Britain's Record On Skills

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Executive Summary

The aim of this paper is to document the international position of the UK in terms of the skills base of its employees, to explain how the documented situation arose, and to suggest changes that could be made. Various data sets are used to this end.

The paper begins with the observation that wages (in a constant currency, taken as an indicator of productivity) at the top of the distribution are at a similar level in Germany and the UK. However, at the lower end of the wage distribution, wages in Germany are over half as large again as they are in the UK. It is therefore hypothesised that the overall 20% difference between productivity in Germany and the UK is due to higher productivity of the lower-skilled workers in Germany, compared to their equivalents in the UK.

Inspection of various data sets supports this hypothesis. Data from the Skills Audit makes clear that although the UK has just as high a proportion of employees with a degree as Germany, France and the US, it falls behind Germany in terms of the proportion holding qualifications to at least A-level standard, and is behind both Germany and France in terms of the proportion educated to at least O-level standard. The International Adult Literacy Survey confirms that Britain has a higher proportion of individuals in the lowest categories for both literacy and numeracy than all continental European countries in the survey. Worse is the fact that in all continental European countries, a smaller proportion of the younger age groups are in the lowest categories for literacy and numeracy than the older age groups, which suggests that basic skills levels are improving over time in those countries. This is not the case in Britain, however, where, if anything, the older age groups perform better on the skills tests than the younger age groups. The paper goes on to show the poor wage and employment prospects of individuals with low levels of literacy and numeracy.

The second area on which the paper focuses is that of vocational qualifications. Vocational qualifications are used in some countries as a means of educating the less academically-inclined to a Level 3 (A-level equivalent) standard, for example the apprenticeship system in Germany. Vocational preparation is much less developed in the UK, however. The paper attempts to show that there is no justification for this, as the returns to vocational qualifications are no lower than the returns to academic qualifications, once we take into account the generally shorter amount of time required to study for a vocational qualification, and if anything the returns per year of study may be even higher for vocational than for academic qualifications.

The paper ends with a discussion of why the skills situation in the UK has developed the way it has, and considers some remedies that have been put in place, for example the Literacy and Numeracy Hours for primary school children, the reduction of mixed ability teaching for secondary school children, Education Maintenance Allowances to induce lower income individuals to stay in further education, the expansion of the apprenticeship system, and the *Learndirect* scheme for adults with low literacy levels.

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1. International Comparisons

Productivity per hour worked in Britain is roughly 20% lower than in Germany and so are real hourly wages?[1] Why is this?

The answer is that Britain has less human capital *and* less physical capital per hour worked.[2] This chapter is only about human capital. But since human capital is complementary to physical capital, one reason why Britain has less physical capital is that its low skills attract less physical capital investment than would otherwise occur. (In the 1990s Britain's investment rate was 17%, compared with 22% in Germany and 18% in the US.[3])

But this is an indirect effect of skills: it works through the amount of physical capital. In this chapter we focus only on the direct effect. We begin with the striking facts shown in Table 1. Germany's top 40% of earners do no better than Britain's top 40%. But their bottom 40% earn half as much again as the equivalent group in Britain. So, if we want to understand Britain's low productivity, we should focus heavily on the bottom 40% of the workforce.

If we turn to Britain's skill performance, it is precisely at the bottom of the ladder that Britain does worst. As Table 2 shows, Britain does as well as most countries at higher education. But when we move down to the numbers with A-level (normally taken at 18) or with advanced craft qualifications, Britain is way behind Germany. And when we move down to numbers with good performance at GCSE (normally taken at 16), Britain falls way behind France as well. Only the US has similar skills to Britain. (Annex 1 discusses the equivalences of qualifications across countries.)

We can get a crude measure of the significance of the British skill weakness recorded in Table 2 by calculating what the average Briton would earn if the wage for each qualification remained constant but Britain took on the skill distribution of each other country in turn. The result is shown in Column 4 of the table. These data suggest that nearly half of the wage gap between Germany and Britain is due to differences in qualifications. The differences are important but they capture only a fraction of the story.

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[1] Productivity in the UK: the Evidence and the Government's Approach. HM Treasury, November 2000, p.6, and Table 1 below.

[2] Capital per hour worked is 37% below that in Germany and 30% below that in the US. An accounting approach would expect that labour productivity would be lower by about ¼ of these figures on account of differences in the capital/labour ratio.

[3] European Economy, Statistical Annex.

It is extremely difficult to control effectively for the quality of the education associated with different qualifications. The only completely comparable information relates to literacy and numeracy, where the International Adult Literacy Survey (IALS) asked identical questions to a representative sample of adults of working age in 12 countries (see Table 3). Those in Group 1 for literacy can be described as "functionally illiterate". They are not able to read simple instructions on a medicine bottle. Similarly those below Group 2 in numeracy cannot calculate the change they are owed after a simple purchase at the corner shop.

In Britain 22% of adults are functionally illiterate, compared with only 7% in Sweden. And 23% are innumerate, compared with 7% in Sweden. The US is as bad as Britain at the bottom end, but somewhat better at the top end.

To construct a skill index based on literacy and numeracy we can, as in Table 3, construct for Britain a 25-cell matrix of wages for the 5 levels of literacy and the 5 levels of numeracy and then apply these weights to the skill distribution of each other country. The result shows that simple differences in literacy and numeracy account for 7 out of the 20 percentage points difference in real wages between Britain and Germany. If we combine the effects of literacy and numeracy with those of qualifications discussed earlier, we have explained well over half of the productivity gap between Germany and Britain[4]. The rest of the difference is mainly due to the fact that Germany has 60% more capital employed (per hour worked).[5]

The comparison with the US is rather different. US productivity per hour is also roughly 20% higher than British. But this time there is no clear overall difference in skills, and US capital employed (per hour worked) is only about 25% higher than in Britain. The main remaining factor is a substantial gap in total factor productivity – with the US nearer to the cutting edge than Europe. A factor here may be the exceptional quality of the research in the leading universities in the US, which are well ahead of any in Britain or the rest of Europe.

The most depressing feature of the skills position in Britain and the US is that younger adults are no more literate than older ones – so there is no improvement between cohorts. By contrast, in most continental countries the young are markedly more literate.

[4] For this purpose, we have to include only the 'partial' effect of each variable. We therefore reduce the gross effects in Tables 2 and 3 by one third (see Table 7).

[5] See HM Treasury, Productivity in the UK: the Evidence and the Government's Approach, November 2000, p.6 and 9, for this and the following paragraph.

The same age pattern is true of numeracy.[6] Interestingly, at age 13 British mathematics is not much behind Germany[7]. The falling behind occurs between age 13 and young adulthood, when in most countries people continue studying maths beyond 16 – but not in Britain. The peculiarity of Britain in this regard emerges clearly from Table 4.

How much does all this matter? From a policy point of view the issue is not only to understand where we are, but to ask what we could achieve through change. We need to know how much we could raise individuals' productivity by helping them become more literate/numerate, or by giving them more vocational competence and knowledge. The rest of the paper is therefore organised as follows:

- Section 2 analyses the returns to literacy and numeracy
- Section 3 analyses the returns to vocational and other qualifications, and
- Section 4 describes how we got where we are and how far recent changes are improving things.

2. Literacy and Numeracy Matter

Both literacy and numeracy matter, and numeracy matters at least as much as literacy. We have three measures of each: the British national standards which build on the tests developed by the Basic Skills Agency (BSA); the National Curriculum Tests given to school children; and the IALS tests.

Table 5 shows the rough equivalences between these tests. It also shows the fraction of adults reaching each level on IALS.

The Level 1 standard for adults is roughly the level now expected of 11-year-olds. It is the level needed for functional literacy and numeracy. As we have seen from the IALS survey, roughly one in five adults in the UK fall below this level for literacy. We also have the results of two recent British panel surveys – the National Child Development Study (NCDS) of 37-year-olds and the British Cohort Study of 21-year-olds. These show similar results. In each group roughly 18% of adults fall below the national Level 1. (Note that the government expects that by 2002 only 20% of 11-year-olds will fall below this standard.)

[6] It is true whether we look at the numbers in Group 1 or in Groups 1 and 2.
[7] International Association for the Evaluation of Educational Achievement (1996), Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS).

Even worse, 6% of adults fall below the level now expected of 7-year-olds. For numeracy the situation is considerably worse.

People with poor literacy and numeracy are seriously disadvantaged in the labour market. Table 6 shows wage equation results using the NCDS. Someone with Level 2 Literacy and Numeracy gains in log terms (.28 + .23) over someone with below Level 1 – *i.e.* 67% higher wages.

The effect is reduced when in Column 2 we allow for the effect of qualifications, which are of course correlated with literacy and numeracy, and also add substantive capabilities beyond extra literacy and numeracy. The effect of numeracy is slightly higher than of literacy, but this may of course reflect the relative difficulty of measuring each of them.

In Column 3 we include as controls a person's test scores at 7, 11, and 16. This represents an attempt to estimate the effect of that part of literacy and numeracy acquired as an adult. It confirms that there is a serious case for tackling illiteracy and innumeracy in adulthood – though there is no clear basis yet for knowing what costs are needed to achieve a given learning gain.

These findings are confirmed if we look instead at IALS (see Table 7). In Britain an individual with level 2 literacy and numeracy skills will earn 68% more than someone below level 1, almost identical to the NCDS result. IALS results suggest that numeracy has a distinctly larger effect than literacy. The numeracy results for the USA are very similar to those for Great Britain, although the American literacy effect is larger than its British counterpart, leading to a greater (95%) effect of level 2 basic skills on earnings. As with Britain, this effect is reduced, but remains strong and statistically significant, once we hold qualification level constant. The results for the Netherlands differ substantially. Basic skills have a smaller effect on wages, reflecting their greater abundance in the population.

We investigated whether these results differed by gender[8]. With the exception of the numeracy results in the Netherlands, in each case the effects of literacy and numeracy on earnings were greater for women than for men, with the gender differences being particularly large in the case of literacy skills.

On top of these earnings effects are effects on unemployment (see Table 8). An individual in Great Britain with level 2 literacy and numeracy skills has a probability of unemployment 13 percentage points lower than an individual below level 1 (8.0 + 4.6). This

[8] Results available from authors on request.

effect is only marginally reduced if we hold qualifications constant. Basic skills similarly reduce the likelihood of unemployment in the United States and the Netherlands, although to a smaller extent than in Great Britain – largely reflecting the lower level of aggregate unemployment at the time in those countries. When we estimated separate equations for males and females, the effects were in general larger for men, although this may be due to not formally taking account of female participation decisions.

Further evidence on the importance of mathematical skills for productivity and wages is supplied by Dolton and Vignoles (forthcoming), who use NCDS data and a survey of 1980 graduates to show that an individual who obtains a mathematics A-level earns on average approximately 10% more than an individual without such a qualification, even after controlling for GCSE performance, the final highest qualification obtained and the field of study for a degree (where appropriate). Thus numeracy, and also literacy, have large effects on labour market outcomes.

3. Vocational Preparation

If nearly everyone agrees that general skills of communication, analysis and numeracy matter, there is less agreement on specific vocational preparation. Why not leave it to employers, it is sometimes said? Interestingly, this is not usually suggested for doctors, lawyers, clergymen, scientists, linguists and other graduates, whose parents believe they should be educated over long periods at great public expense. But it is frequently said of plumbers, electricians, hotel workers and others who typically come from less articulate parents. The argument is put particularly strongly when the off-the-job education is only part-time: the individual has an employer who could pay - so let the employer pay, it is said. This overlooks the standard argument for educational subsidies, without which there is little case for subsidy to <u>any</u> post-compulsory education: namely, the presence of external benefits. If someone qualifies as an electrician in a full-time college (which is possible), the external benefits are unlikely to be greater than if he learns through part-time study while working at a job.

On top of this, no strategy to engage all 16-19 year olds in learning can succeed if the only learning offered is full-time. For many youngsters abhor school and want to earn. They can only be induced to learn if they can do it while earning. So a government might well

wish to pay for part-time vocational education as a measure against social exclusion, even if it was not fully justified on a narrow earnings-only calculation of rate of return.

Even so, the starting point must be a calculation of the rate of return to qualifications obtained full-time and part-time. Column 1 of Table 9 estimates the earnings effect of each qualification obtained after the completion of compulsory schooling at age 16. The data source is the Labour Force Surveys (LFS) of 1997 and 1998, which together provide a sample of 52,000 employees aged 20-50 with both wage and qualifications data[9].

We focus on returns to the following post-16 qualifications[10] (controlling for earlier experience). On the academic side we focus on

A-level (1 or more), - normally taken after 2 years.
Higher education diploma, - normally 2 years.
1st degree, - normally 3 years.
Higher degree, - averaging around 1½ years.

and on the specifically vocational side we look at

RSA Advanced Diploma, - typically requiring half a year FTE
City and Guilds Part 2, - typically 2 years day-release (a standard craft qualification)
City and Guilds Part 3, - typically 2 years day-release (an advanced craft qualification)
ONC/D, - with ONC requiring 2 years day-release and OND 2 years full-time (an advanced craft qualification)
HNC/D, - similar to ONC/D (a technician level qualification)
Professional qualifications, - in for example accounting, banking, surveying, engineering, medicine and law.

We do not include City and Guilds Part 1 nor Lower Levels of RSA, given that these can be obtained pre-16 and mainly pick up effects of ability differences, as do GCSEs and O-

[9] See also Dearden *et al* (2000) for related work on this issue using both LFS and NCDS data. Blundell *et al* (1997; 2000) also provide detailed estimates of the return to higher education using the NCDS.
[10] We do not include NVQs because relatively few people have them and in many cases they reflect not further study but a certification of existing performance. Moreover, if we do include NVQs we find that NVQs 1 and 2 have negative coefficients (reflecting the lower ability of those who take them) and the higher NVQs have positive coefficients. It would have been convenient if the NCDS could help us with this problem (since it includes ability variables) but there were no NVQs awarded by 1991.

levels. Otherwise we include every qualification that a person has – not simply the highest qualification[11].

A drawback of the LFS analysis is that it does not control for early ability and family background, both of which may be associated with both education and earnings[12]. Their omission may therefore bias the estimated returns to the various qualifications. The issue of the potentially offsetting biases caused by omitted ability and measurement error is discussed in the context of the NCDS data by Dearden (1999). Here we adjust for this as best we may by using the NCDS, which, while having a much smaller sample size than the LFS and surveying only 33 year olds, does have the advantage of containing extensive background information from earlier sweeps of the survey, as well as results from ability tests taken at a young age. Column 2 of Table 9 reports the difference in the NCDS between the effects of qualifications when they are measured with controls for background and ability and when they are measured without such controls. It reveals that the largest biases from omitting these characteristics occur, in general, on academic qualifications, particularly in the estimated returns to A-levels.

A second important effect of qualifications is on employment. These results for the LFS are reported in Column 3[13], again using a pooled 1997-98 sample aged 20-50, this time also including those who are unemployed or inactive. The results show a clear effect, especially of vocational qualifications upon employment[14]. These effects provide an important part of the overall return to gaining qualifications – which in our table is estimated by taking Column 1 minus Column 2 plus Column 3.

However, what we are really interested in is the social *rate* of return per year. This relates annual returns (as measured above) to cost. The cost consists of the earnings foregone

[11] For the LFS data we assume that everybody who does City and Guilds Part 2 has Part 1 and everyone who does City and Guilds Part 3 has Parts 1 and 2, unless they have an O-level. Anyone with RSA Advanced Diploma is assumed to have RSA Stages 1/2/3/Diploma unless they have an O-level. Anyone with a Higher Degree is assumed to have a first degree. For those with an O-level/GCSE at A-C we ignore any lower O-level/GCSE passes, thus making these into two mutually exclusive groups – both for the LFS and NCDS samples.

[12] Our estimates implicitly assume a homogenous model of education, *i.e.* the effect of a particular qualification on earnings is assumed to be the same for all individuals (see Blundell, 2000 for a discussion of the various models and estimation techniques). We do attempt to control for observed heterogeneity, in particular ability. Our estimates are based on OLS regression, and we do not control for unobserved heterogeneity. However, we appeal to Card (1999) who suggests that, under certain circumstances the various biases of standard OLS estimates of the return to schooling may offset one another, such that OLS estimates are a reasonably consistent estimate of the true return to education.

[13] The NCDS sample of non-employed is too small to provide meaningful estimates of the employment effects when controlling for ability, although the general pattern of results is similar. See Dearden *et al* (2000), Table 6.13, for NCDS employment results.

[14] If instead, we look at unemployment results we get smaller effects. Column 3 would then show the following reductions in unemployment; 1,0,0,1,2,2,1,1,1,2 associated with each qualification respectively.

through spending time in education, plus the direct cost of tuition. The time taken to obtain the various qualifications is estimated in column 3. We assume that the tuition cost is, for each course, one-half the earnings foregone. Thus the social rate of return is calculated as

$$\frac{\text{Col (1)} - \text{Col (2)} + \text{Col (3)}}{\text{Col (4)} \times 1.5} + 2\%$$

The 2% is included in order to allow for the 2% growth in real age-education-specific earnings that would occur if the relative supply of skill is made to grow at the same rate as the relative demand grows[15]. The social rates of return to the various qualifications are shown in column 5. These estimates are incredibly imprecise, but their general pattern makes it clear that the rates of return on vocational qualifications are no smaller than the rates of return on academic qualifications[16]. There appears to be no basis for undervaluing vocational qualifications when allocating public funds.

Previous work (see Dearden *et al*, 2000) has considered gender differences in the returns to qualifications. The results suggested that, with respect to academic qualifications, the returns are slightly larger for women, while for vocational qualifications, men receive higher returns to the craft-based qualifications, with women receiving higher returns to vocational qualifications such as teaching and nursing.

4. How We Got Here and Where We Are Going

In Section 1 we documented a situation which was in many ways unsatisfactory and in Sections 2 and 3 we found supporting evidence for remedial action. But how did Britain get where it is, and how well is it now tackling its problems?

As compared with the Continent, British education has until recently suffered from

[15] In computing rates of return we make no allowance for drop-out since there is evidence that people benefit even from uncompleted courses. To the extent that drop-out rates vary systematically between academic and vocational courses, this will bias our results.

[16] An important caveat is that our results are sensitive to assumptions about the costs of learning, both earnings foregone and tuition costs. Data on the exact length of each course taken, particularly vocational courses, is sparse, making the task of estimating social returns even more problematic. Small numbers of individuals taking some courses, again principally vocational courses, also reduces the precision of our estimates. We prefer therefore not to draw attention to some of the large estimates of social returns to vocational qualifications in Table 9, and simply conclude that there is no evidence for the social return to be lower on vocational than on academic qualifications.

- greater decentralisation
- excessive child-centredness, and
- greater neglect of the "bottom half" after the age of 16.

Primary Schools

Until 1988 there was no national curriculum. Schools decided what to teach and how. Once selection at 11 had disappeared (around 1965-75) primary schools could follow whatever objectives they believed in. Under the influence of the Plowden Report[17] and other documents, the tide of opinion turned towards, what many have argued, is excessively child-centred education, as in the US. Whole-class teaching largely disappeared and the children sat around tables pursuing their individual work-plans. Already the pre-War system of passing each grade before a pupil moved up had disappeared. Now the prevailing philosophy was increasingly to accept the wide diversity in children's attainment as quite natural. It was not, as in the US, that different children received widely differing resources, but rather that widely differing outputs were readily accepted.

The counter-attack on this philosophy was led by Prais and others.[18] He pointed out how on the Continent and in the Far East whole-class teaching was much more common and, closely linked to it, the notion that everyone in the class must be helped-and-pushed to keep up to a common minimum standard. This he contrasted sharply with practice in Britain and the US, where a long lower tail of achievement was allowed to emerge.

The first government action to alter this was the introduction of the National Curriculum in 1988. This laid down clear goals for each stage of education, but offered little guidance on how these were to be achieved.

The next step was the introduction of national tests at 7, 11 and 14, which happened progressively though the 1990s. The tests at age 11, as well as those at age 14, are sent away from the school to be marked. This exposed primary schools to the public gaze, since league tables of results at 11 were published.

It was not until Labour came to power that central government intervened directly in what went on in the classroom. In 1998 a Literacy Hour was introduced for every primary school child every day. The proposed methods of teaching were based on extensive review of evidence. A 'big book' was provided – as well as other reading – and detailed instructions

[17] Children and their Primary Schools: Report of the Committee of Enquiry into Primary Education (1967).
[18] For a survey of his views see Prais (1995).

were given as to how the teacher should organise the different parts of the hour. All teachers were trained in how to do this. At first many complained but now most are enthusiastic.

A national target was set for the percentage of 11-year olds passing the 11-year-old norm in 2002, and the minister promised to resign if it were not achieved. In 1999 a corresponding Numeracy Hour every day was introduced, with corresponding targets. As Table 10 shows, both targets are highly likely to be hit. This shows, as Continental systems have shown, how centralisation can be an effective way of spreading best practice.[19]

Secondary schools

Secondary schools, by contrast, have always been influenced by the system of national exams, and examination league tables have been published for some years. From 1950 onwards academically-inclined children took the General Certificate of Examination at O Level at 16 and at A-level at 18. And from the mid-1960s the less academically inclined children took the Certificate of Secondary Education at 16. In 1988 the two 16-year-olds exams were combined in the GCSE (General Certificate of Secondary Education), so that many more of the middle group of children came to achieve academic success. This led to a big increase in staying on beyond the compulsory school leaving age, which had been raised to 16 in 1972 (see Figure 1). Even so, as Table 11 shows, British enrolment rates at 17 and 18 are still way below those of other countries, and the latter rates are also on an upward trend.

Teaching methods in secondary schools vary enormously. Some schools teach in mixed ability groups up to age 14 or even 16 for some subjects. Others practice selecting or streaming from as early as age 11. In British practice, mixed ability is associated with individualised, child-centred learning. There is now a government-led move to reduce the amount of mixed ability teaching, in the belief that it will then be easier to achieve an appropriate minimum standard for each group of children.

[19] The most important figure in the reform has been Professor Michael Barber who was brought into the government to implement these policies. Another important influence was the Chief Inspector of Schools, Chris Woodhead.

Further and higher education

As attainment at GCSE and A-level has risen, so has university entry. It has also been encouraged by the rise in the rate of return that occurred in the 1980s. Britain now has 33% of 18-20 year olds entering university on a full-time basis[20]. If we consider those aged up to 30, and include part-time courses, the number is even higher. The government wants to raise the latter number to one-half by 2010.

Yet at the same time a third of youngsters have no qualification worth thinking of (*i.e.* something less than Part I of a trade apprenticeship). The educational system has become virtually bi-polar. Nearly all the expansion has been of full-time "academic" education and very little of vocational education (even including full-time vocational education) – see Table 12. This polarisation is one reason why the government has increased the amount that university students contribute to the cost of their education. Maintenance grants have been replaced by loans, and since 1998 new students have to pay a means-tested tuition fee of £1000 a year.

To engage the 40% who do not currently stay on in full-time education, even to age 17, the government's strategy is two-pronged. First, they are experimenting with Educational Maintenance Allowances to induce lower-income youth to stay on full-time. Second, they are expanding the apprenticeship programme and aiming to make it universally available to all who perform adequately in school between the ages of 14 and 16.

In Britain the history of vocational education at craft level is a sad tale. Up to the 1980s Britain had a goodish apprenticeship system run with standards set by national Industrial Training Boards for each industry. The Conservatives abolished most of the boards, and the number of apprentices declined steadily as a result of this and of economic recessions. Instead the Conservatives set up local Training and Enterprise Councils (based on the American PICs) with highly devolved powers and budgets. The theory was that local factors rather than national should be paramount in thinking about skill shortages. But most of these Councils were judged by most people to have been less than a roaring success. Britain's skills base at craft level eroded until craftsman, be they gas-fitters, plumbers or whatever, are in desperately short supply. At the same time disengaged youth are at the root of the crime wave. A new careers service called ConneXions is being set up, to point them in

[20] Source: DfEE skillsbase (http://www.skillsbase.dfee.gov.uk/Database). The reported figure is the age participation index, which is the number of home-domiciled young (aged less than 21) initial entrants to full-time and sandwich undergraduate courses of higher education, expressed as a proportion of the averaged 18-19 year old GB population.

the right direction. But it is hoped that the apprenticeship system, which has been expanding in Australia, France, Denmark, Ireland and elsewhere, succeeds in plugging the yawning void in the middle of Britain's bi-polar system.

Adults

This leaves the problem of what to do about all the adults who have missed out educationally. At present in Britain sub-degree education is free up to 19 but not thereafter (except for remedial literacy and numeracy courses). Hence Britain has fewer 19-25 year-olds improving their qualifications than on the Continent, where education in public colleges is free irrespective of age. The Skills Task Force has urged the government to follow the Continental example.

However, the problems of literacy and numeracy go deeper than finance. The government has launched a well-funded national effort to halve the number of adults who are functionally illiterate/innumerate by 2010. Already by 2004 this will cost nearly half a billion pounds a year. Like the school strategy, it is centrally led, but unlike the school strategy there is no captive audience. People have to be reached through the workplace, the benefit office, the school where their children study, or the community centre. A new positive tool is on-line teaching, and the government has founded an ambitious new teaching network called Learndirect that already reaches 2000 learning centres and will reach more. National tests of adult literacy and numeracy are coming in, which can then be taken on demand like the driving test. It is hoped that these will motivate employers and workers to take literacy and numeracy seriously – and thereby raise the return to improved basic skills.

In the meantime, other countries are raising their levels of skill too. If Britain wants its productivity to reach levels found in other countries, it will have to catch up with their skills. For where the skills are, there will the world's capital go.

5. Conclusions

At least one half of the 20% productivity gap between Britain and Germany is due to the difference in skills. This includes both literacy and numeracy, and specific qualifications (academic and vocational).

In Britain and the USA over 20% of adults have the lowest level of literacy and numeracy on standard international tests. This is twice as bad as in Sweden, Germany and Holland. But, more worryingly, in those countries young adults are much more literate and numerate than older people; in Britain and the USA they are not.

Britain now has major national strategies for attacking this problem – in primary schools since 1998 and for secondary children and adults from this year. The Literacy Hour and Numeracy Hour have been centrally imposed in primary schools and are having good effects on externally-marked test results. But it will take years to change the whole workforce.

As regards specific knowledge and skills, Britain's higher education is as good as anywhere in the world, and over 40% of the cohort already reach higher education, full- or part-time. But half of young people receive very little formal education beyond the age of 16. Most educational expansion has been of academic qualifications, and vocational education for those who do not care for the academic route has been neglected. The government is now aiming to offer to every young person who does not want full-time education beyond 16 a German-style apprenticeship including serious off-the-job education.

The neglect of literacy and numeracy and of vocational education appears to explain at least half of the productivity gap between Britain and Germany. Clearly educational levels are rising in every country and it will be a big challenge to Britain to keep up with the general pace of advance. But to catch up with Northern Europe's productivity, Britain's educational advance will have to be even faster than theirs.

Annex 1: Equivalencies of qualifications across countries

The following table shows the qualifications allocated to the various levels for each country in Table 2.

Summary table of equivalent qualifications

	UK	Germany	France
At least degree	NVQ4; HND/HNC; University degree and above.	Fachhoch- or Ingenieur-schulabschluss; Meister, Techniker or equivalent; Fachschulabschluss; University degree and above.	BTS/DUT; DEUG; License and above.
"A-level"	A-level; NVQ3, GNVQ3; BTEC National Diploma.	Abitur; Fachhochschulreife; Apprenticeship or Berufsfachschulabschluss with: the Real- or Haupt-schulabschluss.	Baccalaureats: General, Vocational, Technological.
"Good GCSE"	GCSE; NVQ2, GNVQ2; City & Guilds 2.	Realschulabschluss or equivalent; Apprenticeship certificate.	Brevet d'Etudes Professional (BEPC); CAP/BNEP.

Table 1
Average wage in each part of the distribution, 1996

	Average hourly wages (£'s)				
	UK	Germany	Ger/UK	US	US/UK
Top 40%	12.35	12.86	1.04	13.40	1.09
Next 20%	6.00	8.25	1.38	6.90	1.15
Bottom 40%	3.68	5.64	1.53	4.18	1.14
Total	7.62	9.05	1.19	8.48	1.11

Sources: UK: Labour Force Survey 1996; Germany: Socio-Economic Panel 1996; US: Current Population Survey, 1996.

Note: Earnings adjusted to £'s using purchasing power parity measures from OECD Economic Outlook.

Table 2
Qualifications held in the workforce, 1998 (percentages)

	At least degree	At least "A-level"	At least "good GCSE"	Skills index (UK=100)
Germany	22	74	83	109
France	23	45	73	103
UK	**24**	**36**	**55**	**100**
US*	22	29	50	97

Source: The Skills Audit (1996), published by the DfEE and the cabinet Office.

Note: Economically active population aged 16-65 (for women in the UK 16-59). For information on equivalencies for qualifications, see Annex 1.
* US results are for 1994.

Table 3
Literacy and numeracy among adults

	Literacy		Numeracy		
	% in group 1	% in groups 1&2	% in group 1	% in groups 1&2	Skill index (Britain=100)
Sweden	7	28	7	25	112
Germany	14	49	7	33	107
Netherlands	11	41	10	36	105
Belgium (Flanders)	18	47	17	40	104
Switzerland (German)	19	55	14	40	104
USA	21	46	21	46	102
Britain	**22**	**52**	**23**	**51**	**100**
Ireland	23	52	25	53	99

Source: IALS

Note: population aged 16-65.

Table 4

Percentage of 17-year-olds involved in mathematical studies

	A or A/S Level or Equivalent	Any formal maths
	(1)	(2)
England	**11**	**27**
France	37	85
Germany	32	81
Sweden	32	90
US		80

Sources: DfEE News 335/98 Table 6; Utbildnings Statistisk Arsbok 1995 Tables p.57 and Table 32; Reperes et References Statistiques, 1998, Tables 4,15,16; Grund-und Strukturdaaten 1997/98 pages 26 and 27; US Department of Education, Digest of Education Statistics, Tables 6 and 98.

Note:

Col (1):
- France: all on scientific, economics and technological Baccalaureat courses.
- Germany: all studying for Abitur.
- Sweden: all on scientific/economics courses in the upper secondary school.

Col (2):
- England: all on A or A/S maths courses, GNVQ3, NVQ3 and equivalent and GCSE resits.
- France: includes also all on vocational courses and non-scientific/economic Baccalaureat courses.
- Germany: includes also all in full-time and part-time vocational education.
- Sweden: includes also all on vocational courses, and academic arts courses in upper secondary school.
- US: all in high school.

Table 5

Levels of literacy and numeracy

Level	National curriculum	% at this literacy level	% at this numeracy level
Below entry level	Under 7s	22	23
Entry level	7 year olds		28
Level 1	11 year olds	30	30
Level 2+	14 year olds	48	19

Source for numbers: IALS

Note: We have assumed that the IALS groups corresponding to the various British levels are, for literacy, IALS group 1 = Below level 1, IALS group 2 = Level 1, IALS groups 3-5 = Level 2+. For numeracy, IALS group 1 = Below entry level, IALS group 2 = Entry level, IALS group 3 = Level 1, IALS groups 4-5 = level 2+. This is based on question analysis and comparison with the Basic Skills Agency's own results based on National Child Development Study and Youth Cohort Study.

Table 6

Regression to explain log hourly earnings at age 33 in 1991

(Sample: people born in 1958)

		1		2		3		4	
Numeracy:	Level 1 only	0.13	(0.04)	0.10	(0.03)	0.04	(0.04)		
	Level 2+	0.28	(0.04)	0.17	(0.03)	0.05	(0.05)		
Literacy:	Level 1 only	0.13	(0.04)	0.06	(0.04)	0.03	(0.05)		
	Level 2+	0.23	(0.04)	0.13	(0.04)	0.10	(0.06)		
Highest Qualification									
	CSE/O-level or equiv			0.14	(0.05)	0.09	(0.07)	0.19	(0.05)
	A-level or equiv			0.34	(0.06)	0.25	(0.08)	0.43	(0.06)
	Degree/HND or equiv			0.47	(0.05)	0.38	(0.08)	0.61	(0.05)
Mathematics at age 7						-0.05	(0.02)		
Mathematics at age 11						0.01	(0.03)		
Mathematics at age 16						0.02	(0.03)		
Reading at age 7						0.03	(0.02)		
Reading at age 11						0.06	(0.03)		
Reading at age 16						0.01	(0.03)		
Female		-0.29	(0.03)	-0.29	(0.03)	-0.28	(0.03)	-0.31	(0.03)
number of observations		920		920		554		920	
adjusted R-squared		0.30		0.39		0.39		0.35	

Source: NCDS

Note:

Standard errors are in brackets.

All regressions control for father's social class.

The base case is an individual below level 1 in numeracy and literacy.

Mathematics and reading test score variables (age 7, 11 and 16) are divided by their standard deviations.

The literacy and numeracy levels refer to the levels as defined in Table 7.

Table 7
Regression to explain log annual earnings
(Sample: people in work aged 16-64)

	Britain (1995)			United States (1994)			Netherlands (1994)		
	1	2	3	1	2	3	1	2	3
Numeracy: Level 1 only	0.18	0.16	-	0.19	0.17	-	0.06	0.04	-
	(0.04)	(0.04)		(0.08)	(0.07)	-	(0.04)	(0.04)	-
Level 2+	0.35	0.26	-	0.34	0.25		0.19	0.14	
	(0 05)	(0.05)		(0 08)	(0.08)	-	(0.05)	(0.05)	-
						-			-
Literacy: Level 1 only	0.16	0.13	-	0.24	0.14		0.11	0.06	
	(0.05)	(0.05)		(0.08)	(0.08)		(0.07)	(0.07)	
Level 2+	0.17	0.10	-	0.33	0.19		0.18	0.07	
	(0.06)	(0.06)		(0.10)	(0.11)		(0.08)	(0.07)	
Highest Qualification:									
O-level or equiv/isced2	-	0.14	0.20	-	-0.38	-0.29	-	0.08	0.11
		(0.10)	(0.10)		(0.15)	(0.15)		(0.06)	(0.06)
A-level or equiv/isced3	-	0.23	0.33	-	0.17	0.31	-	0.16	0.23
		(0.11)	(0.11)		(0.09)	(0.09)		(0.06)	(0.06)
Degree or equiv/isced5-7	-	0.51	0.66	-	0.44	0.66	-	0.37	0.46
		(0.11)	(0.11)		(0.10)	(0.08)		(0.06)	(0.06)
Female	-0.25	-0.26	-0.28	-0.34	-0.35	-0.35	-0.27	-0.28	-0.29
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
number of observations	1908	1908	1908	1501	1497	1497	1655	1648	1648
log likelihood / R^2	-2257	-2189	-2232	0.608	0.636	0.622	-14350745	-1415543	-14188176

Source: IALS.

Note: Standard errors in brackets. All regressions control for age, age^2, father's education, part-time status, and weeks worked in the year. Numeracy is the quantitative literacy score in IALS, literacy is the prose literacy score in IALS. For literacy, Level 1=IALS group 2 and Level 2+=IALS groups 3-5. For numeracy, Level 1=IALS group 3 and Level 2+=IALS groups 4-5. The UK and Netherlands' equations are estimated by Stewart's (1983) maximum likelihood technique for grouped dependent variables. For the US we have the precise value of annual earnings.

Table 8

Percentage point effect of each variable on the probability of unemployment (sample: all active in labour force. Probit analysis)

	Britain (1995)		United States (1994)		Netherlands (1994)	
	1	2	1	2	1	2
Numeracy: Level 1 only	-2.9	-2.7	-0.9	-0.8	-1.2	-1.2
	(1.5)	(1.4)	(0.8)	(0.7)	(0.7)	(0.7)
Level 2+	-8.0	-7.2	-2.6	-2.3	-3.9	-4.2
	(3.5)	(3.1)	(1.8)	(1.5)	(2.2)	(2.4)
Literacy: Level 1 only	-6.7	-6.4	-2.2	-1.2	-2.0	-2.4
	(3.3)	(3.1)	(1.9)	(0.9)	(1.0)	(1.1)
Level 2+	-4.6	-3.8	-2.2	-0.7	-2.8	-3.5
	(1.7)	(1.4)	(1.4)	(0.4)	(1.0)	(1.2)
Qualifications	no	yes	no	yes	no	yes
Number of observations	2351	2351	1822	1815	1813	1804
Pseudo R^2	0.07	0.08	0.05	0.06	0.04	0.04

Source: IALS.

Note: The coefficients measure the marginal effects, showing the percentage point difference in the probability of unemployment between individuals at the stated skill levels, and those with Below level 1 skills. Z-scores in brackets. All analyses control for gender, age, age^2, and father's education. Column 2 in each country additionally controls for highest qualification. Numeracy is the quantitative literacy score in IALS, literacy is the prose literacy score in IALS. For literacy, Level 1=IALS group 2 and Level 2+=IALS groups 3-5. For numeracy, Level 1=IALS group 3 and Level 2+=IALS groups 4-5.

The mean unemployment rate in the British sample is 12.5%, in the US it is 6.6% and 6.5% in the Netherlands.

Table 9

Return to qualifications: Labour Force Survey

	(1)	(2)	(3)	(4)	(5)
	Effect on hourly earnings (%)	NCDS omitted variable correction (%)	Effect on employment rate (% points)	Assumed years of study (FTE)	Social rate of return (% p.a.)
Academic					
A-level	19 (1)	-5	0 (0.4)	2.0	7
HE Diploma	12 (1)	-0	3 (1.1)	2.0	7
1st Degree	28 (1)	-3	7 (0.5)	3.0	9
Higher Degree	13 (1)	-1	4 (1.0)	1.5	9
Vocational					
City & Guilds (Pt.2)	7 (1)	-1	5 (0.8)	0.5	17
City & Guilds (Pt.3)	6 (1)	-1	5 (0.7)	0.4	19
RSA (Advanced /higher Dip.)	11 (3)	-1	4 (1.8)	0.5	21
ONC/D	6 (1)	-3	5 (0.6)	1.2	6
HNC/D	12 (1)	-1	7 (0.6)	1.2	12
Professional Qualification	40 (2)	-3	11 (0.9)		
R^2	0.32		0.10		
Sample Size	50,540		90,348		

Note: Column 1 – estimated returns to post-16 qualifications, 1997-1998 LFS. Standard errors in parentheses. The regression equation also controls for gender, age and other qualifications not used in the post-16 analysis (CSE/GCSE (D-F), O/GCSE level (A-C), City and Guilds (Pt.1) RSA (any of stages 1,2,3, Diploma), nursing, teaching and 'other' qualifications).
Column 2 – correction necessary to LFS estimates, due to omitted controls for ability and family background, based on NCDS estimates.
Column 3 – estimated effect of qualifications on the probability of being employed, 1997-1998 LFS, estimated by probit analysis, because of the bivariate nature of the dependent variable. The equation also controls for gender, age and other qualifications not used in the post-16 analysis (CSE/GCSE (D-F), O/GCSE level (A-C), City and Guilds (Pt.1) RSA (any of stages 1,2,3, Diploma), nursing, teaching and 'other' qualifications). Standard errors in parentheses. The R^2 given is a pseudo R^2.
Column 4 – estimated time required to obtain qualification.
Column 5 – estimated social rate of return to qualifications, calculated from formula in text.

Table 10

Percentage of 11-Year-Olds achieving their norm

	Literacy	Numeracy
1996	57	54
1997	63	62
1998	65	59
1999	71	69
2000	75	72
2002 (target)	80	75

Source: DfEE (2000) *Key Stage 2 National Summary Results.*

Note: The table shows the percentage of all 11 year olds achieving Level 4 or above in the Key Stage 2 National Curriculum Tests in English and Mathematics. The first results of the Literacy Strategy were in 1999, and of the Numeracy Strategy in 2000.

Table 11

17 and 18 year old participation rates in education and training, 1995/6 (%)

	17 year olds	18 year olds
Germany	93	83
France	92	83
Netherlands	92	78
Portugal	72	50
Sweden	96	93
UK	**72**	**55**

Sources: *Education Across the European Union*, Eurostat.

Note: numbers include those who report that they have are receiving vocational training, or have received vocational training in the four weeks prior to the survey.

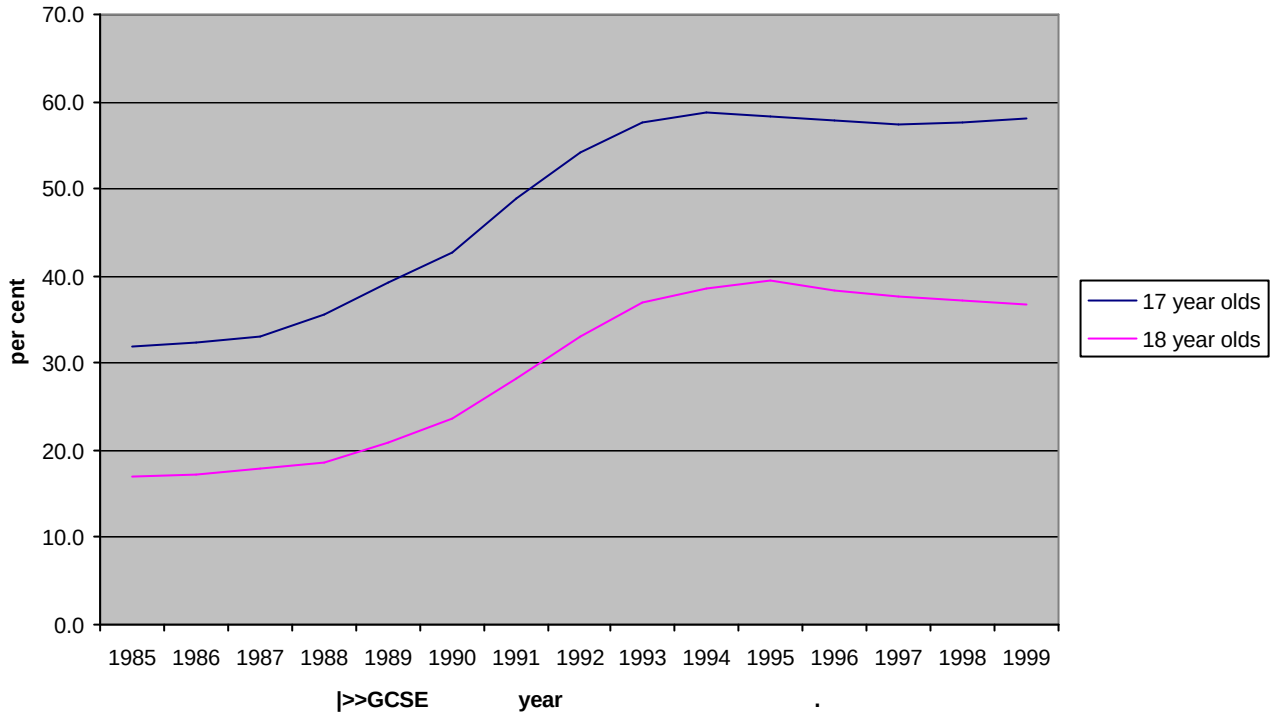
Table 12
Young People: by highest qualification

	19-21 year olds			25-28 year olds		
	1985	1991	1996	1985	1991	1996
Higher education	2.9	3.0	7.4	16.9	17.1	24.3
A-level / Scottish Highers	16.5	19.7	29.8	7.7	8.5	7.4
Vocational qualification, level 2 or 3	15.0	21.8	22.7	19.5	19.3	21.9
Others	65.6	55.6	40.1	55.8	55.1	46.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Labour Force Survey

Figure 1

Participation rate in full-time education (England)



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