are also significant.
- Today's (and tomorrow's) working practices increasingly require an ability to manipulate quantitative and symbolic data using information and communications technology. However, there are substantive concerns about the numbers of students participating in mathematics and the sciences, which develop the necessary technical skills needed for these kinds of activity.
- As well as scientific and technological competencies, the relative success of individuals in the workplace also depends increasingly on social, emotional and communications skills. Poor capacities in these areas are also strongly predictive of risky outcomes such as inadequate sexual health, anti-social behaviour, criminality and drug misuse. Emotional literacy, then, is of central importance in the learning trajectory.
- Learning through life has a critical role in unlocking a wide range of benefits, both for the individual and for society. Such benefits are diverse in nature, and can provide substantial and lasting outcomes. Examples include its potential to play an important role in engendering wellbeing and good mental health in the individual, and in promoting social cohesion within society. Such considerations argue strongly for taking a broad perspective when developing policy and when considering strategic choices concerning learning and education.
- Learning through life has direct impacts on the mental health and wellbeing of the UK population across all age groups. Older people in particular often require reskilling and professional development, along with non-work-related learning opportunities that might help delay the onset of neurodegeneration. Children and adults with special educational needs also benefit from appropriate educational provision.
- Teacher training and sharing of relevant data between practitioners need to be closely examined in the light of the requirement for 'evidence-based' education.

- Looking to the future, a number of important factors could affect learning through life over the next 20 years. These include technology, employer behaviour, political goals, family structures, migration and demographic change, cultural dynamics and environmental sustainability. As these drivers of change evolve, they could cause substantial changes in the provision and uptake of learning, and have a substantial impact on the size and nature of the resulting benefits.
- There are important challenges for policy. In order to flourish, the UK must remain competitive and productive by enhancing its skill levels across the board. Basic skills, as much as technological and scientific expertise, are equally important. Quality, personalised teaching will be essential to raise skills levels, especially in the workplace – a key environment for learning through life.
- Social inequalities in educational access and attainment need to be addressed both to improve social cohesion and to broaden and deepen the range of capability and innovation within the UK population.

# **1 Introduction**

## **1.1 The challenge**

## **1.2 What is meant by learning? The diversity of experiences of learning**

## **1.3 Changes through life**

## **1.4 The importance of level of aggregation**

# 1 Introduction

Chapter 1 introduces this report, which analyses the evolving challenge of learning through life, and the strategic issues that policy makers need to consider.

It places the report within the wider context of the Foresight Project on Mental Capital and Wellbeing. It also introduces important topics which underpin the subsequent chapters, notably: the central importance of the “disposition to learn”; the meaning of learning; its changing nature through life; and different levels of aggregation at which learning needs to be considered.

# 1 Introduction

The aim of the Foresight Project on Mental Capital<sup>3</sup> and Wellbeing<sup>4</sup> ([www.foresight.gov.uk](http://www.foresight.gov.uk)) is to advise the Government how to achieve the best possible mental development and mental wellbeing for everyone in the UK in the future.

The starting point of the Project was to generate an understanding of the science of mental capital and wellbeing (MCW). To make the analysis tractable, the work was divided into five broad areas:

- Mental capital through life
- Learning through life
- Mental health
- Wellbeing and work, and
- Learning difficulties.

This report presents the findings from “Learning through life” which, through its influence on MCW, has substantial economic and wider benefits, both for the individual and society (chapters 3 and 4). We will set out our interpretation of learning through life shortly (section 1.2) but emphasise at the outset that we take a broad-based definition to include formal and informal learning, technical and academic study, accredited and unaccredited learning.

The focus of this report is on the disposition to learn. This individual characteristic is at the heart of decisions by individuals to engage in learning, throughout life. Although this is a feature of individuals, it has multiple consequences for families, communities, businesses, society and the wider economy. A person’s disposition to learn shows considerable stability and yet is not immutable. Determinants which are especially influential include a person’s experiences at school, life events, and access to technology. Genetic factors may be important.

However, the disposition to learn is heavily moderated and constrained by the contexts within which people live and work. The actual take-up of learning involves crucial interactions between the demand for learning and the supply of learning opportunities. There are several important factors that affect lifelong learning within these interactions, and the relative influence of these may change with time. For this reason, these factors are termed “drivers of change”, or more simply “drivers”, in this report. In chapter 2, we use a framework to help understand the complex interactions between these various elements. This is then used to support subsequent discussion of key drivers, and of how the current situation might change in the future (chapter 5). The possible implications and challenges for policy are then set out in chapter 6.

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- 3 Mental capital refers to the totality of an individual’s cognitive and emotional resources, including their cognitive capability, flexibility and efficiency of learning, emotional intelligence (e.g. empathy and social cognition), and resilience in the face of stress. The extent of an individual’s resources reflects his/her basic endowment (genes and early biological programming), and their experiences and education, which take place throughout the lifecourse.
  - 4 “Wellbeing” throughout this report refers to “mental wellbeing”. Mental wellbeing is a dynamic state in which the individual is able to develop their potential, work productively and creatively, build strong and positive relationships with others, and contribute to their community. It is enhanced when an individual is able to fulfil their personal and social goals and achieve a sense of purpose in society.

## 1.1 The challenge

We begin by setting out some key facts and trends which suggest the scale and significance of the challenge of supporting learning through life.

- Currently, more than one third of all adults in the UK lack the equivalent of a basic school leaving certificate; 6.8 million people have serious problems with numeracy; and 5 million people are not functionally literate<sup>5</sup>. While 3.2 million unqualified workers were in employment in 2004, demand is likely to fall to 600,000 by 2020, if current trends continue<sup>6</sup>.
- Although overall participation in adult learning is high in the UK, there is wide variation between different groups<sup>7</sup>. Professionals and non-manual workers are more than twice as likely as unskilled workers to have recently participated in adult learning<sup>8</sup>. Low-skilled people are less likely to receive training from their employers<sup>9</sup>. There are substantial barriers to engagement in adult learning that include structural factors such as cost, availability and location, as well as developmental and psychological factors such as prior negative experiences of school, anxiety about assessment and disengagement from learning<sup>10</sup>.
- The unequal rates of participation in learning in adulthood mirror the experiences in learning of children. Progress in school achievement at all ages in the UK is heavily influenced by family background<sup>11</sup>. For example, for children moving from Key stage 2 to Key stage 4 between 1999 and 2004, the chances of staying in the top half of the distribution were 52% for those eligible for Free School Meals and 78% for those not so disadvantaged<sup>12</sup>.
- Recent analysis of the Millennium Cohort Study of children born in 2000 suggests there are already substantial gaps in cognitive development by family background in the UK by age 3<sup>13</sup>. Differences between ethnic groups were also substantial. Positive net migration is projected to remain an important driver of population growth<sup>14</sup>.
- New work practices increasingly involve quantitative or symbolic data processed by information technology, and demand for techno-mathematical literacies is expanding<sup>15</sup>. However, student participation in maths and sciences remains low, despite recent progress. There are also concerns about the quality of maths teaching<sup>16</sup>.
- There is substantial evidence that labour market outcomes do not depend only on qualifications and on educational attainment such as achievement in tests of cognitive skill<sup>17</sup>. Wider skills are also important for educational achievement and later labour market outcomes. There is no universally agreed definition and

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5 HM Treasury (2006b)

6 Ibid

7 Aldridge and Tuckett (2007)

8 Gorard (SR-A4). This is one of a number of science reviews commissioned by the Project. See Appendix C for a full list

9 Coffield (2000)

10 Sabates et al. (2007)

11 Feinstein (2004)

12 Cassen and Kingdon (2007)

13 Joshi and Hansen (2007)

14 HM Treasury (2006a)

15 Mellor and Kambouri (2004)

16 Williams (2008)

17 Carneiro (SR-A11) – see Appendix C

classification of these wider skills and many phrases are used to refer to them, such as “non-cognitive skills”, social and emotional skills, soft skills, personal development, wider skills and so on. Holding problems of definition until later in this report, it is evident that lack of these wider skills is a very strong predictor of engagement in risky behaviours such as poor sexual health, engagement in anti-social behaviour, criminality, suspension from school, and drug and alcohol misuse, as well as these skills being very important for positive life outcomes and life chances.

- British children are bottom of the UNICEF international league table for the physical and emotional wellbeing of youngsters in the world’s wealthiest nations<sup>18</sup>. They drank more alcohol, took more drugs, and had more under-age sex than children in other, comparable rich nations. British children came last in three of the six categories analysed, finding themselves in the bottom third for two others.
- Social exclusion in most forms is strongly associated with problems of mental health. For example, one in five prisoners has four of the five major mental health disorders and 72% of male and 70% of female sentenced prisoners suffer from two or more mental health disorders<sup>19</sup>. Of children aged 5–17 years, cared for by local authorities in England, 45% were assessed as having a mental disorder: 37% had clinically significant conduct disorders; 12% were assessed as having emotional disorders<sup>20</sup>.
- There are very strong links between family of origin, human development and adult life outcomes in the UK<sup>21</sup>. The risk of multiple deprivation in adulthood for those born into families where the father was in unskilled manual work is six times higher than for those born into households characterised by professional or managerial occupations.

To summarise, there are substantial limitations to the skill levels of the UK population at a time of rising economic demand for skills. There are also substantial disparities between different groups in terms of their skill levels and access to learning. These skills are not just a matter of narrow academic capabilities but also of social skills and of emotional and behavioural development. Disparities in these elements of mental capital and wellbeing are important drivers of inequality of opportunity and life outcomes for the UK population. They lead to substantial social and economic costs, arising from outcomes such as crime, anti-social behaviour, ill-health and worklessness.

These findings raise the question of why the UK is characterised by such disparities in learning and why there is a shortage of basic skills and wider capabilities. In order to address these questions, it is necessary to understand how choices about learning are made and why individuals choose to persist in learning or to disengage. We first address three prior questions:

1. What is meant by learning?
2. How does learning change through the lifecourse?
3. What is the level of social aggregation at which effects impact (i.e. is it neighbourhood, community, city etc.)?

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18 UNICEF (2007)

19 Meltzer (SR-B5) – see Appendix C

20 Meltzer (SR-B7) – see Appendix C

21 Feinstein et al. (2008)

## 1.2 What is meant by learning? The diversity of experiences of learning

It is important to make clear that learning is a very broad term encompassing a wide range of activities at different stages of life and in different contexts. These activities may have very different causes and consequences. Key distinctions are:

- Learning content, i.e. what is learnt (e.g. academic, vocational/technical etc.).
- The duration and timing (part-time/full-time/occasional) of the learning experience.
- The age at which learning takes place.
- How learning is assessed.
- The level of accreditation or otherwise of learning (qualifications).
- The degree of formality of learning (how deliberate, degree of structure).
- Where learning is undertaken (school, workplace, college, home etc.).
- What kind of teaching is provided (pedagogy, curriculum and ethos).
- How learning is funded.
- The learner's degree of commitment to learning.

Learning experiences differ substantially in terms of these distinctions. For example, very different experiences with different implications for the lifecourse and different motivations characterise a Higher Education (HE) course undertaken by a full-time student in early adulthood; work-based training in a new production technology provided informally by a supervisor; a mentoring session by a line-manager; and an evening course undertaken for interest and for the pleasure of learning (e.g. a new language). We take the phrase "learning through life" to refer to the full range of learning opportunities and experiences potentially or actually available to individuals – although the personal and social implications of these different forms of learning may vary greatly, as do the currently feasible policy scenarios and the depth and quality of the evidence base in relation to the scale of such benefits as may accrue.



### 1.3 Changes through life

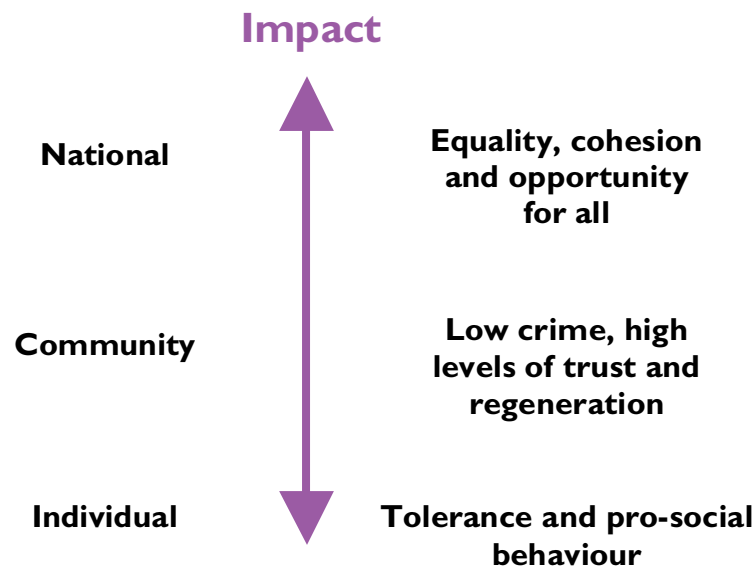
How we learn through the lifecourse changes in important ways with age. Key factors which influence these changes include:

- The level of learner agency
- The institutional environment
- The contextual environment
- Identities, such as gender, ethnicity, class and wider identity beliefs
- Funding scenarios
- The role of workplace
- Time constraints
- The salience of non-financial objectives
- The role and importance of prior experience
- Group dynamics in learning.

For all of these factors, learning in adulthood will be very different to learning in childhood, but even within these broad stages there will be important distinctions (primary school versus secondary school, for example). For retired learners or those approaching retirement, the salience of these different factors will change again. Individuals will experience learning in different ways through their lives and the differences between individuals will also change as people have diverse experiences of life and learning. Thus, an analysis of lifelong learning cannot consider learning to be static or identical, but must recognise this diversity, complexity and change in what learning may mean to the learner and in how it is experienced throughout life.

### 1.4 The importance of level of aggregation

Effects of learning may occur at multiple levels of social aggregation, i.e. for individuals, for families, for communities and at the national level. In each category, the benefits of learning can be conceptualised in general terms as good functioning and wellbeing, but the meaning of this generic conceptualisation will vary at each level because the nature of the units of analysis differ.

**Figure 1.1 A multi-level model of social cohesion**

For example, social cohesion as a hypothesised benefit of learning may be observed or manifested in specific ways at different levels of social aggregation (Figure 1.1). Socially cohesive societies will tend to have high prevalence of equality at the national level<sup>22</sup>, low prevalence of crime in communities<sup>23</sup>, and high prevalence of tolerance and pro-social behaviour in individuals<sup>24</sup>.

There are important interrelationships between levels of social aggregation. For example, equality is an outcome at the national level that will influence attitudes and behaviours in individuals<sup>25</sup>; at the individual level, identity beliefs are a key channel for effects of inequality. Relativities in income influence people's sense of identity and where they fit in the social hierarchy; poor self-image leads to health inequalities through stress and low wellbeing<sup>26</sup>, as well as to crime<sup>27</sup>, anti-social behaviour, disengagement from learning and social exclusion.

A large body of research in sociology shows how social structure is an important influence on individual outcomes. This is emphasised, for example, in the work of Talcott Parsons<sup>28</sup>, and by research<sup>29</sup> that links individual beliefs and attitudes to structural differences in access to scarce resources between social groups. The importance of social and economic context in moderating the effects of education in adults was also highlighted in Schuller et al. (2004).

However, the relationships are not all from higher level causes to effects at lower levels. Crime at the community level will be influenced by attitudes and behaviours at the individual level. Resources at the individual and community level can protect individuals and communities against the consequences of inequalities of income. Outcomes at the individual level are important for promoting community-level wellbeing.

22 Green et al. (2006)

23 Fleisher (1996)

24 Green et al. (2003)

25 Wilkinson (1997)

26 Marmot et al. (1991)

27 Merton (1938)

28 Parsons (1937)

29 Olzak and Nagel (1986)

## **2 Learning for the individual**

**2.1 Motivations for learning**

**2.2 Economic rationality**

**2.3 Expectancy–value and efficacy models of behavioural choice**

## 2 Learning for the individual

This chapter explores motivation for learning for the individual.

Contrasting models for motivation are presented and explored. The insights offered by this analysis are used in later chapters of this report to inform the conclusions.

## 2 Learning for the individual

### 2.1 Motivations for learning

In the UK, people with low skill levels, high unemployment or low income show very low participation in lifelong learning<sup>30</sup>. Five measures (time, place, gender, family background and initial schooling) predict learning trajectories with 90% accuracy<sup>31</sup>. Evidence from the reviews commissioned by the Project highlights the stability of economic, practical and psychological constraints to learning, and their substantial role in the maintenance of inter-generational patterns of inequality.

From a research perspective there is a range of theories for explaining and modelling the decision to engage in learning. Here we focus on two: economic rationality and motivational psychology. In many ways they are distinct, but they may be viewed as important elements of a linked model that can take account of both the importance of contextual and structural limitations on the one hand, and internal psychological process on the other.

### 2.2 Economic rationality

The 'human capital revolution' in economics put forward the notion that income invested in education can be considered as an investment in human capital.

McCloskey (1990) describes the revelation of the idea of human capital for the theorist of human capital, Theodore Schultz, who:

*"interviewed an old and poor farm couple and was struck by how contented they seemed. 'Why are you so contented', he asked, 'though very poor?' They answer: 'You're wrong, Professor. We're not poor, we've used up our farm to educate four children through college, remaking fertile land and well-stocked pens into knowledge of law and Latin. We are rich' (p 13)."*

This is a definition based on the idea that rather than investing assets in physical capital or consuming them, education is an investment in the stock of skills to earn a future return. Hence the metaphor implicit in the term "human capital" relates to investment and to the notion of using resources to build up a stock of additional resources (human capital) that will earn a return.

The application of the economic model to education was extended considerably by Gary Becker<sup>32</sup>, drawing on a tradition which considers how educational attainments can be modelled on the basis of an analogy between the family and the firm<sup>33</sup>. In this framework, the household is figured as a production unit, producing the basic goods of family wellbeing such as health, the consumption of goods and the successful development of household members, on the basis of the allocation of the time of the productive members of the family in the relevant production processes. Inputs are allocated in such a way as to produce that set of outputs that maximises the utility of the decision-making family members, subject to the constraints of the family which are time, wealth and their ability to produce the desired outputs. Decisions about whether or not to engage in learning in adulthood are made so as to maximise the future

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30 Gorard (SR-A4) – see Appendix C

31 Gorard and Rees (2002)

32 Becker (1975); Becker and Tomes (1976); Card (1999)

33 De Tray (1973); Hanushek (1992)

earnings and resulting benefits, subject to the constraints of time, money and technology.

Moreover, parents can choose to influence children's attainment by spending resources of time and money on those activities that produce attainment. The limit to this investment is the time and money available and the ability of the attainment production process to produce attainment. The strength of the model lies in making explicit the substitutions involved in parental decision-making. Money spent on school-books for children cannot simultaneously be spent on restaurants for the parents. Time spent in the labour market earning income to buy consumer goods cannot be spent on leisure, and so on. The decisions about the relative allocation of time and resources depend on the valuation parents make about the different outputs obtainable to them. These are referred to as preferences and expressed mathematically in economic modelling as utility functions.

### 2.3 Expectancy-value and efficacy models of behavioural choice

A different formulation of the learning decision comes from the psychological study of motivation. The expectancy/value model<sup>34</sup> of behavioural choices and performance provides a useful theoretical framework for understanding the influences on decisions about participation in learning. This model, set out in Figure 2.1, was developed by Eccles and Wigfield primarily for modelling the learning choices of children and adolescents, but is also applicable to the question of adult participation and has been adjusted here for this purpose.

The model is general, in that it considers the influences on any form of achievement-related choice or behaviour. Our interest is in the application of the model to the specific choice to participate in learning.

The model draws upon the theoretical and empirical work associated with research in a number of areas, in particular, achievement<sup>35</sup>, efficacy<sup>36</sup>, and attribution theory<sup>37</sup>. The model links behavioural choices to expectations of success (expectancies) and the individual's valuation of outcomes (subjective task values), and specifies the relation of these two psychological constructs to: cultural norms, experiences in various contexts, aptitudes, and personal beliefs and attitudes. This model is particularly useful for analysing individual differences in learning through life.

At the right-hand side of the model in Figure 2.1 is the outcome of participation in learning. This is the result of an interaction between two key sets of individual conceptualisations, namely expectation of success and the subjective assessment of the value of the outcome.

In Figure 2.1 three major components of subjective value are proposed: intrinsic value, extrinsic value and cost. Intrinsic motivation refers to the value individuals obtain from activities themselves, such as interest in the activity or enjoyment of it. Extrinsic motivation relates to instrumental factors, or other subsequent reward. Extrinsic value is used here to encompass attainment value (the importance of doing well on a given

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34 Wigfield and Eccles (2000)

35 Atkinson (1964, 1966); Pintrich and De Groot (1990); Pintrich and Schrauben (1992)

36 Bandura (1994)

37 Graham (1991); Weiner (1985)

task) and utility value or usefulness (how a task fits into an individual's future plans, for instance, taking a vocational training programme to obtain employment)<sup>38</sup>.

The distinction between intrinsic and extrinsic motivation is considered to be fundamental in the literature on motivation and has important implications for the assessment of learning. There is evidence that extrinsic incentives and pressures can reduce the motivation to perform even inherently interesting activities<sup>39</sup>. However, this is not to suggest that achievement in challenging tasks is not of value. Deci and Ryan (1985) have suggested that people seek out optimal stimulation and challenging activities because of a basic need for competence. In addition, they argued that intrinsic motivation is maintained only when actors feel competent and self-determined. They have also argued that the basic needs for competence and self-determination play a role in more extrinsically motivated behaviour. Consider, for example, a student who consciously and without any external pressure selects a specific degree course, because it will help her attain high earnings. This student is guided by basic needs for competence and self-determination, but her subject choice is based on reasons totally extrinsic to the topic of study.

A different but related kind of intrinsic motivation and enjoyment is emphasised in flow theory. Csikszentmihalyi (1988) highlights the immediate subjective experience that occurs when people are engaged in activity characterised by: (1) immersion in the activity, (2) merging of action and awareness, (3) focus, (4) lack of self-consciousness, and (5) a sense of control.

Cost in this model refers to what the individual has to give up to do a task (i.e. opportunity cost) and refers to many of the elements of context and structure made more explicit in the economic model, but also, as economists have emphasised recently<sup>40</sup>, "psychic costs."

Inherent in this model is the idea that participation in learning is influenced not only by the values and expectations associated with learning, but also by the expectations and values associated with other activities. However, an important feature of the expectancy-value model that takes it beyond the approach of neo-classical economics is that it provides a structural framework for understanding the role of perceptions and interpretations of experiences as important influences on engagement in learning. Figure 2.1 highlights impacts of perceptions about the beliefs of others, and of the individual's interpretations of their own experience, on expectations of success and on the assessment of the value of learning. Thus, perceptions and interpretations impact on the decision to participate in learning via the impact on expectancies and valuations.

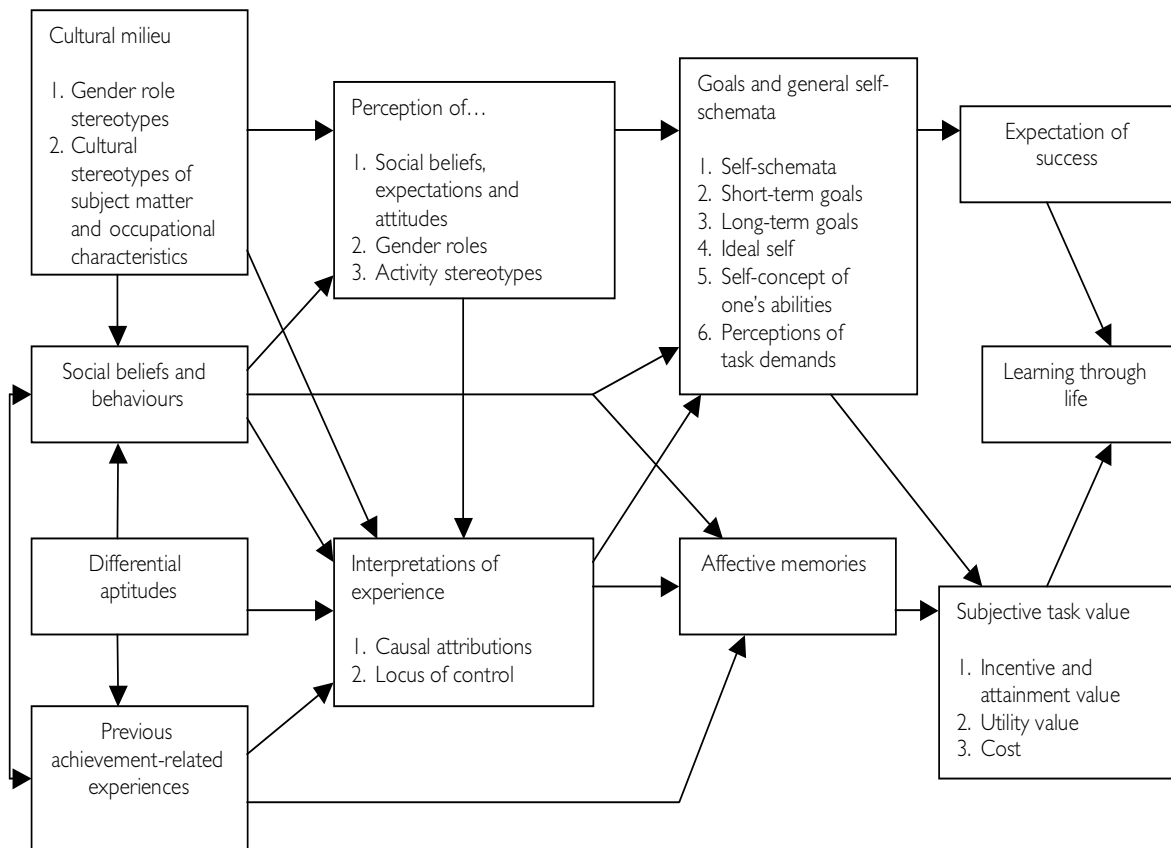
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38 See Houle (1961) or McGivney (1998) for applications of motivation theory to adult learning and more detailed discussion of non-economic motivations for learning

39 Amabile et al. (1994); Cameron and Pierce (1994); Deci and Ryan (1985); Lepper (1988)

40 Cunha et al. (2005)

**Figure 2.1 An application for learning through life, based on the Eccles and Wigfield expectancy-value model of achievement motivation.**



Moreover, as well as highlighting the importance of the evaluation of likely benefits in the process of decision-making, the model makes explicit how expectation of success is an important moderator of these evaluations. For example, the decision to engage in adult learning depends not just on the scale of the likely benefit if a qualification is gained, but also on the perceived likelihood of realising the qualification. This expectation will be strongly influenced by prior experiences of learning, emphasising the importance of early experiences of education for subsequent participation. There is also evidence that explicit structural barriers to adult participation, such as cost, access and time constraints, may be less important than the valuation by individuals of the intrinsic value of the experience, based on prior experiences<sup>41</sup>. However, there are also important structural barriers that may be implicit as well as explicit<sup>42</sup>.

In conclusion, it is clear that the expected effects of learning are implicit in any analysis of the decision to engage in learning. Models derived from assumptions of economic rationality focus on the economic return to learning. This comprises an important element of the overall return to learning for the individual and for their decision about engagement in learning. However, intrinsic motivations are also important in individual decision-making, and theory also suggests the importance of non-economic but nonetheless extrinsic returns.

41 Gorard (SR-A4) – see Appendix C; Sabates et al. (2007)

42 See, for example, Coffield (2000)



### **3 The economic benefits of learning – a review of UK evidence**

### **3 The economic benefits of learning – a review of UK evidence**

This chapter explores how the economic benefits of learning can be assessed, particularly at the level of the individual and the firm.

It then reviews the evidence from the UK and other countries to assess the return for education and learning at different stages of life, in different contexts, and for different classes of individual. In doing so, it identifies where learning can act to reduce economic disparities, and where it can exacerbate them.

### 3 The economic benefits of learning – a review of UK evidence

There is a large literature on rates of return to education. This includes micro-econometric evidence which focuses on the private return to the individual or firm, rather than the macro-economic returns in terms of economic growth<sup>43</sup>.

Blundell et al. (2003) provide an excellent overview of the problems faced when estimating the economic returns to education (defined as the extra income earned as a result of attaining one additional year or level of education, and discounted to the time of entrance into the labour market). The most common problem arises from unobserved factors, such as ability and motivations, which have an impact upon the choice of education and also on labour market outcomes. Other problems are the heterogeneity of returns to education, missing information, and non-random selection into employment (in particular for females). Blundell estimated an average return of about 27% for males in employment who completed some form of higher education. When compared with leaving school at age 16 without qualifications, achieving O-level yields a return of 18%, A-level yields 24% and higher education yields 48%.

Blundell et al. (2000) used a more restricted sample of individuals in their estimation of the returns to higher education, based on the 1958 Cohort Study. They found that returns to higher education (HE) were different for men and for women. Compared with men who achieved A-levels, the average return to a non-degree HE was 14%, to a first degree HE was 12% and to a higher degree HE was 8%. For women, these returns were 22%, 34% and 33% respectively. With respect to starting and not completing HE, the authors found that for men starting HE but not completing yielded a negative return of 9% relative to those who did not start HE. Finally, they also estimated that men who started HE over the age of 21 had 7% lower returns to HE than men who started HE earlier. However, mature students (both men and women) had positive returns to HE compared with those who achieved only A-levels.

With respect to vocational qualifications, returns have been found to differ according to the type of qualification and by gender<sup>44</sup>. Men earn positive returns to craft-based qualifications, such as Advanced Craft City and Guilds (4 to 7%) and TEC/BTEC higher (6-22%), while women earn positive returns to nursing qualifications (16 to 30%) and teaching qualifications (18-28%). A recent study found high wage returns for Modern Apprenticeships at Level 3 (18%) and at Level 2 (16%) compared with individuals whose highest qualification is at Level 2 and Level 1, respectively. Positive wage returns for Modern Apprenticeships at Level 3 were also found for women (14%) compared with women whose highest qualification was at Level 2<sup>45</sup>.

The Labour Force Survey has been used to investigate differences in returns to qualifications for those employed in the public and private sectors<sup>46</sup>. For men, the higher academic qualifications yield a higher return in the private sector than in the public sector. For example, holding a degree raised wages by 29% in the private sector and 17% in the public sector. Similarly, other HE qualifications yield a return of 13% in

43 Viarengo (SR-A3) – see Appendix C – provides a review of evidence on the importance of the distribution of skills for economic growth

44 Dearden et al. (2002); McIntosh (2004)

45 McIntosh (2007)

46 McIntosh (2004)

the private sector compared to 3% in the public sector. For women, there is little difference in the returns to academic qualifications across either sector. The returns to higher vocational qualifications in teaching and nursing are lower in the public sector than in the private sector. Other higher vocational qualifications also yield a higher return in the private sector for both men and women. For example, returns to HNC/HNDs are 4% and 16% for men in the public and private sector, respectively. For women, these qualifications yield a return of 0% and 14%, respectively. Although for low-level vocational qualifications (NVQ 1 and NVQ 2) very small gains (some not statistically significant) have been observed for both men and women in both private and public sectors, compared with those without any qualifications.

Booth and Bryan (2004) used the Workplace Employee Relations Survey (WERS 98) to investigate the impact of highest educational qualifications on union-covered workers from workplaces with 25 or more employees in the private sector. They subdivide their population according to occupations in terms of manual and non-manual work and by gender. In accordance with other studies, they found positive returns to all academic qualifications for male and female union-covered workers in the private sector. For vocational qualifications, they only found evidence of negative returns to male workers.

Chevalier and Walker (2002) provided detailed evidence on the returns to education accounting for the following factors: years of schooling versus qualifications achieved; impact of family background and previous ability; difference in returns between unionised and non-unionised workers; and difference in returns between those working in the private and in the public sector. The authors used several UK datasets, including the Family Expenditure Survey (FES), the General Household Survey (GHS), the Family Resource Survey (FRS), the National Child Development Study (NCDS), and the British Household Panel Survey (BHPS). Returns to education were found to be higher for women than for men, for white workers than for non-white, for non-unionised workers than unionised workers; the impact of schooling was found to be lower for low educational attainment. Kim and Kim (2003) investigated the returns to higher education in the UK (as well as in Germany). They tested the hypothesis that weak linkage between education and the labour market yields low returns to schooling in the UK, but that field of study is highly associated with occupations in the UK. Their results indicated that British students obtain lower returns to qualifications than their German counterparts, and that field of study is more highly associated with socio-economic position in the British higher education system than in Germany.

In terms of adult learning, the Economics literature has focused on economic returns to work-based training<sup>47</sup>. Blundell et al. (1996) used the NCDS and a sample of employed men and women in 1991 with complete information on training, wages and qualifications. Training on the job provided by the employer yielded a pay-off of around 4% in the wages of men between 1981 and 1991, but not for women's wages. Off-the-job training provided by the employer resulted in an increase of 7% on men's wage between 1981 and 1991. Off-the-job training *not* provided by the employer yielded a positive increase to wages between 1981 and 1991 for both men and women of about 7%. They also found that only higher vocational qualification training courses, defined to be those that resulted in a recognised vocational qualification of level 4 or above, yielded a positive return for men and women – 8% and 10% respectively. However, lower vocational qualification training courses did not yield a significant increase in wage growth from 1981 to 1991.

47 Blundell et al. (1996); Feinstein et al. (2004)

Blundell et al. also found that the duration of training mattered for the estimated wage increase (between 1981 and 1991). For these estimates the authors were only able to estimate returns for men, due to the small number of observations for women. They found that off-the-job training with a duration of more than a month yielded a positive increase in wages of 15% whereas returns for on-the-job training with a duration of less than a week yielded a wage increase of only 2% – which was not statistically significant. For off-the-job training, the estimated wage increase was 6%, 13% and 9% for courses with a duration of: less than one week, between one week and one month, and more than one month, respectively.

Although, on average, work-related training does lead to higher wages<sup>48</sup>, only some workers gain from training. Male workers who undertook work-related training in mid-career (age 33-42) experienced 4 to 5% higher wage growth over the period 1991-2000 than similar workers who did not undertake any training. However, workers who are selected to receive training are not representative of all workers. Rather, firms appear to identify those workers most likely to gain from training. When this was taken into account, workers who received training gained substantially (12 per cent higher wage growth over the period). However, the evidence suggests that those workers who did not receive training would probably not have gained higher wages from the training, had they done so<sup>49</sup>.

One might conclude from this finding that firms appear good at selecting workers for training or that ambitious workers are good at obtaining training. Neither interpretation indicates that firms represented in the data have been effective at supporting the training of all workers, but the research does raise a question about the extent to which there are earnings-returns to training for all workers.

Booth et al. (2003) found that unionised workers received more days of training, a higher wage growth and greater return to training than their counterpart non-unionised workers. They used data from the BHPS and a sample of full-time employed men with complete participation in the survey between 1991 and 1996. Training was self-reported and indicated whether training to improve skills was taken up in the previous 12 months. Duration of training was measured as number of days. Their results showed that workers in unions who received training earned almost 10% more than workers who received training but were not union-covered. A higher number of training days increased union workers' wages by 1%. Although unionised workers showed a higher wage growth, this was mainly as the result of on-the-job training activities.

The economic returns to improvements in basic skills have also been investigated. A number of different measures of skill improvement have been tested, including: whether respondents had taken a basic literacy or numeracy course; whether respondents believed that their skills had improved; and whether there had been real changes in respondents' literacy and numeracy test scores between the ages of 16 and 37<sup>50</sup>. Individuals who reported that their skills had improved, generally were likely to be employed and earned more than those who did not believe that their skill levels had improved. Most of the other skill improvement measures were insignificant in the model. However, males who improved their literacy skills between the age of 16 and

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48 Feinstein et al. (2004)

49 The authors reached this conclusion from the estimated parameter of the average treatment effect on the non-treated.

50 Dearden et al. (2002)

37 (particularly those who started with higher-level literacy skills) did earn more subsequently.

Other research has used data which contains an objective measure of adult literacy and numeracy levels<sup>51</sup>. Results indicated that men who moved from the median of the literacy (numeracy) distribution to the 84th percentile increased their hourly wage by 14% (11%). For women, these estimates were 15% and 13% for literacy and numeracy respectively. Using the econometric method of Instrumental Variables, they also found a statistically significant impact of basic skills on wages.

In terms of employability effects, results indicated that an increase in literacy basic skills was associated with a 3.5 percentage points higher probability of being in employment by age 34 for women of the 1970 British cohort<sup>52</sup>. This is not the case for an increase in numeracy skills. For men, the opposite associations were found in that an increase in men's numeracy skills was associated with a 2 percentage points higher probability of being in employment by age 34.

Finally, research on female identical twins to estimate private economic returns to education found that for the females in the sample the return to an additional year of schooling was about 8%.

Thus the evidence reviewed in this chapter allows the following conclusions to be drawn:

1. There is an extensive literature on the economic returns to achieving educational qualifications, including a range of relatively robust causal analyses. Most of this evidence points to important wage returns to most academic qualifications, to higher level vocational qualifications, teaching and nursing, as well as other professional qualifications.
2. In general, evidence on economic returns varies by sector, occupation and gender. For each, and whenever data allows, research has tried to investigate the average returns to every qualification.
3. For instance, the returns to academic qualifications appear to be much larger for females than males. This may be the result of differences in labour market opportunities for males and females and the high level of part-time, low-wage employment for women with low skills.
4. There is less evidence on the economic returns to adult learning. Evidence suggests positive returns to mature students in higher education, to undertaking work-based learning, to employer-provided on-the-job and off-the-job training.
5. Recent new evidence suggests positive economic returns yielded by improvement in basic skills during adulthood.

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51 DeCoulon et al. (2007)

52 Ibid

The challenge for employers and Government is to clarify which benefits are social and which accrue directly to individuals or firms. It is the existence of externalities, i.e. benefits that accrue to society but are not received by individuals or firms, that makes a case for Government investment. Many of the benefits of learning undertaken by an employee may accrue to a future employer. This difficulty may lead to a level of funding of learning by employers that is below the social optimum, even if each individual employer is behaving rationally. This issue is at the centre of the challenge of lifelong learning. How it is dealt with by businesses, managers and potential learners will be central to the success of the UK in responding to the opportunities and threats of globalisation and accelerating skill-based technological change.

## **4 The wider benefits of learning**

### **4.1 The immediate outcomes of learning**

### **4.2 The wider benefits of learning – individual health and wellbeing**

### **4.3 The importance of equity in distribution**



## 4 The wider benefits of learning

While Chapter 3 has considered the economic returns of learning, this chapter considers the wider benefits, specifically those that are less amenable to direct monetary quantification.

It shows that these benefits are diverse in nature and can provide substantial and lasting outcomes: for the individual, and also for communities and society. In so doing, it argues strongly for taking a broad perspective when formulating policy decisions and choices on learning and education.

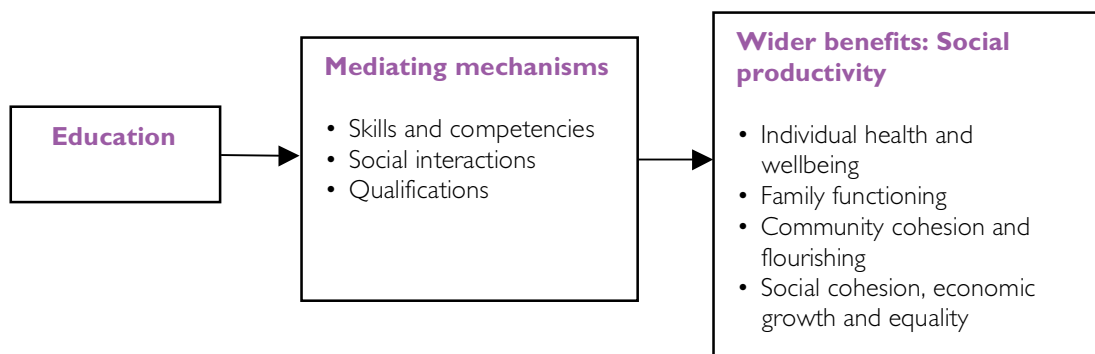
## 4 The wider benefits of learning

In the previous chapter, positive economic returns of learning to the individual were clearly demonstrated by a range of evidence for different categories of education and training. However, the picture is complex and many factors will influence outcomes for the individual. Also, learning and educational experiences can generate wider benefits that are not always easily or commonly reduced to a simple monetary metric, but which are nonetheless of important social value. These outcomes include the sustaining of positive developmental trajectories, the achievement of potential, and the formation and generation of positive life chances. Alternatively, wider benefits may be conceptualised as the prevention of the many negative outcomes that tend to dominate much policy-related discussion: individual social exclusion and community breakdown encompassing crime, teenage parenthood, anti-social behaviour, intolerance of diversity, mental health problems, social division, disengagement from educational, social and economic activity, drug abuse and social immobility<sup>53</sup>. Education has a potential role to play in the prevention of most, if not all, of these features of personal and social dislocation.

However, it is important to emphasise that the skills, capabilities and social networks that can be developed through the educational process cannot be acquired in a simple and straightforward way from the mere experience of attending educational institutions over some fixed period of time. Education may also reduce or limit skills, capabilities and networks, diminishing individuals rather than empowering them. Skills and capabilities develop in part from the complex interactions of individuals in the multiple contexts in which they spend time. The effect of education as one such context for the individual will depend on: the nature of the experience of education for that individual<sup>54</sup>; the interactions with peers, teachers and other individuals; the impact of the experience on the identity, self-concepts, and on his or her beliefs and values. These impacts depend on the ethos, pedagogy, assessment, curricula and often unintended social interactions experienced in learning environments.

Figure 4.1 sets out a simple model of the mediating mechanisms for achievement of the wider benefits of learning. In this model the factors gained through learning are expressed in terms of three particular features of individuals and their relationships with others: skills and capabilities, social networks and qualifications. Each of these is discussed in more detail below.

**Figure 4.1: A simple model of the mediating mechanisms for achievement of the wider benefits of learning**



53 See also the Project report: Jenkins et al. *Mental health: Future challenges* (Appendix A refers)

54 Pollard (SR-A5) – see Appendix C

Figure 4.1 highlights the basic premise that education may support the expansion, formation and sustenance (or their opposites) of a broad range of features of personal and social development that are important for an equally broad set of wider benefits that are central to public policy across Government. These benefits include positively influencing wellbeing and functioning at the level of the individual, family, community and nation.

Educational systems have a crucial role in equipping children and adults to withstand the economic, cultural and technological challenges they face in an increasingly globalised world. The fast pace of new technological developments and the intensification of economic pressures mean that the technical and academic skills of the working population are crucial for the UK economy. However, as we discuss below, so are features of personal development such as resilience, self-regulation, a positive sense of self, and personal and social identity. The capability of individuals to function as civic agents with notions of personal responsibility, tolerance and respect depends on these wider features of identity which are strongly influenced by interactions with others in schools, workplaces, communities, neighbourhoods and through the media and other channels.

However, there can be a tension between meeting these wide-ranging objectives for personal development, and focusing on the core question of basic skills and qualifications. To some extent these objectives run in parallel, so that children who are developing well in terms of personal features of development are also more likely to follow positive trajectories with respect to core academic skills, and vice versa. However, there may be occasions when these outcomes conflict in resource terms: for example, space within the curriculum, teacher training, or assessment. Unfortunately, relatively little is known about such trade-offs.

The remainder of this section sets out the mediating mechanisms or immediate outcomes of learning (section 4.1) and then considers the implications of these effects for wider socially-valued outcomes, the wider benefits of learning (section 4.2).

#### 4.1 The immediate outcomes of learning (mediating mechanisms in Fig 4.1)

Three particular sets of immediate outcomes of learning are key:

- Skills and competencies
  - Cognitive skills
  - Technical/vocational skills
  - Resilience
  - Beliefs about self
  - Social and communications skills (including behavioural and self-regulatory development)
- Social networks
  - Bridging
  - Bonding
  - Linking
- Qualifications.

The first of these sets of outcomes covers a very broad range of factors between which there are important distinctions. They are grouped here because they all describe impacts of learning on features of individuals. The elements of the first set of outcomes are thus distinct from the latter two groups. Social networks are not properties of individuals, but of social groups to which learning may provide or change access. They cannot be reflected in competency measures.

Qualifications are also not features of individuals and also cannot be reduced to the notion of a competency. Although in some circumstances they may provide a measure of a level of achievement, their function is not just as a measure, but also as a signal – the same competency would not have the same benefit in the absence of the qualification. The prospect of a qualification also changes the nature of the learning experience, sometimes adding to the motivation and purpose of learning, at other times distracting from it.

The three sets of outcomes are distinctive from each other in important ways. For example, the benefit of achievement of qualifications provides signalling benefits in the labour market and in social status, and in this sense the benefits are positional and relative in that qualifications aid an individual in competition with others for employment or other opportunities. The same in some ways is true of skills, many of which are of value in proportion to their scarcity, but this positional feature is not necessarily true of elements of psycho-social development or cognitive development.

The first two sets of immediate outcomes of learning are now discussed in more detail, i.e. i) the skills and competencies of the individual, and, ii) the access to social networks.

#### 4.1.1 Skills and competencies

For the wider benefits of learning, a broadly-based set of skills and competencies are relevant. These have been conceptualised and measured in a range of different ways. One approach is that of identity capital. As James Côté expressed it<sup>55</sup>:

*“Identity capital represents attributes associated with sets of psychosocial skills, largely cognitive in nature, that appear to be necessary for people to intelligently strategise and make decisions affecting their life courses (i.e., to individualise).”*

Such skills may ultimately also be of value in the labour market<sup>56</sup>. This distinction between human and identity capital is related to the distinction expressed in the economic literature between hard and soft skills or, alternatively, between what economists call cognitive and non-cognitive development. It has been widely recognised in recent years<sup>57</sup> that soft skills and non-cognitive skills are of value in the labour market. This has led to the inclusion of them in some definitions of human capital<sup>58</sup>. Rather than using the umbrella terms “identity capital” or “human capital”, this paper focuses instead on some specific elements that have been stressed in research and policy debate. Below, two particular sets of beliefs and attributes are discussed that are believed to be important for wider outcomes: self-concepts and resilience. Others may be as or more important and many are covered in other parts of the present Foresight Project and in its commissioned papers<sup>59</sup>.

55 Côté (2005)

56 Carneiro (SR-A11) – see Appendix C

57 Bowles et al. (2001); Dunifon and Duncan (1997); Heckman and Rubinstein (2001); Goldsmith et al. (1997)

58 Healy and Côté (2001)

59 For example, executive function: Greenberg and Rhoades (SR-A9); mental ill-health: Jenkins et al. *Mental health: Future challenges*; ADHD: Simonoff (SR-D11) – see Appendix C

## Self-concepts and self-efficacy

Self-concepts are a key element of identity, including an individual's perception of their own abilities and worth. Such beliefs depend on the information available to the individual and the cognitive ability to process this information<sup>60</sup>. Such self-concepts are multi-dimensional<sup>61</sup>, varying across a range of different domains, for example relating to academic capabilities, social capabilities, or general self-worth.

These self-concepts develop while children are at school but have long-term implications. Among very young children, self-concepts of ability and worth tend to be consistently high, but, with increasing life experience, children learn their relative strengths and weaknesses. As seen in the expectancy-value model, school plays an important role in the development of these self-concepts. It provides children with external feedback about their competencies in academic, psychological and social areas. The child also develops perceptions of him or herself from their academic successes and failures, and also from their relationships with peers, and with their teachers.

Self-concepts of ability and worth have an impact upon, and are affected by, other psychosocial factors such as self-efficacy, resilience, and inter-temporal preferences (i.e. decisions over whether to do something immediately or in the future). If an individual has a sufficient regard for themselves generally, and of their abilities in particular, they will consider themselves capable (or efficacious), be more inclined to persevere in the face of adversity (resilience), and take care of themselves not only in the here and now, but also in the future. Through channels involving these psychosocial factors, positive and balanced self-concepts promote positive health-related behaviours, protect mental health and help individuals to manage chronic health conditions<sup>62</sup>.

One important self-concept is known as self-efficacy. Bandura (1994) describes self-efficacy as an individual's confidence in their ability to organise and execute a given course of action to solve a problem or accomplish a task. It may apply specifically to a particular competence or more generally. Self-efficacy in relation to learning is an important determinant of motivation which in turn supports active engagement in learning<sup>63</sup>. Parents' and teachers' perceptions of children's competencies and likely success are important influences on children's beliefs about their efficacy. These perceptions may be communicated through verbal persuasion and also in more subtle, non-verbal ways. Other factors are also important, such as an environment that provides good emotional and cognitive support<sup>64</sup>. Both home and school play important roles in the development of self-efficacy, and they should be understood as parts of an interacting and reinforcing system of influences.

*Resilience* refers to positive adaptation in the face of adversity<sup>65</sup>. It is not a personality attribute, but rather a process of positive adaptation in response to significant adversity or trauma<sup>66</sup>. A major source of adversity in childhood and throughout adulthood is socio-economic disadvantage. This is associated with a number of cofactors, such as poor living conditions, overcrowding, and lack of material resources<sup>67</sup>. The experience

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60 Markus and Wurf (1987)

61 Shavelson (1976)

62 Schuller et al. (2002); Hammond (2002)

63 Eccles et al. (1997)

64 Ibid

65 Schoon and Bynner (2003)

66 Luthar et al. (2000)

67 Duncan and Brooks-Gunn (1997)

of disadvantage early in life may weaken resilience although this is not necessarily so for specific individuals<sup>68</sup>.

Protective factors fall into three broad categories: attributes of children; characteristics of their families; and aspects of the wider social context<sup>69</sup>. Thus, resilience can be described as the phenomenon that some individuals show positive adjustment despite being exposed to adversity<sup>70</sup>. It is associated with personality characteristics like self-worth and efficacy, but it is also influenced by factors external to the child, such as having a supportive family and other sources of external support.

Howard, et al. (1999) reviewed theoretical and empirical literature relating to the development of resilience amongst children. The authors focused on personal attributes, concluding that the following “internal attributes” characterise the resilient child: autonomy, problem-solving skills, a sense of purpose and future, and social competence. It is plausible, though not proven, that education – among adults as well as children – has an impact on each of these “internal attributes”.

Many studies of students in community-based education who have a history of mental health difficulties report that participation in learning has positive effects upon mental health (e.g. Wertheimer 1997; McGivney 1997). Indeed, some GP practices now prescribe education as treatment for their patients<sup>71</sup>, and such schemes have been piloted and evaluated<sup>72</sup>.

Dealing effectively with adversity and stressful conditions brings benefits for physical and mental health. Reliance upon nicotine, alcohol and other addictive substances, as well as certain patterns of eating, are common responses to adversity and stressful conditions<sup>73</sup>. Individuals who (through education) are more resilient may be inclined to respond in other ways, which are less damaging to their physical health and possibly more effective in reducing levels of experienced stress in the longer term.

Individuals who are more resilient, almost by definition, experience lower levels of chronic stress in response to a given stressor or life event. This not only affects health behaviours, but also affects physical health, because chronic stress exacts a cost that can both promote the onset of illness and its progression<sup>74</sup>. Levels of experienced stress and self-efficacy may also affect the perception of certain symptoms such as pain<sup>75</sup>.

#### 4.1.2 Social networks

The effects of education are not limited to effects on the capabilities, competencies and skills of individuals. Another very important aspect of educational experiences is that they are social and involve the engagement of individuals in collective experiences of learning and development. This involvement can have positive and negative effects, bringing benefits but also risks. One of the key influences of education may relate to changes to the social networks in which individuals take part, as well as to the ways in which they develop and maintain such networks. Educational settings may be a source of support or distress depending on the nature of the relationships formed in them.

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68 Feinstein and Peck (2008)

69 Garmezy (1985); Rutter (1987)

70 Luthar et al. (2000)

71 Wheeler et al. (1999)

72 James (2001)

73 Allison et al. (1999)

74 See Ogden (1997) and Wilkinson (1996) for fuller discussions

75 Turk et al. (1983)

Education has the capability to promote social integration and civic engagement, and to widen social networks. Schlossberg et al. (1995) suggest that social networks and the ability to draw upon social resources can contribute to resilience, leading to better psychological and physical health-related outcomes.

Crucially, however, education can provide access to particular types of social networks for the individual, or change the type of social networks to which the individual has access. This can usefully be conceptualised in terms of social capital.

The most basic form of social capital is bonding social capital, which coalesces around a single, shared identity, and tends to reinforce the confidence and homogeneity of a particular group. Bridging social capital refers to horizontal social networks that extend beyond homogeneous entities. This form of social capital involves cross-cutting networks among people of various ethnic, cultural, and socio-demographic backgrounds. Linking social capital is characterised by connections with individuals and institutions with power and authority. This is theorised in terms of vertical rather than horizontal networks within the social hierarchy.

It is commonly suggested that those of lower socio-economic status (SES) and education tend to have access to higher levels of bonding social capital, allowing them to use their social networks as a protective factor; but lower levels of access to bridging and linking social capital, limiting their access to resources not available in more local environments. The reverse is commonly thought to be true for higher SES individuals, who may have higher levels of access to bridging and linking social capital, allowing them to tap into a wide range of productive resources.

Putnam (1993) suggests that education and learning can be a valuable source of social capital. In primary education learning can promote societal cohesion and strengthen citizenship when individuals from wide ranging socio-economic backgrounds are enrolled in the public education system. Learning experiences can:

- Provide opportunities to gain and practice skills to improve social capital, such as participation and reciprocity;
- Provide a forum for community-based activity;
- Provide a forum in which students can be taught how to participate responsibly in their society;
- Provide an opportunity to extend and deepen social networks;
- Support the development of shared norms and the values of tolerance, understanding, and respect; and
- Affect individual behaviours and attitudes that influence communities<sup>76</sup>.

Thus, education can provide wider benefits for the individual through impacts on access to social networks while also leading to possible tensions in bonding networks, particularly in terms of challenging the ties of individuals to working-class identities.

Peer groups are an example of how education can influence social capital. Education influences the peer group memberships of individuals directly through effects on the nature and range of social interactions and networks experienced in school, HE, or adult learning environments. However, it also acts indirectly, through effects on the

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76 Heyneman (2001); Schuller et al. (2002)

occupations individuals can take up. The peer groups formed through educational experience influence norms and values as well as providing direct network-related benefits.

## 4.2 The wider benefits of learning – individual health and wellbeing

The evidence for explicit effects of education on wider outcomes is less well developed and rigorous than that for the economic returns<sup>77</sup>. However, there is evidence from a number of countries that education is strongly linked to health and to determinants of health such as health behaviours, risky contexts and preventative service use, and that a substantial element of this effect is causal<sup>78</sup>. There is also evidence in relation to benefits of learning for social cohesion and civic participation, although here the evidence is more about equality in the outcomes of education and in access to education than about the specific benefits for an individual following participation in learning. Moreover, there has been relatively little robust, quantitative evaluation of the wider benefits in relation to these outcomes. Therefore, in this short review we focus on the wider health benefits of learning but emphasise that this is unlikely to be the full range of wider benefits.

In relation to health, a number of studies have gone beyond simple models of correlation in order to estimate causality. For example, for individuals born in the US between 1914 and 1939, an additional year of schooling reduced the probability of dying in the next 10 years by 3.6 percentage points<sup>79</sup>. In another study<sup>80</sup>, an additional year of schooling reduced the risk of poor health by 18.5% in a cohort of Swedish men born between 1945 and 1955. For women in the US at the margin of college enrolment, being able to enrol in college and stay for a minimum of two years decreased the probability of smoking during pregnancy by 5.8 percentage points. This is a large effect given that on average only 7.8% of the women in the sample smoked during pregnancy<sup>81</sup>.

Education can increase uptake of preventative care which may lead to long-run savings but short-term increases in health care costs. Those with more education are also more likely to take advantage of health care provision. However, education and some forms of illicit drug use and sometimes alcohol use have been found to be positively associated: i.e. education is associated with increased use<sup>82</sup>. Finally, although education appears to be protective against depression, it has been found to have less substantial impacts on general happiness or wellbeing<sup>83</sup>.

It is also important to emphasise that if the quality of education is not appropriate to the developmental needs of the individual, it can have directly injurious effects. This is a result of impacts on features of the self (particularly self-concepts and attitudes).

Few studies have considered the effects of learning in adulthood on health, although health and health-related behaviours may be impacted on in important ways by adult learning<sup>84</sup>. Feinstein and Hammond (2004) used the 1958 Cohort Study to examine

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77 Behrman (SR-A7) – see Appendix C

78 OECD (2006)

79 Lleras-Muney (2005)

80 Spasojevic (2003)

81 Currie and Moretti (2002)

82 Maggs et al. (2008)

83 See Feinstein et al. (2006) for a summary

84 Ross and Mirowsky (1999)



the contribution of adult learning to a wide range of health and health behaviours. Analysis was in terms of changes in life-outcomes for adults between the ages of 33 and 42 years, controlling for their development and context up to age 33. This method is robust to time-invariant confounding bias, although changes in the individual or context between the ages of 33 and 42 may bias the results. Their results showed that participation in adult learning had positive effects on changes in smoking, exercise taken, and life satisfaction. The sizes of the effects were small in absolute terms. However, there is little change in behaviours during mid-adulthood, and relative to this baseline, participation in adult learning is an important driver for change.

Hammond and Feinstein (2006) found that adults who participated in adult learning had positive transformations in wellbeing, optimism, self-efficacy and self-rated health. The magnitudes of the associations were not very large, but were important nevertheless. The adjusted odds for improved wellbeing for those who undertook courses of adult learning between the ages of 33 and 42 years were between 1.2 and 1.3 times greater for those who took no courses.

The impact of education on depression in adults, as measured by highest qualifications achieved by age 33, has been investigated by Chevalier and Feinstein (2006). They used information from the 1958 Birth Cohort to control statistically for long-term impacts of measures of mental health during childhood. They also used matching methods. Achievement of qualifications was consistently found to reduce the risk of adult depression. Individuals with at least O-levels were estimated to reduce their risk of adult depression by 6 percentage points, the effect being similar for men and women. In another study, adult learning was found to be statistically associated with an increase in the uptake of cervical screening in British women<sup>85</sup>. Adult learning leading to qualifications led to an increase of between 4.3 and 4.4 percentage points in the individual's probability of screening, whereas for general training the increment was between 1.5 and 1.7 percentage points.

### 4.3 The importance of equity in distribution

It was stated above that our model recognises that the wider benefits of learning are not only about benefits for an individual flowing from their own participation in learning. The distributional aspect of learning is also important<sup>86</sup>. Marmot et al. (1978) were among the first to demonstrate the existence of a socio-economic gradient in health, whereby health disparities are not confined to extremes of rich and poor, but are observed at all levels of SES. Decreasing returns to income suggest that this finding may arise from relativities in SES rather than absolute gains; in other words what matters for individual health is not only the absolute level of resources available to individuals but also their position in relation to others. At the societal level, recent studies have shown that the degree of relative deprivation within a society is strongly associated with overall mortality and life-expectancy<sup>87</sup>. Middle-income groups in relatively unequal societies have worse health than comparable or even poorer groups in more equal societies. This result holds even in countries that have universal health care systems, suggesting an impact of relative differences in income on individual health.

The exact nature of the processes linking social inequality with health inequality is not always readily apparent in research studies, in part due to methodological challenges, but links to education have been demonstrated. Using crime and social dislocation as

85 Sabates and Feinstein (2006)

86 Green et al. (2006)

87 Daniels et al. (2000)

proxies for social cohesion, a strong statistically negative relationship has been reported between educational inequality and social cohesion<sup>88</sup>. Educational inequality is hypothesised to lead to income inequality, which it is suggested in turn leads to lower levels of social cohesion. Educational inequality was also found to have a direct negative relationship with social cohesion.

Using a psychosocial approach, Wilkinson (1996) argues that the income distribution in a country may directly affect an individual's perception of their social environment, which in turn affects their health. Based on qualitative evidence, Wilkinson finds that more egalitarian societies have better health outcomes. Egalitarian societies are characterised by high levels of social cohesion, he argues, because market orientation and individualism are restrained by a social morality, thereby allowing the public arena to become a source of supportive social networks rather than of stress and potential conflict<sup>89</sup>. Hence, the structural impact of hierarchical status relations is softened and reduced, with benefits for health.

In an alternative formulation of this model, inequality undermines civil society and political participation. This assertion is supported by evidence from the US showing that states with the highest income inequality are least likely to invest in human capital and to provide generous social safety nets<sup>90</sup>. Kaplan et al. (1996) find a correlation for states of the US between inequality of the distribution of income and a large number of negative health outcomes and social indicators, such as mortality trends. They also find evidence that these differences accord with relative investments in human and social capital, in that states with greater income inequalities tend to invest less in education. Under these conditions, income inequality may drive educational inequality, which is in turn associated with poor health outcomes.

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88 Preston and Green (2003)

89 Wilkinson (1996)

90 Kawachi et al. (1997)

## 5 Drivers of lifelong learning

## 5 Drivers of lifelong learning

There are many factors that affect learning through life. As these evolve in size and influence, they can drive substantial changes in the provision and uptake of learning, and in the benefits which accrue. This chapter identifies and explores a number of these “drivers” that are considered to be particularly important.

Trends and future uncertainties in these “drivers” are considered, and implications for lifelong learning over the next 20 years are identified. These implications inform the key challenges for policy that are described in Chapter 6.

## 5 Drivers of lifelong learning

In previous chapters of this report, we have set out some of the key economic and non-economic benefits of lifelong learning. We have shown how perceptions about these benefits influenced by prior experiences and the influences of others may affect individuals' intrinsic and extrinsic motivations for learning and hence their participation in learning through life. In this chapter we consider how important drivers of change may evolve over the next 20 years, and assess the possible implications for lifelong learning. However, it should be noted that while the future trends associated with some of these drivers are well defined, others are much less predictable. For this reason, our discussion should be viewed as an exploration of what could happen rather than an attempt to make firm predictions.

Uncertainties about the behaviour of individual drivers in the future is compounded by the many possible interactions that can occur between them. However, there are established techniques which can be useful in exploring such complexities and uncertainties, of which the use of "future scenarios" is one. This Project has developed three contrasting scenarios of possible futures to investigate interactions and uncertainties in the drivers affecting lifelong learning. They have also been used as a tool to evaluate the robustness of possible interventions. The scenarios are designed to be equally plausible, and essentially sample the future "possibility space". Further details of the scenarios may be found in the final Project report and also in a Project contractual report, that will be made available through [www.foresight.gov.uk](http://www.foresight.gov.uk).

Here we consider the following important drivers:

- Technology (in work, society and in learning)
- Employers' sources of productivity growth and competitiveness
- Political goals
- Family structures
- Migration and demographic change
- Cultural dynamics and diversity
- Environmental sustainability.

### Technology

Technology is clearly a central driver of learning through life, both in terms of technology for learning (how learning is provided) and of the context within which learning generates benefits or risks<sup>91</sup>. An important application of this driver is the continued prominence and expansion of the knowledge economy<sup>92</sup> in which information and knowledge are central to individual and economic wellbeing. The knowledge economy changes the types of learning required to maintain competitiveness and a positive identity, suggesting an emphasis on information management and processing and on the techno-mathematical literacies required for representing and simplifying complex systems. Tasks that are readily programmable will become increasingly routine and low-skill, forcing a growing divide between highly-

91 Mellar and Kambouri (2004)

92 European Commission (1994)

skilled work characterised by techno-mathematical skill and communication and management skill on the one hand and low-skill, low-wage work on the other.

### Employers' sources of productivity growth and competitiveness

There is considerable concern in Government<sup>93</sup> about the scale of the evolving threat to UK competitiveness arising from the rapid economic growth of China and India, which are now major new sources of production and innovation. However, it is also important to recognise the difficulty for Government to predict with any accuracy what the sources of technological and competitive growth are likely to be, and therefore what specific skills to develop and support in the UK. Thus, as a second key driver, we have the responses of employers to observed trends in markets for products and services, and in production and recruitment. In a trading and production environment characterised by high levels of global competition, it is important that firms can both respond to observed trends and be proactive and innovative in establishing new markets.

This emphasises the importance of lifelong learning as the method through which individuals, firms and communities develop the skills required, both reacting to observed trends and through innovation, creativity and enterprise. Although Government cannot predict with certainty which business sectors will experience prolonged growth, there are compelling arguments that certain personal features will prove valuable in enabling individuals to have the ability and disposition to learn and respond to change: the features of personal resilience, identity and capability are particularly important.

However, alongside these individual skills it is vital that employers respond to the challenge of supporting the development of specific skills and capabilities important to their business, and that employers fund a substantial share of this training need. The willingness and capacity of firms to do this will be a key variable in establishing the skills base of the UK over the long term. (This is also a major theme of the Project report Dewe and Kompier. *Wellbeing and work: Future challenges* (Appendix A refers))

### Political goals

The education system has been a locus for considerable growth in investment and legislation during the last 10 years. As a major investor in education, the Government is therefore a major driver of lifelong learning. Through the subsidy of learning in all sectors, the Government has a leading influence on the structure of learning demand. For example, moves to enhance learning at the level of basic skills and HE in the last few years have shifted take-up towards these forms of provision and away from other sectors such as part-time, mature and unaccredited learning. Thus, the public sector (Government and other regulatory agencies) is a major driver, not just of the level of learning, but of its content, distribution, assessment, accreditation and purpose.

### Family dynamics

The expectancy-value model of lifelong learning and the economic approach both indicate that the family context exerts an important influence on the uptake of learning. This acts through two channels in particular. First, the family is a context within which important interactions occur that are, particularly in childhood, important in the

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93 For example, HM Treasury (2006a)

formation of beliefs, values, aspirations and expectations and that have strong implications for decision-making about participation in learning. Secondly, the family is a context in which resources of time and money are shared in the servicing of obligations, such as household chores and in looking after children and others in need of care.

Key trends in family structure in the UK are that fertility rates declined from 3 children per woman in 1964 to 1.8 in 2006<sup>94</sup>; the average age of child-bearing has increased to over 29 from 26 in 1976<sup>95</sup>; and divorce rates which rose during the 1980s and 1990s have now fallen to their lowest level since 1984<sup>96</sup>. However, marriage rates also continue to decline, suggesting that the decline in divorce may be due to a compositional effect.

The stability of families and close relationships is hard to forecast but relationships with family, peers and significant other adults will continue to have strong influences on learning identities and motivation to learn. More important than issues of family structure will be the motivations, values, beliefs and knowledge of families and close others. Therefore, the principal aspect of family dynamics will be how families and adults engage in and understand learning and how this is communicated to children. This could be either as a vicious cycle of disengagement or a virtuous one of participation.

## Migration and demographic change

Demographic change will have important implications both for the level and nature of learning through life. It is forecast that in 2017 the UK will have 1.9 million more people aged 65-84 and 0.5 million more aged over 85, compared to 2004<sup>97</sup>. This changing demographic structure will put greater pressure on those in the labour market to ensure national economic output and competitiveness, thus adding to the pressure on skill formation for young workers and in schools and FE/HE. How the education and training system combines skills training for the labour market with learning for health and wider personal development, will be an important influence on outcomes.

For older learners still in active participation in the labour force, maintaining economic activity and productivity through lifelong learning will be crucial. As Kirkwood et al. highlight<sup>98</sup>, recent legislation to reduce age discrimination is not by itself sufficient to prevent the waste of mental capital, productivity and human potential caused by under-valuation of the economic productivity of older workers, with associated costs in terms of ill-health. However, learning can also enhance mental health and wellbeing, with substantial associated benefits for health costs and social inclusion<sup>99</sup>. This is true both for older and younger members of society.

In addition to changes in the age structure of the population, migration is also likely to play a substantial role as a driver of lifelong learning. Trends towards inward migration have been strong in the past decade but their continuation is not inevitable. In the 1950s and 1960s the UK had a net outflow of migration. Nonetheless, the demographic trends referred to above are likely to make inward migration a continuing

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94 HM Treasury (2006b)

95 Ibid

96 Office of National Statistics (2006)

97 HM Treasury (2006b)

98 Project report: Kirkwood et al. *Mental capital through life: Future challenges* (Appendix A refers)

99 Feinstein et al. (2006); Behrman (SR-A7); Rebok (SR-E22) – see Appendix C

factor. This trend has substantial implications for the demand for learning, both in terms of increasing demand for training in English as a second language and in maintaining at the fore issues of cultural, ethnic and social diversity.

### **Cultural dynamics**

Alongside families, wider peer cultures and cultural norms have substantial implications for lifelong learning. There has been very little quantitative estimation of such relationships, but it is important to emphasise that cultural trends such as the greatly increased participation of women in labour market activity, the growth of owner-occupation in housing or the increased diversity of the current era have large and often unpredicted impacts on lifelong learning – changing both the nature of demand and the context in which learning is provided.



## 6 Key challenges for policy

## 6 Key challenges for policy

This chapter draws upon our analysis to identify important challenges for policy.

Whilst it looks ahead 20 years, many of the issues raised have substantial commonality with today's problems and issues. Others require strategic choices to be considered now in order to meet future requirements.

Options for addressing the challenges identified here will be presented in the final report.

## 6 Key challenges for policy

We now conclude with a brief summary of the implications of these drivers of learning through life for policy over the next two decades, focusing in particular on a number of key challenges that will be important in ensuring that the UK can respond to global change.

We have described important sources of motivation to engage in learning through life and also set out the extent of the challenge, given currently low levels of participation in the UK. As Field<sup>100</sup> indicates by reference to the situation in other countries, the inequality in current rates of participation is not inevitable. There are a number of elements to a cross-cutting approach by which the objective of enhancing the disposition to engage in learning through life can be achieved.

### Enhancing the skill-base at all levels

The principal feature of policy which will strongly influence the success or failure of the UK to develop further a competitive, productive and cohesive society will be its ability to enhance the skills levels of the UK population. In previous eras it has been sufficient to ensure that a minority of the population have high levels of skill. However, the increasing pace of skill-based technological change means that the number of low-skill jobs is continuing to fall to very low levels.

Although there are sound foundations for the view that increasing skill is important, there is not persuasive evidence to suggest that increasing skill at any particular level has the highest economic returns. There are macro-economic and individual benefits to expansion of skills at all levels from basic skills to the highest levels of technological and scientific specialisation. Social cohesion, citizenship, good health and wellbeing and low rates of crime and anti-social behaviour all depend on skills developing at all stages of the distribution. A broadening of the gap between those with high and low skill not only weakens social bonds and leaves substantial sectors of the population disengaged and alienated, it also reduces the pool from which new dynamism, creativity and innovation will emerge.

### Raising demand for skills from employers

As discussed above, a key driver of learning through life is the extent to which workplaces are contexts for learning, both formally and informally and the extent to which employers recognize benefit to them of increased skill level of their workforce and are willing to fund this. (See Project report, Dewe and Kompier. *Wellbeing and work: Future challenges* (Appendix A refers) for further discussion of this crucial area).

### Improvement of practice

There is considerable evidence from evaluation of programmes to support learning that it is only quality education and learning that can enhance skill and capability. Thus, enhancing the quality of learning provision in the UK is a central policy challenge. Some helpful principles to support this response have been established in the Teaching and Learning Research programme (TLRP), the major UK investment in understanding

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100 Field (SR-A10) – see Appendix C

teaching and learning<sup>101</sup>. In their present form, reflecting the early conclusion of TLRP's school-focused portfolio, these principles are stated as follows:

### **Evidence-informed principles from the Teaching and Learning Research Programme**

1. Learning should aim to help individuals and groups to develop the intellectual, personal and social resources that will enable them to participate as active citizens, contribute to economic development and flourish as individuals in a diverse and changing society. This may mean expanding conceptions of worthwhile learning outcomes, and taking seriously issues of equity and social justice for all.
2. Teaching and learning should engage learners with the big ideas, key processes, modes of discourse and narratives of subjects, so that they understand what constitutes quality and standards in particular domains.
3. Teaching and learning should take account of what the learner knows already in order to plan their next steps. This includes building on prior learning, but also taking account of the personal and cultural experiences of different groups of learners.
4. Teachers should provide activities and structures of intellectual, social and emotional support to help learners to move forward in their learning, so that when these supports are removed the learning is secure.
5. Assessment should be designed and implemented with the goal of achieving maximum validity both in terms of learning outcomes and learning processes. It should help to advance learning as well as determine whether learning has occurred.
6. A chief goal of teaching and learning should be the promotion of learners' independence and autonomy. This involves acquiring a repertoire of learning strategies and practices, developing positive learning dispositions, and having the will and confidence to become agents in their own learning.
7. Learners should be encouraged and helped to build relationships and communication with others for learning purposes, in order to assist the mutual construction of knowledge and enhance the achievements of individuals and groups. Consulting learners about their learning and giving them a voice is both an expectation and a right.
8. Informal learning, such as learning out of school, should be recognised as at least as significant as formal learning and should therefore be valued and appropriately utilised in formal processes.
9. The need for teachers to learn continuously in order to develop their knowledge and skill, and adapt and develop their roles, especially through classroom inquiry, should be recognised and supported.
10. Institutional and system-level policies need to recognise the fundamental importance of teaching and learning and be designed to create effective learning environments for all learners.

<sup>101</sup> [www.tlrp.org](http://www.tlrp.org); see also Pollard (SR-A5) – see Appendix C

## Personalisation

There is momentum behind the notion of personalisation in education, as in the rest of Government provision. It has been emphasised as a key element of policy for achieving the wider benefits and necessary for the achievement of an increase in social mobility. It harnesses a number of elements:

*The idea of person-environment fit* and its implications for the delivery of education and other Government services. The determination of the most effective locus of intervention to enhance life chances is a difficult decision, often requiring detailed knowledge of the individual and their family, community and other contexts. Moreover, there is no single programme that will benefit all, at all points in life, in all contexts. Needs are heterogeneous, and Government provision should be able to respond to these personal differences;

*The importance of inter-person interactions in the development of children and adults.* Education theory emphasises the crucial role of student-teacher relations in the learning process, as well as of child with parent, parent with teacher and so on. These relationships need to respond to the communication and needs of the individual child or adult if they are to support his or her learning. A good example is “scaffolding”, whereby the teaching strategy provides individualised support based on the learner’s “zone of proximal development”<sup>102</sup>, or the gap between what children can do by themselves and what they can learn with competent assistance. Learning theory emphasises the importance of scaffolding, of recognising development and progress in learning.

*Choice on the demand side of public services.* Choice has come to be seen as one of the forces that drives up quality in provision, as it creates a context in which clear signals can be sent to suppliers and in which they are responsive to those signals. It is argued that consumers in the private sector expect services to be tailored to their needs. This market segmentation is necessary to firms in the private sector trying to find a niche of unmet or unrealised demand.

Little is presently known about the mechanisms of personalisation or about its effectiveness relative to more universal forms of provision. There are questions about how much should be invested in encouraging one-to-one time with teachers or small-group time, and how this trade-off changes through the life-cycle. There is also a very important structural question of how to match pupils to schools in a way that recognises the particular needs, aspirations and capabilities of each child and provides for them a context that, as much as is reasonable, is appropriate and developmentally positive for each child – if the only mechanism is postal location. (This is a particular and important theme of the Project report, Goswami. *Learning difficulties: Future challenges* (Appendix A refers)).

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<sup>102</sup> Chang et al. (2002); Daniels (1996)

## Addressing social inequality in access and outcomes

Recent research has highlighted that already at age 3 for the current generation of UK children, there are substantial gaps in cognitive achievement<sup>103</sup>. A recent report from the Sutton Trust<sup>104</sup> has found that 100 elite schools – representing less than 3% of 3,700 schools with sixth forms and sixth form colleges in the UK – accounted for a third of admissions to Oxbridge during the last five years. Moreover these 100 schools are highly socially selective. These findings and others<sup>105</sup> point to the wide skills and attainment gap that exists in the UK. This reduces social cohesion and limits the pool from which innovation and capability can be harnessed for the benefit of all. The wide gap in access to resources of income and education also has implications for health and wellbeing. Therefore, addressing this gap is a central challenge for policy.

## Summary of policy implications

- In order to flourish, the UK must remain competitive and productive by enhancing its skill levels across the board. Basic skills and technological and scientific expertise are equally important. Indeed, there is creative and innovatory synergy to be gained from the dynamic interaction of improved skills throughout the population.
- Quality teaching and learning are essential to increased skills levels, especially in the workplace, which is a key environment for learning through life. Management skill in perceiving and responding to training need is critical. This in itself depends on a wide range of skills of managers.
- Personalised education is central to successful delivery. No one method or strategy is applicable to every individual child or adult.
- The learning process needs to be underpinned by insightful communication between student and teacher. Therefore teacher skill and training is critical.
- Just as consumers in the private sector expect educational provision to be tailored to their needs, so too in the public sector individual needs, aspirations and capabilities have to be matched by appropriate learning and teaching.
- Social inequalities in educational access and attainment need to be addressed to improve social cohesion as well as extend the range of capability and innovation within the UK population.

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103 Joshi and Hansen (2007)

104 Sutton Trust (2007)

105 Gorard (SR-A4) – see Appendix C

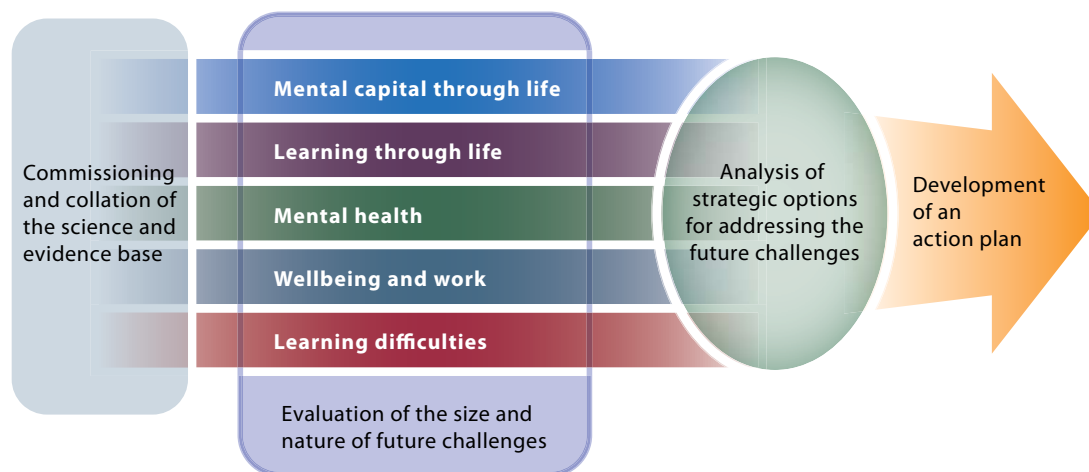


# Appendix A: Overview of the work of the Foresight Project on Mental Capital and Wellbeing

The aim of the Project is to advise the Government on how to achieve the best possible mental development and mental wellbeing for everyone in the UK.

The principal parts of the Project are set out in Figure A.1 and are described below. Further information may be found on the Project website ([www.foresight.gov.uk](http://www.foresight.gov.uk)). All the Project papers and reports will also be made freely available through this website in October 2008 – either electronically or in hard copy.

**Figure A.1 The principal parts of the Project**



## Analysis of future challenges

The starting point was to generate a vision for the size and nature of future challenges associated with mental capital and wellbeing, and to assess how the situation might change over the next 20 years. This analysis was predicated on the assumption that existing policies and expenditure remain unchanged. To make the analysis tractable, the work was divided into five broad areas, as indicated in Figure A.1 (second from left box). The present report documents the findings from one of these – Learning through life. Details of the reports of the five areas are listed in Table A.1.



Table A.1: The challenges ahead – reports of the findings		
Designation	Title	Authors
CR-E	Mental capital through life: Future challenges	T. Kirkwood J. Bond C. May I. McKeith M. Teh
CR-A	Learning through life: Future challenges	L. Feinstein J. Vorhaus R. Sabates
CR-B	Mental health: Future challenges	R. Jenkins H. Meltzer P. B. Jones T. Brugha P. Bebbington D. Crepaz-Keay M. Knapp
CR-C	Wellbeing and work: Future challenges	P. Dewe M. Kompier
CR-D	Learning difficulties: Future challenges	U. Goswami

The five areas were chosen to map closely onto the interests of important Government Departments, although it was recognised from the outset that the areas were interrelated. Therefore, consideration across the five has also been undertaken – the results of that cross-cutting analysis will be reported in the final Project report.

### Supporting evidence and analysis

The above analysis was informed by:

- Consideration of the underpinning science associated with each of the five areas. This was informed by approximately 80 commissioned reviews – these set out the current state-of-the-art of science in diverse fields, including social science, and also scientific developments of particular interest (Appendix C provides a full list).
- Reviews of certain socio-economic factors. These were performed when the existing literature was deemed insufficient for the purposes of the Project. In particular, these reviews addressed the relationship of the physical environment to wellbeing, and the evolving use of information and communication technology (see Appendix C).
- Economic analysis. This has taken a broad view of the direct and indirect impacts of important issues – such as specific learning difficulties and mental health problems.
- Systems analysis relating to each of the five areas. An account of the Project systems work is being prepared in a separate report (see Appendix C; SI Systems maps).

- The development of hypothetical future scenarios. These have been used to explore future uncertainty in the five areas (listed in Figure A.1), and to test the robustness of possible interventions. An account of the scenarios and their use within the Project will also appear in a separate report (available through [www.foresight.gov.uk](http://www.foresight.gov.uk)).

In addition to the above, the work also drew extensively upon the existing literature as well as numerous workshops and meetings with leading stakeholder organisations.

### **Analysis of strategic options**

Having identified important challenges for the future, the Project identified and analysed possible interventions and strategic options for addressing them. Here the analysis of possible costs and benefits has taken a lifecourse approach, recognising that interventions affecting today's children might affect them for the rest of their lives.

Consideration was also given to practicalities affecting the effective realisation of the interventions. For example, these included issues of ethics, governance and public attitudes.

### **Stakeholder engagement**

From the outset, the Project has involved a wide range of leading stakeholders from both the public and private sectors. The intention is to work closely with these to develop a comprehensive plan to take forward the findings of the Project. That plan will be announced at the time of the launch of the final Project report in October 2008.

## Appendix B: Learning through life – a visual representation

This report has shown that there are many factors that affect the provision, uptake and outcomes of learning through life. It was therefore considered useful to develop a single visual representation which encapsulated the principal elements and their broad interaction. Such a representation has therefore been developed and used in the present work to conceptualise the many issues within a common framework.

This Appendix briefly presents the visual representation (also termed a “conceptual overview”) that was developed. It is beyond the scope of this report to provide a full explanation here, but a detailed description will be made available in a separate report through [www.foresight.gov.uk](http://www.foresight.gov.uk). The report will also provide equivalent diagrams for four other important aspects of mental capital and wellbeing (introduced in Appendix A), as well as other types of systems diagrams which have been used within the Project.

Figure B.1 provides a schematic of the principal parts of the conceptual overview which appears in full in Figure B.2. However, it should be stressed that Figure B.2 does not purport to cover every possible aspect of learning at every stage in life – that would have rendered an already detailed representation overly complex, and masked the underlying structure. Likewise, it is expected that other experts might contest the precise choice of elements and some aspects of the detailed structure. However, the presented diagram was considered to be sufficiently detailed and sufficiently accurate to be of use for the present Project – and, indeed, a useful basis for further development by others.

Referring to Figure B.1, the principal parts are outlined as follows:

- The core of the diagram is the individual, which appears within two circles – broadly representing the school-age learner, and – to the right – the adult learner.
- The green arrow at the bottom of the diagram represents the timeline through life. (Figure B.2 shows that this timeline starts at birth and continues through until death.)
- The school-age individual is seen to be particularly influenced by the home/family environment and the learning environment.
- Three principal outputs appear for the school-age learner: “cognitive skills”, “reflexive and social skills” (also termed “non-cognitive skills”), and “learner identity”. Together, these provide a foundation for the adult learner.
- The adult learner (assumed here to be in a work environment) interacts in particular with the workplace environment, which in turn is affected by globalisation and the economic environment. Technology is also seen as a key input in the learning environment of the adult learner.

Figure B.1: Schematic of the principal parts of the conceptual overview

### Economic environment

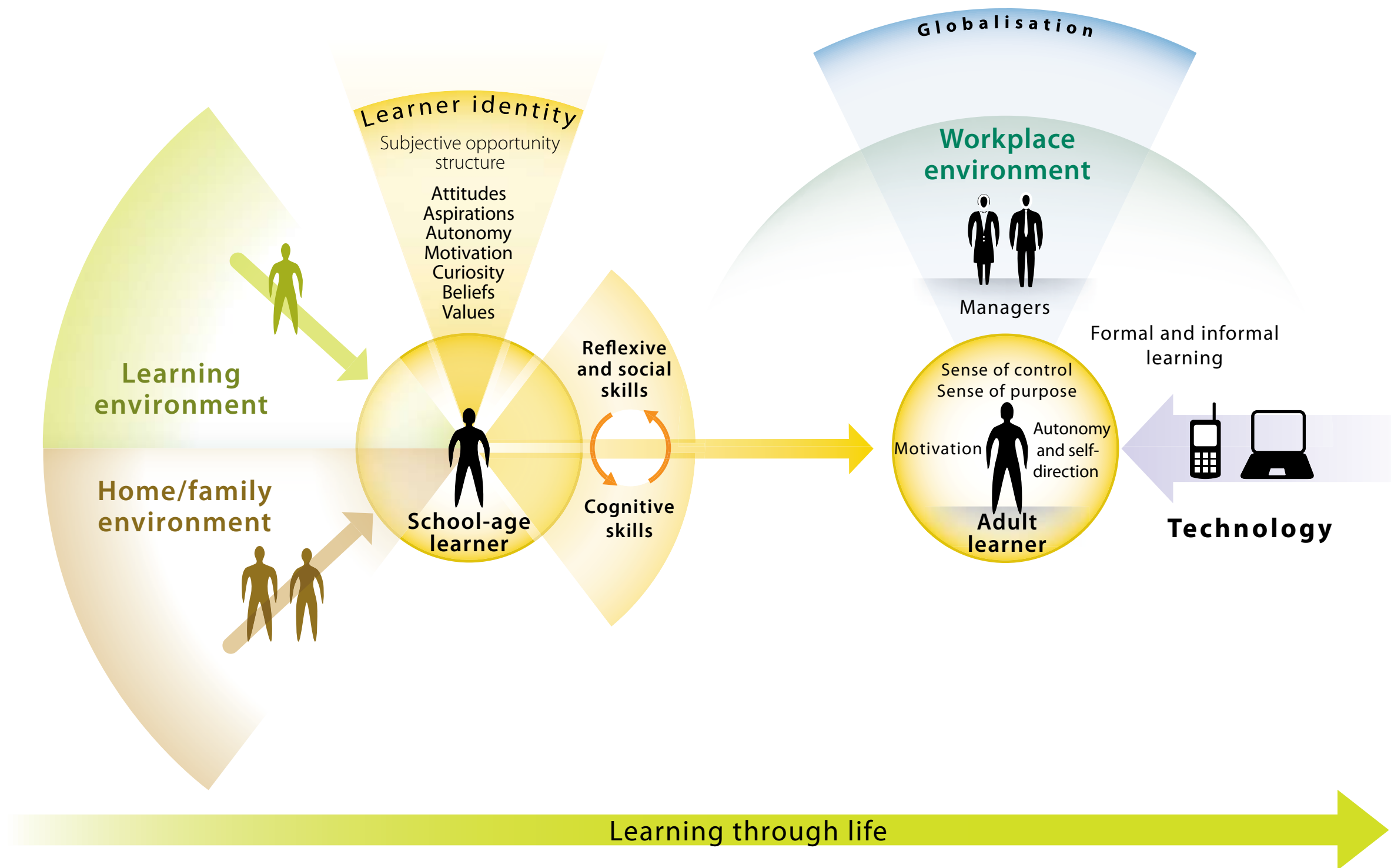
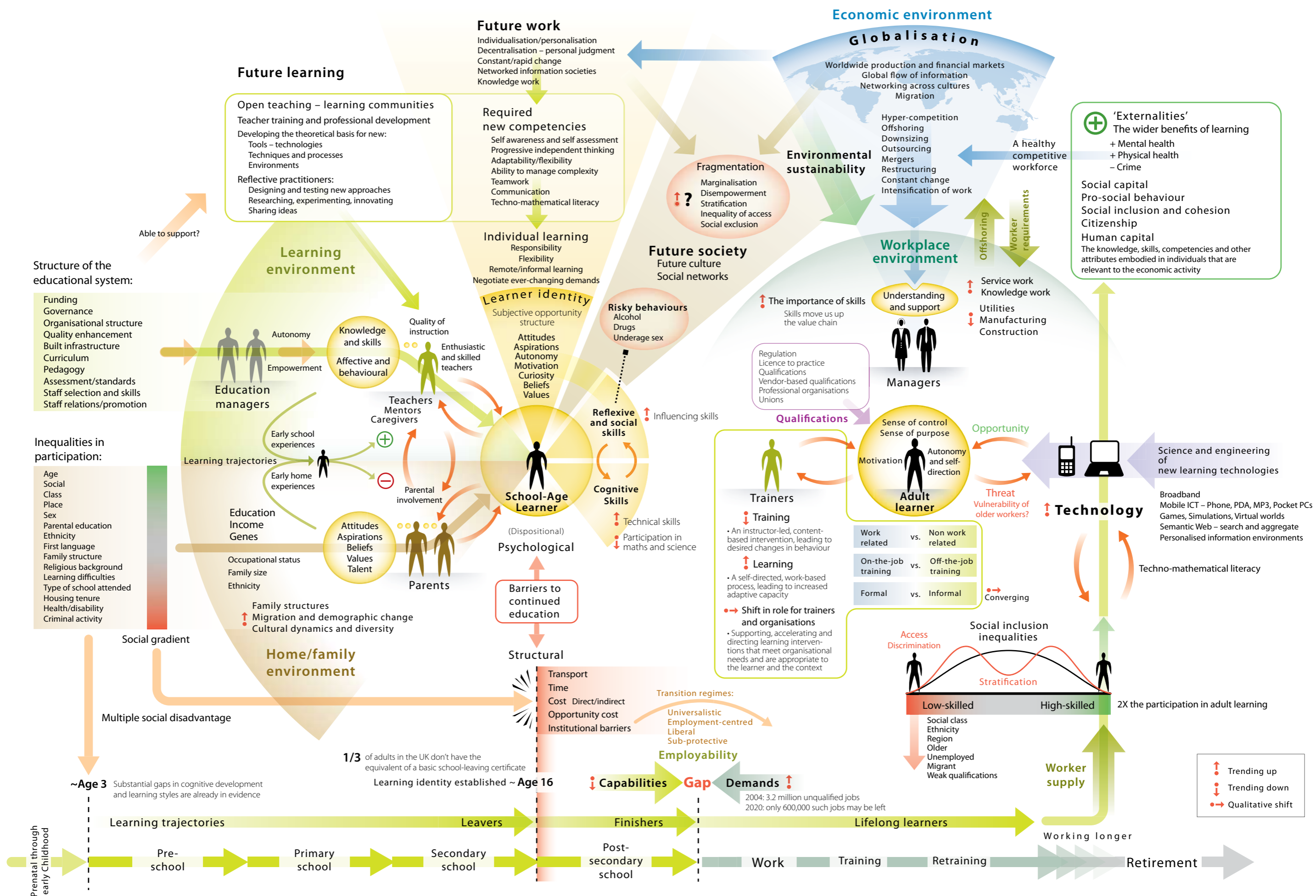
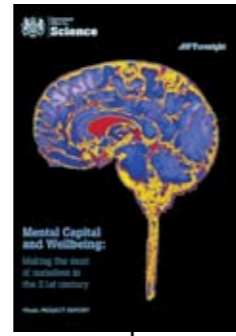
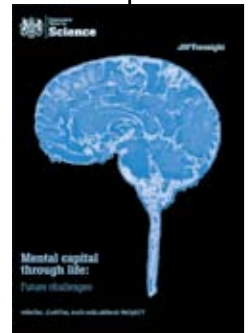


Figure B.2: A conceptual overview of factors that affect learning through life



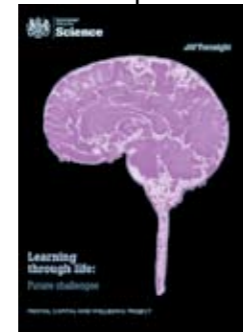


## Appendix C: Structure of the Project reports and supporting papers



### Mental capital through life: Future challenges

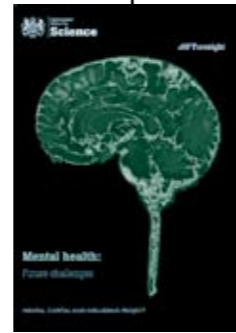
- SR-E1:** Neuroscience of education
- SR-E2:** Human reward
- SR-E3:** Neuroeconomics
- SR-E4:** Cognitive reserve
- SR-E5:** The adolescent brain
- SR-E6:** Behavioural economics
- SR-E7:** Resilience
- SR-E8:** Adolescent drug users
- SR-E9:** Pharmacological cognitive enhancement
- SR-E10:** Stem cells in neural regeneration and neurogenesis
- SR-E11:** Early detection of mild cognitive impairment and Alzheimer's disease: An example using the CANTAB PAL
- SR-E12:** Anxiety disorders
- SR-E13:** Neurocognition and social cognition in adult drug users
- SR-E14:** Normal cognitive ageing
- SR-E15:** Social cognition in teenagers – inclusion
- SR-E16:** HPA axis, stress, and sleep and mood disturbance



### Learning through life: Future challenges

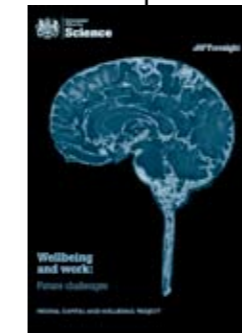
- SR-E17:** Nutrition, cognitive wellbeing and socioeconomic status
- SR-E18:** Nutrition and cognitive health
- SR-E20:** Effect of chronic stress on cognitive function through life
- SR-E21:** Depression and its toll on mental capital
- SR-E22:** Fitness and cognitive training
- SR-E24:** Effects of exercise on cognitive function and mental capital
- SR-E25:** Technology solutions to prevent waste of mental capital
- SR-E27:** Housing as a determinant of mental capital
- SR-E29:** Cognitive neural prosthetics
- SR-E31:** Cellular and molecular logic of neural circuit assembly

- SR-A2:** Learning at work
- SR-A3:** Skills
- SR-A4:** Participation in learning
- SR-A5:** Evidence-informed principles from the Teaching and Learning Research Programme
- SR-A7:** Estimating the effects of learning
- SR-A9:** Self-regulation and executive function
- SR-A10:** Lifelong learning across the world
- SR-A11:** Non-cognitive skills
- SR-A12:** Future technology for learning



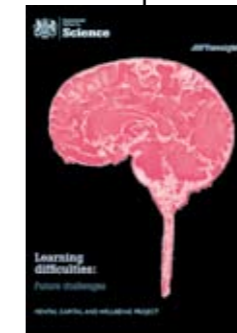
### Mental health: Future challenges

- SR-B1:** Genetics and social factors
- SR-B2:** Mental health of older people
- SR-B3:** Positive mental health
- SR-B4:** Mental disorders in the young
- SR-B5:** Prisoners
- SR-B6:** The homeless
- SR-B7:** Children in local authority care
- SR-B8:** The costs of mental disorders
- SR-B9:** Serious and enduring mental illness
- SR-B10:** Personality disorders
- SR-B11:** Violence
- SR-B12:** Ageing
- SR-B13:** Migrants
- SR-B14:** Substance abuse
- SR-B15:** Depression



### Wellbeing and work: Future challenges

- SR-C1:** Workplace stress
- SR-C2:** Mental wellbeing at work and productivity
- SR-C3:** Management style and mental wellbeing at work
- SR-C4:** Flexible working arrangements and wellbeing
- SR-C5:** New technology and wellbeing at work
- SR-C6:** Stress management and wellbeing
- SR-C7:** Working longer
- SR-C8:** Leisure: the next 25 years
- SR-C9:** Training in the workplace
- SR-C10:** Careers
- SR-C11:** Violence at work



### Learning difficulties: Future challenges

- SR-D1:** Specific language impairment
- SR-D2:** Dyslexia
- SR-D3:** Adult learning disabilities
- SR-D4:** Dyscalculia
- SR-D5:** Deafness
- SR-D7:** Genetics and diagnosis of learning difficulty
- SR-D8:** Conduct disorder and anti-social behaviour
- SR-D9:** Social cognition and school exclusion
- SR-D10:** Autism and autism spectrum disorders
- SR-D11:** Attention Deficit Hyperactivity Disorder
- SR-D12:** New technologies and interventions
- SR-D13:** Trajectories of development and learning difficulties
- SR-D14:** Early neural markers of learning difficulty
- SR-D15:** Childhood depression
- SR-D16:** Eating disorders

### Cross-Project papers

- SR-X2:** Science of wellbeing
- SR-X3:** Neurobiology of wellbeing
- SR-X5:** Neural circuit assembly
- DR-1:** ICT as a driver of change
- DR-2:** Physical environment and wellbeing
- ER-1:** Ethics



### S1: Systems maps

Note 1: Some reference numbers were assigned to topics; however, the reports/papers were not subsequently commissioned.

Note 2: The Project commissioned some additional “discussion papers” as referred to in the text of the final report.

These will be made available through [www.foresight.gov.uk](http://www.foresight.gov.uk) in due course.

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*This review has been commissioned as part of the UK Government's Foresight Project, Mental Capital and Wellbeing. The views expressed do not represent the policy of any Government or organisation.*

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