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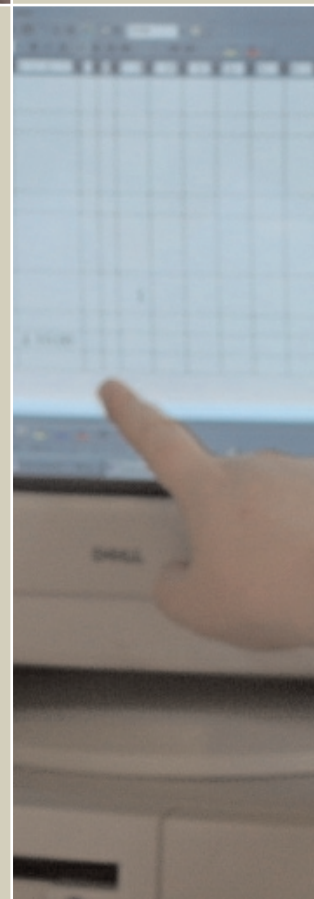
Research Review



The benefits to employers of raising workforce basic skills levels: a review of the literature

Katerina Ananiadou, Andrew Jenkins and Alison Wolf
Institute of Education, University of London

October 2003



Published by the National Research and Development Centre
for Adult Literacy and Numeracy

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ISBN 189453 44 6

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NRDC is a consortium of partners led by the Institute of Education,
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Design: chapmandesign

Photography: Phillip Meech

Print: Starfish

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This report is funded by the Department for Education and Skills as part of **Skills for Life**: the national strategy for improving adult literacy and numeracy skills. The views expressed are those of the author(s) and do not necessarily reflect those of the Department.

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Foreword

This paper summarises the literature on the benefits which employers derive from raising the basic skills levels of the workforce. Because the evidence on basic skills in the workplace is still quite sparse, the review also covers the benefits to individuals of improving basic skills and looks at the literature on the benefits of training for employers, and employees, more generally.

The aims of the literature review were to review and synthesise the existing literature on the economic and wider benefits of basic skills improvements in the workplace, focusing in particular on the benefits that accrue to the employer. We aimed to provide a theoretical framework of benefits within which the evidence could be placed and to identify gaps in the evidence. Among the benefits to be considered in the review, subject to the availability of evidence, were increased profits, productivity, sales, turnover, growth and other direct benefits, as well as improved workforce flexibility, product quality, customer service and ability to seize new initiatives.

More specifically, we were required to:

- collate existing evidence about the economic returns to employers of higher basic skills levels among the workforce;
- identify any evidence of the returns to employer provision of basic skills learning (either through direct funding or through time off for study);
- consider the benefits in terms of an organization's productivity, flexibility, ability to handle change and other wider benefits;
- review evidence on benefits to employers of more generic adult learning and training (where lessons can be learnt for basic skills). This may include communication skills, low level skills etc.;
- cover specific areas of interest including the importance of raising basic skills levels in different sizes of firm and different industrial sectors along with issues of retention/staff commitment following basic skills training;
- summarise evidence of the cost to industry of low basic skills;
- draw together any available evidence on the impact of basic skills improvements on the economy as a whole;
- cover academic literature, working papers, practitioner journals and internet sources;
- review any matched plant studies (or similar surveys) of how basic skill deficiencies (or improvements) are detrimental (or beneficial) in the workplace;
- use UK literature but also review relevant international evidence where possible.

Because of the well-known paucity of data in the area of basic skills, we were also requested to conclude the literature review with a summary of the key evidence gaps.

In what follows we attempt to fulfil these requirements to the best of our ability. The review was initiated in December 2002 and completed during January 2003. We are very grateful to Magdalen Meade for calmly and efficiently assembling the rough drafts of three authors into an orderly final report.

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Summary

- There is robust evidence that poor literacy and numeracy skills have adverse effects on the earnings and employment prospects of individuals. A number of large-scale UK surveys have shown that people with good literacy and numeracy tend to have higher wages and better chances of being in work than people who lack basic skills (see Bynner and Parsons, 1997; Dearden et al. 2000; Machin et al. 2001). The differences are not fully explained by differences in formal qualifications between the two groups. This in turn suggests that improvements in basic skills among adults should increase their earnings (reflecting their greater value to employers): however there is little direct evidence of such results.
- Labour market studies indicate that very few jobs could be performed properly without basic skills, and that skills requirements, and especially the numeracy requirements of jobs, will further increase in coming years (see Atkinson and Spilsbury, 1993 and Section VIII of this review). The limited UK evidence on the costs to employers of poor basic skills among the workforce (see ALBSU, 1993) suggests that, in 1992, they were costing an average of £165,000 per year in companies employing 50+ workers, and up to £500,000 per year for larger companies (equivalent to £208,000 and £626,000 in 2002 prices). However, these figures have been widely criticised for methodological deficiencies (e.g. Robinson, 1997) and are, in any case, out of date.
- No systematic data are available for the UK on the benefits to employers of investing in basic skills training. International evidence is also very limited but some studies have suggested that employer-provided literacy and numeracy courses may raise productivity, improve the use of new technology in the workplace, contribute to enhanced customer satisfaction, save time, and reduce costs (see Bloom et al. 1997; Pearson, 1996; Hollenbeck, 1996; Krueger and Rouse, 1998). However, these results are based on only a tiny handful of research studies and must therefore be treated as extremely tentative, and in need of much more corroboration.
- Those employers who have sponsored basic skills training are generally positive about the experience. Although not all those interviewed by researchers have perceived any impact on measured outcomes (e.g. productivity), there is no evidence that employers who have sponsored basic skills training have found it to be either burdensome or an unnecessary expense (Krueger and Rouse, 1994; 1998).
- Far more evidence is available on training in general than on basic skills training, and a number of well-constructed studies show a positive impact on firm performance. There is a sizeable body of literature attesting to the improvements in productivity stemming from workforce training while some studies have found that training was associated with higher levels of innovation and/or better financial performance (see Section V of this review; earlier surveys include Keep et al. 2002; Barrett and Hovels, 1998; Green, 1997). Studies of employees have consistently found that training led to improvements in earnings (see Section VII of this review; key papers include Blundell et al. 1999; Greenhalgh, 2002; Blundell et al. 1996; Arulampalam et al. 1997).
- Concerns are sometimes raised about the poaching of trained workers, but the evidence in fact points strongly in the opposite direction. Workplace training is associated with longer job tenure and reduced probabilities of quitting the firm for individuals, and with lower labour turnover for the company as a whole (Dearden et al. 1997; Green, 1997). Researchers have also found a statistical relationship between provision of training and higher levels of worker commitment to the organization (as measured by expressed loyalty, pride in the organization and agreement with its values – see e.g. Dex and Smith, 2001).
- Finally, the overwhelming impression from this review of the literature is of the scarcity of studies on the effects of basic skills training in the workplace. There is a real and urgent need

for more research on this topic. Both large-scale quantitative analyses, assessing the benefits and costs of literacy/numeracy training on representative datasets, and case studies investigating the effects of basic skills training at particular workplaces in depth would be valuable. There is also an almost total dearth of data – and especially UK data – on rates of return to training of any kind, because of an absence of firm-level data, or data on training costs.

Introduction

This review presents the major findings, and implications for employers, of research bearing on the effects of basic skills training in the workplace, and the potential benefits to employers of encouraging higher basic skills levels among their workforce. In preparing it we have carried out an extensive search of primary research material in English and in French, and of secondary sources reporting on material published in other languages; it is clear that the amount of well-conceptualised sound research bearing directly on the issue is very limited indeed.

Hollenbeck (1996) provides a cost–benefit framework for analysing the outcomes of workplace training generally, and basic skills workplace training specifically, which underscores that employers are only one of the potential beneficiaries: the workers themselves, the education sector and the rest of society are also important. Of the eight hypothesised outcomes of training which he identifies – (higher) productivity; (higher) wages; non-wage compensations such as pensions; (less) worker turnover; safer workplaces; (higher) taxes; (improved) self-esteem and payments to trainers – it is productivity, safety and turnover which are of direct interest to employers, and the first of these largely to the degree that productivity gains are not immediately swallowed up in higher wages.

In the area of general training, there is a considerable amount of evidence relating to the effects of training on labour force turnover, and on changes in productivity, though none that looks directly at effects on workplace safety (and associated costs). While not directly concerned with the impact of basic skills training on workplace outcomes, this research does have clear implications regarding the likely impact of such training, and so is discussed here. There is also a large body of research which bears on the effects of training on individuals' wages, and which we have also summarised in some detail. We would argue that, while changes in wages are unlikely to be an exact measure of the effects of training on productivity, they are likely to provide a reasonable indicator of whether or not productivity increases have taken place and, more specifically, to set a lower bound to the productivity effects. This is because there is both a sizeable theoretical and some empirical literature suggesting that not all the increased productivity which may result from training will normally be captured by the employees concerned: in other words, they may receive higher wages because they are more productive but some of the increased output accrues to the employer. (See e.g. Dearden et al. 2000.) The findings for the effects of training on individual wages can thus be used in evaluating the likely effects for company productivity even though they are not directly concerned with benefits to the employer.

The evidence on the effects for individuals of basic skills acquisition is almost entirely concerned with learning and skills acquisition which took place outside the workplace. It is

nonetheless quite detailed in respect of both wages and employment, and allows one, moreover, to distinguish between literacy and numeracy, and, in some cases, to look at the effects of changes during adult life. The evidence is important because it provides a basis on which to predict the likely effects of workplace-based skills improvements on learners' future wages and, therefore, by implication, for the productivity of the enterprises for which they work. However, here we think that existing estimates must be treated as offering upper bounds to the likely impact, even for the individual learners themselves, of undertaking basic skills learning in a workplace setting. The main reasons for this are firstly that there are likely to be endogeneity problems – the estimates may be only partly of returns to basic skills themselves, and partly reflect unobserved characteristics of the individuals studied – and secondly that recent empirical work on returns to lower-level qualifications achieved in adult life indicate that, in the current UK labour market, qualifications attained by adults have generally lower returns than those attained by young people (Machin et al. 2001; Jenkins et al. 2002). These reasons are discussed in more detail below.

Outline of the report

For readers who may not be fully familiar with this field, we start (Section II) by summarising the evidence on levels of basic skills problems in the current UK workforce. We also explain, briefly, the way in which different skills levels are currently categorized. Since much of the most important research relates to the impact of achieving various critical levels of basic skills, we explain what these levels are and how far different categorisations can be related to each other. We then (Section III) outline the main methodological challenges facing research in this field, and specifically the need to be aware of these when interpreting the results of available research and extrapolating from them.

In Section IV we summarise evidence relating directly to the impact of basic skills training from an employer's perspective; and then (Section V) look at the larger (but still limited) body of work on the impact of general training on outcomes of importance to employers. Following this, for the reasons just outlined, we summarise research findings relating to the impact of basic skills acquisition on individuals (Section VI), and to the effects of general workplace training for individual workers (Section VII). Finally, Section VIII discusses some of the work on current trends in workplace skill demand because of its clear implications for likely pay-offs to basic skills training in the future.

The context - basic skills deficiencies and levels

Evidence on the extent of literacy and numeracy problems in the adult UK population comes from two major sources: (i) a survey of 37-year-olds carried out in 1995 as part of the *National Child Development Study* (NCDS) and (ii) the *International Adult Literacy Survey* carried out in Great Britain in 1996 by the Office for National Statistics. Below we summarise the findings of these two surveys in turn.

The NCDS is one of the major longitudinal surveys of people living in Great Britain who were born at a particular point in time: in this case, between 3 and 9 March 1958 (for more details on the NCDS see e.g. Bynner and Parsons, 1997). There have been six principal waves of data collection for the NCDS so far, the last one in 2000 when the cohort members were 42 years old. An additional sweep of a random and representative 10% sub-sample only (with 1714 respondents) was carried out in 1995 when participants were aged 37. This additional survey had as its main aim to assess the basic skills of the cohort. These were assessed by means of a literacy and numeracy test developed by NFER that comprised eight literacy (reading only) and eight numeracy tasks. The tasks were grouped at different levels corresponding to the 'WordPower' and 'NumberPower' standards being used at the time by the Basic Skills Agency to define basic skills attainment.

The raw scores that participants obtained in the tests were grouped by the researchers into four ability categories: 'very low', 'low', 'average' and 'good' for literacy and numeracy separately and findings have subsequently mainly been reported in the literature in terms of these groupings. Table 1 below presents the percentages of participants falling into each of the four ability groups for each of the two skills: it shows just under 20% of UK-born adults fall into the low or very low categories for literacy and almost half (more than half for women) do so on numeracy.

Literacy	Very low	Low	Average	Good	N
All (%)	6	13	38	43	1711
Men (%)	5	11	37	47	799
Women (%)	7	16	39	39	912

Numeracy	Very low	Low	Average	Good	N
All (%)	23	25	25	27	1702
Men (%)	19	23	24	34	799
Women (%)	27	28	25	21	903

Table 1: Distribution of men and women by assessed literacy and numeracy ability based on NCDS results. (From Bynner & Parsons, 1997).

The NCDS results were very important in highlighting the scale of basic skills problems in the population and the existence of such problems was confirmed, and given a far higher political profile, in the wake of the *International Adult Literacy Survey*, carried out over a period of years in the late '90s in nearly 30 different countries. The British survey (England, Scotland and Wales only) was conducted in 1996 on a national random probability sample of 3,811 adults aged 16–65 (see Carey, Law and Hansbro, 1997 for more details). The survey measured three dimensions of literacy: prose, document and quantitative literacy. Each dimension was measured on a scale from 0–500 and these raw scores were subsequently grouped into five levels, with Level 1 representing the lowest ability and Level 5 the highest.

The IALS data showed that over 20% of the UK population falls into the bottom category (level 1) on all three dimensions of IALS, as shown below in Table 2. These results created considerable political concern (not least because they suggested that Britain did not compare well internationally with a number of other major countries¹). Like the findings from the NCDS, the IALS surveys have been widely cited, and are the basis for the figures used by the Moser report (DfEE, 1999) and the *Skills for Life* strategy document (DfEE, 2001): for example, the estimate that around 7 million (20% of) adults are functionally illiterate, '...may read slowly with little understanding...' and are below the standard set for 11-year-olds. Even more adults are estimated to have difficulties with basic numeracy: the Moser report uses a 30–50% estimate based largely on the NCDS survey. (The 'quantitative literacy' dimension of IALS does not provide a very good measure of numeracy.² Scores on this dimension are very strongly correlated with scores on prose and document literacy and appear to measure reading comprehension more than numeracy as such. See Brooks & Wolf, 2002.)

	Level 1	Level 2	Level 3	Level 4/5
Prose				
All (%)	22	30	31	17
Men (%)	21	30	32	17
Women (%)	22	31	30	16
Document				
All (%)	23	27	31	19
Men (%)	20	25	31	24
Women (%)	27	29	30	15
Quantitative				
All (%)	23	28	30	19
Men (%)	18	27	30	25
Women (%)	29	29	30	12

Table 2: Levels of attainment of UK men and women for prose, document and quantitative literacy based on IALS results. (Adapted from Carey et al. 1997).

¹ However, IALS data should be treated with caution in making international comparisons, as a host of translation and methodological problems render the results problematic (see e.g. Carey ed. 2000; Hamilton and Barton, 2000; Goldstein and Guerin-Pace, 2001).

² In terms of algorithmic content, for example, researchers note that 'examination of the numeracy questions from the IALS tests suggested that IALS level 3 in numeracy was of a lower standard than BSA level 2. For example, IALS level 3 is the first time that respondents have to deal with percentages and ratios, whereas these concepts are dealt with at BSA level 1 (Dearden et al. 2000:90)'.

IALS, unlike the NCDS, included respondents born outside the UK, but without providing separate estimates for their skills. However, earlier work commissioned by the Basic Skills Agency has provided systematic evidence on the scale of basic skills problems among the ESOL population in England and Wales, and specifically those of five linguistic communities: Bengali, Gujarati, Punjabi Urdu, Punjabi Gurmukhi and Chinese – and of four refugee groups: Bosnians, Kurds, Somalis and Tamil (Carr-Hill et al. 1996). A total of 1170 people were interviewed and tested for their reading, writing, listening and speaking ability in English. The results showed that more than a third of Bengali and Punjabi speakers scored zero on the reading and writing test, i.e. they could not even perform tasks such as filling in a library card form or read the phone book. Further, more than half the participants in all the linguistic groups did not reach 'survival' level English, equivalent to the ALBSU Foundation level in literacy, and roughly equivalent to the current level 1 (see below) and described by the researchers as 'the level at which it becomes possible to work in an English speaking environment, although not if extensive verbal and listening comprehension is required' (Carr-Hill et al. 1996:66). The proportions of participants in employment or education who did not reach 'survival' level were also high, with, for example, 65% of Chinese males and females and 70% of Bengali women in employment or education not achieving this level.

We do not at present have separate test-based estimates for the basic skills of UK employees as a whole. The incidence of serious basic skills problems is likely to be lower than for the population as a whole (since, as discussed in more detail below, the NCDS results show basic skills to be strongly associated with unemployment) but many people with low skills are nonetheless employed. We do, however, have some survey evidence on the degree to which employers perceive serious deficiencies among their workforce, based on a survey carried out by Gallup for the then-Adult Literacy and Basic Skills Unit (ALBSU, 1993). 400 interviews were conducted with a random sample of companies employing 51 or more employees. Employers' representatives (mostly personnel/training managers) were asked to assess the adequacy of their employees' following four basic skills: reading, writing, numeracy and oral communication. They were asked to do this separately for operatives, skilled technicians/craftsmen; blue-collar supervisory staff; clerical/secretarial staff, sales staff and managerial/professional staff. The results showed that although a very small minority of white-collar staff and of supervisory/skilled staff were considered by their employers to have basic skills problems, the proportion was higher for operatives, with 1 in 7 operatives rated as having problems with reading, 1 in 6 with oral communication, 1 in 5 with numeracy and 1 in 4 with writing. Furthermore, when asked to what extent they thought that problems with basic skills affected how well staff undertook their duties, around a quarter of employers said that that they affected all blue-collar workers and even for managerial/professional staff the proportion was as high as 14% of employers (1 in 7). Employers were also asked to estimate the costs to them of low basic skills levels: the findings are reported in Section IV.

What do we mean by 'poor basic skills'?

The *Skills for Life* strategy takes as its starting point the Moser report estimate that 7 million adults are functionally illiterate and aims to improve the basic skills levels of 750,000 of these adults by 2004 and a further 750,000 by 2007. The assumption is that very low levels of basic skills have a major impact on individuals' life-chances as well as on the economy, and that moving people across this particular threshold of attainment should be a major priority. The current strategy and targets, and measures of progress towards them, are based on the new government standards for adult literacy and numeracy which provide for the following 5 levels:

- Entry 1
- Entry 2
- Entry 3
- Level 1
- Level 2

These are criterion-referenced standards, based on attainment of clusters of skills, and cannot be directly equated with previous classifications. Level 1 is seen as a key threshold of attainment, roughly equivalent to level 4 in the National Curriculum (hence Moser's conclusion that large numbers of adults are attaining at a lower level than is expected of 11-year-olds) and to level 1 in the National Qualifications Framework. However, in order to understand how the results reported below apply to the current strategy, it is important to be aware of approximate equivalences with previous level descriptors.

The Basic Skills Agency, prior to the establishment of the current standards, also identified key levels which were used by researchers as well as practitioners, namely:

- Entry
- Level 1
- Level 2

The NCDS analyses referred to above classify both the 'very low' and the 'low' groupings as below or just at 'Foundation level': one of the levels used by ALBSU (precursor organisation to the BSA), and which (again very roughly) means that anyone in these groups would be attaining at a level below the current level 1. The IALS results have been equated to the NCDS ones, and through these, to approximate current national levels, in a purely practical way by researchers: that is, they have set out to preserve the same basic distribution of attainment levels in the population. Thus, since roughly 20% of the NCDS national sample was below Foundation/level 1 in the BSA classification used for the NCDS analyses, and roughly the same proportion was at level 1 on IALS, they have taken the two as roughly equivalent. Since almost half the population, in the NCDS survey, was at this level (below Foundation/level 1) for numeracy, they have equated this to level 1 plus level 2 on the IALS quantitative literacy dimension (giving one a total of something over 50% of the population with serious numeracy problems). In terms of current standards, this provides us with the following rough equivalencies:

National standards	NQF level	National Curriculum (key stage) level	IALS literacy classifications according to Dearden et al. (2000)	IALS numeracy classifications according to Dearden et al. (2000)	NCDS literacy according to Dearden et al. (2000)	NCDS numeracy according to Dearden et al. (2000)
Entry or below	-	2 (age 7)	Level 1 or below	Level 2 or below	Very low (below entry level) and low (at entry)	Very low (below entry level) and low (at entry)
Level 1	NVQ 1	4 (age 11) GCSE D-G	Level 2	Level 3		
Level 2	NVQ 2	GCSE A*-C (age 16)	Level 3+	Level 4+		

Table 3: Classifications of basic skill proficiency.

Methodological issues

The critical question for employers, in evaluating whether to support workplace basic skills provision, is obviously exactly what benefits they can expect from it, and whether these will outweigh whatever costs they themselves incur as a result. This is actually an extremely difficult question to answer definitively, and it is important to understand why.

The standard method of estimating the benefits of any training for employers – basic skills or otherwise – is to conduct a multiple regression analysis on a sample of companies with some measure of firm performance (profits, productivity) as the dependent variable and a measure of training as an explanatory variable, along with control variables which may also influence firm performance, such as the capital stock, composition of the workforce, industrial sector and so on. Whether training has a statistically significant effect on firm performance, after allowing for the influence of the control variables, can then be assessed.

However, the results obtained from such analysis may not be statistically valid if there are unobservable characteristics which determine both company performance and the level of training provision. If this occurs, training is described as an endogenous variable, and social scientists refer to this statistical problem as ‘the endogeneity problem’. There are procedures for dealing with this problem, but it is important to realise that the training area is one in which the possibility of endogeneity must be taken seriously when interpreting research findings.

The most obvious possibility, in this context, is that firms which train a lot may also share one or more other characteristics which make them relatively successful. This could be something which is actually inherently impossible or difficult to observe, such as ‘management style’, which may well affect both the amount of training provided and the measure of company performance (Green, 1997). Or it may be something (such as technical innovation) which is simply not included in the data set, though it could, in principle, be measured. There may also be reverse causation: for example, firms with poor productivity may be especially inclined to engage in lots of training in an effort to improve their performance, which will again suggest a negative link between training and performance which does not actually exist.

The preferred approach to analysing training effects is, for these reasons, to collect data on the same sample of firms at two or more points in time. This is known as panel data, and panel estimation techniques can then be applied. If panel data are available it is possible to look at changes in company performance over time, and their association with changes in the amount of training provided. Such panel studies have some problems of their own – for example, measurement error is likely to be exacerbated by focusing on changes rather than levels (see Huselid and Becker, 1996) but it is probably safe to say that panel studies are generally to be preferred to cross-sectional estimates of the links between training and organisational outcomes (and their results given correspondingly greater weight).

Exactly the same issue of endogeneity arises in the context of studies which look at the returns to individuals of differing skill levels. Rewards – such as higher wages, or lower chances of unemployment – may appear to be linked to the skills or qualifications an individual possesses, when they are actually, in whole or in part, the result of other unobserved characteristics, such as innate ability. This also applies to studies of individuals

within companies: the individuals who receive training may not be a random sample of the population but may be selected in certain ways, for example from the more able or more highly educated workers, or from those already earmarked for possible promotion. This problem is very well recognized: again, the use of panel studies, and a focus on the results of changes in skill levels is highly desirable.

Given these issues, how well can we deal with them? The answer is: less well in the case of studies of training effects than in studies of individuals and skill acquisition, and not perfectly in either. We have very good UK panel data for individuals but even here, the data sets are not large enough to provide detailed information on the results of improving one's basic skills during adult life. Studies of the direct impact of training on company performance have only been conducted in the last ten years or so: good datasets containing information on organisational outcome measures and training have, for the most part, only been collected fairly recently. This applies even more strongly to panel datasets which are still rare. Typically, even they cover only relatively short periods of time, perhaps two or three years, while the effects of training may last longer than that (Lengerman, 1999). Indeed there appear to be no such datasets available for Britain, although some other countries do better (and we have examined, in particular, research findings from the US and France).

Moreover, datasets on firms and training often do not contain all the information we might ideally wish to have. Training comes in a variety of different forms – informal and formal, on-the-job and off-the-job, induction training versus the training of experienced workers and so on. Datasets do not usually tell us about all of these, and the information may just be the number of days of training per worker per year on average, or perhaps training expenditure as a share of the wage bill. Training can also be broken down by type – for example, health and safety training, computer training, managerial training – and evidence is accumulating that the type of training matters in estimating how high the returns to training might be (Groot, 1995; Black and Lynch, 1996; Barrett and O'Connell, 2000). Most large-scale datasets which cover training (such as WERS) do not include basic skills training among their training measures. Those few studies which look specifically at basic skills training and its effects in organisations often suffer from small and/or unrepresentative datasets.

Some studies also suggest that the inter-relationships between training and other practices of the firm may be important in assessing the likely effects of training in the workplace. Several studies have found that training may exert its influence on company performance in association with several other human resource practices of the firm (Black and Lynch, 1996; Ichniowski, 1997; but see Bartel, 1995 for some contrary findings). In such studies, training forms part of a bundle of HR practices (Guest et al. 2000a, b), which may include team working, family-friendly policies, performance appraisals, profit-related pay etc. and it is the bundle as a whole which influences performance. However, what exactly the crucial components of the bundle of high performance work practices are, and how they interact with each other, are areas where there is continuing disagreement among scholars and a need for much more research.

We belabour these points because we conclude, from this review, that there is a real and urgent need for more research. In the context of basic skills workplace provision, both large-scale quantitative analyses, assessing the benefits and costs of literacy/numeracy training on representative datasets, and case studies offering in-depth investigation of basic skills training at particular workplaces would be valuable. Going beyond the immediate scope of this review, the scarcity of good UK studies highlights the general lack of panel data relating to training and its outcomes.

To some degree, the lack of good data on the direct impact of (basic skills) training on organisations can be offset using detailed work on rates of return to years of schooling and qualifications for individuals. Here, largely as a result of large-scale longitudinal studies, there are widely accepted and well-known results, and research has focused on refinements and ever more elaborate approaches to estimation. However, the returns to an individual of a given level of skills acquisition are not the same as the returns to an employer and cannot be used to provide an accurate estimate of likely productivity increases, let alone an estimate of other workplace effects, for example on turnover/employee commitment. The evidence on the effects of basic skills improvement remains limited, simply because we have, to date, very few cases in the major data sets of people who have actually undertaken basic skills classes as adults. Moreover, none of the panel data allows for analysis of results with ESOL employees. We are, therefore, forced to extrapolate from a population which may be significantly different from the one likely to take workplace classes. The available analyses are, nonetheless, analytically sophisticated and can be used (with caution) to predict the effects, for individuals, of basic skills improvements.

Basic skills training in the workplace: the benefits for employers

There is some evidence that sizeable numbers of employers are now making some provision for their workers to improve their basic skills where necessary. The *Learning and Training at Work* 2001 survey (Spilsbury, 2002) asked a sample of over 3,000 employers in England which among a number of learning opportunities they offered to employees at the location. Among all workplaces with five or more employees, some 59% offered at least one of the eight types of learning opportunity discussed. Basic numeracy was offered by 11% of employers and basic literacy by 10%. (Learning in information technology (40%) and working with others (37%) were the forms of learning opportunity most commonly available.)

The likelihood that each type of learning opportunity would be available increased with the size of the workplace. Among establishments with 100 to 199 employees, 22% offered basic literacy and 22% offered basic numeracy; these proportions increased to 25% for numeracy and 27% for literacy for workplaces of between 200 and 499 employees, whilst at workplaces with 500 or more employees 42% offered basic numeracy and 44% basic literacy (Spilsbury, 2002). In the early 1990s, of 400 companies interviewed for ALBSU (ALBSU, 1993), only a minority of companies (27%) indicated that they had a formal policy which addressed the issue of basic skills difficulties among employees, with 71% having no policy at all. The reason provided by most of these employers for not offering basic skills training was that staff had adequate skills for their jobs, therefore the training was unnecessary: 63% in total had never considered the issue, and 59% of companies offered no training in basic skills at all, with only 39% offering such training. Within those offering it, this training was more likely to cover oral communication skills (71%) than numeracy (61%), writing (56%) and reading (41%).

Unfortunately, there are no further details in the *Learning and Training at Work* survey about how basic skills courses were delivered, or how they were funded, or the number or type of employees who had taken advantage of the learning opportunities on offer. However, preliminary work carried out as part of a research study of the National Research and

Development Centre for Adult Literacy and Numeracy (NRDC) does suggest that a substantial proportion of trainees on workplace basic skills programmes, particularly in London and other major cities, are ESOL learners, i.e. they do not have English as their first language.

As we have noted above, the major possible outcomes of basic skills training in which employers have a direct interest are (higher) productivity, (lower) turnover (indicating greater commitment to the firm) and (greater) safety. In spite of the sizeable number of workplace schemes now available, very little evidence bears directly on how basic skills training impacts on any of these outcomes. We have located one plant-level study (Krueger and Rouse, 1994, 1998) carried out in the US which compares outcomes for recipients/non-recipients of basic skills training and, because of its quality and uniqueness, summarise it in some detail. Nothing comparable is available for the UK. Some (subjective) estimates of the costs to business of low basic skills are available; these can also be interpreted as estimates of the gain to business if employees' basic skills levels were increased. However, they obviously cannot provide any rate-of-return estimates without information on the cost of the training which would be required to raise the skill levels concerned. Some survey information is available on employers' attitudes to basic skills training which they have sponsored. Finally, a couple of studies have used individual rate-of-return data to estimate directly the likely productivity gains for business.

Overall, it is clear that businesses which have sponsored basic skills provision for their workers have been content with the experience. This is a non-trivial finding, since involvement in such a programme is inevitably disruptive and costly, even when governments provide subsidies to cover direct costs of instruction. In other respects, as already noted, the research base is extremely thin.

Direct evidence on returns to basic skills training

The one properly structured quantitative study of the impact of workplace basic skills tuition which we have identified is that by Krueger and Rouse (1994, 1998) who studied the impact of workplace literacy programmes on a variety of employment outcomes for individual employees, such as earnings, staff turnover, and absenteeism. The study is particularly valuable in that it was able to collect comparative data for trainees and non-trainees. Moreover, the structure of financing was similar to that currently being offered to employers in England.

A basic skills tuition programme was delivered to 480 low-skilled, hourly-paid workers at two mid-sized New Jersey (US) companies (one service, one manufacturing). It ran for approximately 16 months and classes were taught on-site in five 8–12 week blocks. The programme was subsidised by the federal government, so employers only had to meet the indirect costs that it incurred, i.e. mainly the forgone costs of production due to staff release, rental of training rooms and wages of employees who organised (but did not deliver) the training. The content of training included subjects like basic reading, writing and maths and English as a Second Language and was in part tailored to specific company needs.

The authors found small effects of the programme on all outcomes investigated (although note that the follow-up period was quite short). In the service company, there was no significant effect on wage growth of programme participants compared to non-participants, whereas there was a larger growth in earnings for trainees at the manufacturing company compared to non-trainees. This was especially marked for those who took the education

classes with a strong company-specific focus (e.g. blueprint reading), and remained even when controls were introduced.³ There was evidence that trainees at the manufacturing company were 7% more likely to apply for and gain (internal) promotion ('upgrade'). There was also some evidence that trainees at the service company were more frequently nominated for or won a performance award⁴ compared to non-trainees. These awards were used by the researchers as a proxy for increases in productivity, although the differences might also be largely accounted for by other personal characteristics of the nominees. Workers who had participated in the programme had a lower absenteeism rate during the weeks in which they had classes and this effect continued for the next two months, although it was quite small. It does, however, suggest that workers enjoyed the classes. Finally, there was no evidence that participation in training made workers either more or less likely to leave the company after training.

The authors were not able to measure changes in productivity directly, but did try to do so indirectly by asking participants a range of questions about their own self-perceived productivity as well as about other relevant 'subjective' variables. Examples of such variables were: attitude towards their job, desire to take additional classes, satisfaction with their company and membership of community organisations. In the service company, self-reported productivity was higher among trainees: this may reflect performance or may reflect higher self-esteem. For almost all of the other variables measured, differences between training programme participants and non-participants did not reach conventional levels of significance (especially after controlling for personal characteristics).⁴ One exception was that participants at both companies were significantly more likely to report that they planned to take additional classes in the future compared to non-participants.

This study is also highly unusual in providing some estimates of the rate-of-return to the employer of the training expenditure. On the basis of the actual costs incurred – namely, that the federal subsidy covered approximately half the costs of the training – the authors conclude that, at least in the manufacturing company, the training paid for itself⁶: but that '... it is not clear that other (manufacturing) firms would find it worthwhile to undertake such training in the absence of a subsidy'. This is based on a rather low estimated initial return to the training based on the wage increase for participants (and in the absence of clearly measured outcome data for before and after the training).

Indirect evidence: employers' views on the value of basic skills training

As already noted, we have not identified any other well structured and documented empirical studies of the impact of basic skills training in the workplace, whether on productivity or other outcomes of direct concern to employers. Hollenbeck (1996) provides an overview of the very small amount of work – particularly quantitative work – that had been carried out on the

³ Age, tenure, demographic variables, pre-training wage.

⁴ These were part of a monthly employee recognition programme in which supervisors, co-workers or customers nominated workers who had performed exceptionally well. Introduction of controls (years of education, tenure, age) reduced the size of the coefficients markedly.

⁵ Trainees were somewhat more likely to be younger, male, non-white and better educated than non-trainees. Their pre-training average hourly wage was also lower than the non-trainees. Also, based on their responses to the question on why they had (or had not) participated in the training offered by their employers, around 80% of those who participated stated as their main reason desire to update their skills whereas approximately 40% of non-trainees claimed lack of interest in the classes; these findings suggest that on the whole trainees were more motivated than non-trainees.

⁶ The specific assumptions were: completed job tenure is 16 years, a 4% real discount rate, the value of the training depreciates by 3% per year, and the return to the training initially is 0.5% per year. With federal subsidy the program then pays for itself.

productivity impact of workplace basic skills training up to the mid-1990s. Only one is quantitative and this is an unpublished case study of one US company in which the authors report positive results but do not document their methodology. Hollenbeck calculated from the data provided in the paper that the firm in question experienced 4.67% annual growth in productivity (shipments per employee) between 1989–1994 and noted that the authors ascribe 31% of this to basic skills training.

Other than this, the remaining published evidence relates to qualitative or subjective estimates of the impact of basic skills provision in the workplace. These are generally global judgments, and not based on collection and analysis of ‘hard’ data, but they are consistently positive. Bassi (1994) asked management representatives to assess the outcomes on their firm of such training by indicating whether it had had ‘no impact’, ‘moderate impact’, or ‘significant impact’. The results show that about half the respondents report that training had had either moderate or significant impact on quality of output and ability to use new technology, whereas between 30% and 40% of respondents found that it had had moderate or significant impact on error rates, customer satisfaction, time savings and safety.

Bloom et al. (1997) report the findings of a survey of 41 Canadian companies to explore the benefits of improving literacy skills in the workplace from the perspective of both employers and employees. 21 of the surveyed companies provided qualitative feedback on the benefits of literacy training to their organization by indicating which benefits they had observed in their employees as a result of literacy training: these responses are shown in Table 4 below.

Benefit to employers	Number of citings (out of 21 respondents)
Increased ability to handle training on the job	12
Better team performance	11
Improved labour-management relations	10
Increased quality	10
Improved results in job-specific training/quicker training results	9
Reduced time per task	8
Reduced error rate	8
Better health and safety record	7
Reduced wastage	6

Table 4: Benefits of basic skills training identified by Canadian employers (From Bloom et al. 1997.)

Pearson (1996) reports results of a survey of 30 different Australian workplaces representing 13 industries across five states. Respondents to the survey (n=500) included representatives of senior management, unions, supervisors and workers. The study found that language and literacy training was considered to have had a positive effect on five aspects of the workplace: direct cost savings; access to and acceptability of further training; participation in teams and meetings; promotion and job flexibility; and the value of training (which included issues such as worker morale, confidence to communicate etc.).

Respondents were asked for a quantitative estimate of savings. On average, 70% of respondents considered that their organisation had made perceptible cost savings as a result of language and literacy training at the workplace. The nature of these savings varied by organization, but the most consistently identified ones were related to time-saving (both of supervisor and worker time) when carrying out language or literacy work tasks. The other type of saving most frequently mentioned was related to more accurate and fuller completion of workplace documentation. The amount of savings also varied among organisations; however, the estimated savings on 'unproductive' labour costs per participant per week for each skill surveyed were: A\$9–A\$77 (£3–£28) per training participant per week (average range) or A\$16–A\$28 (£5–£9) per training participant per week (median range). (A\$ = Australian dollar.)

The potential gains from basic skills improvements (1): the cost of poor basic skills

Another way of estimating potential gains from basic skills improvements in the workplace is by looking at the costs of poor basic skills at present. As noted earlier, Gallup was commissioned by the (then) Adult Literacy and Basic Skills Unit (ALBSU) in late 1992 to conduct a survey of employers. This aimed to establish the levels of basic skills difficulties among the workforce as encountered or perceived by employers (as discussed in Section II) and also to quantify and describe the costs to employers of poor basic skills and the effect of these on their operation.

In order to estimate the total cost to industry of poor basic skills among employees, employers were asked a series of questions relating to specific aspects of their company's business. Specifically, they were first asked to indicate how many customer orders were cancelled per year because of errors/problems, how many orders were despatched/produced incorrectly and the number of customers lost per year through problems or misunderstandings. Subsequently, employers were asked to estimate what percentage of the above problems could have been avoided by better basic skills among staff. Further questions were asked addressing the issue of the cost of supervisory staff that could be dispensed with if basic skills were better and the cost of recruiting staff externally because poor basic skills limit their own employees' potential for internal promotion. The results are presented in Table 5 below. It is important to point out here that on average only 15% of respondents (i.e. only 15% of the 400 companies sampled) were able to provide an estimate of costs; all percentages reported below are based on only those who responded.

Table 5 shows that on average the overall cost of poor basic skills for a company employing 51 employees or more is £166,000 per year in 1993 figures (£208,000 in 2002 prices). The cost for smaller companies (51–100 staff) was estimated to be approximately £86,000 (£108,000) per year and for larger companies employing more than 1,000 employees around £500,000 (£626,000) per company per year.

Approximate number of:	(a) Number	(b) % which could have been avoided if basic skills were better	(c) Typical cost in £ of one cancelled order/lost customer/rectifying a problem order (1992 prices)	(d) Total cost in £ due to basic skills difficulties among staff* (1992 prices)
Customer orders cancelled per year because of errors, problems or misunderstandings	30	38.7	2,397	27,600
Customer orders despatched or produced incorrectly each year	161	41.4	1,123	74,600
Customers lost per year because of errors, problems or misunderstandings	12.5	35.3	5,957	26,200
Members of staff employed whose main task is to check and approve the work of others	30.1	2.3	12,473	28,330
Employees needing to be recruited externally each year for posts which could be filled internally if basic	35.9	11.2	2,183	8,800
			Total	16,5530

Table 5: Average cost of poor basic skills per company employing 51 or more.

(From ALBSU, 1993).

Overall costs are calculated by taking the percentage of (a) indicated at (b) and multiplying this by (c). figures at (d) were calculated by computer using the raw data.

The above data obtained from the surveyed sample were subsequently grossed-up in order to provide an estimate of the total cost of basic skills problems to industry as a whole, i.e. all 40,000 companies estimated as employing 51 staff or more. The estimates are presented below in Table 6 and reveal a total of 4.8 billion pounds overall (equivalent to £6 billion in 2002). The authors further point out that these costs are likely to be underestimated, as they do not account for costs associated with lost future business, the need for additional training because staff may be unable to cope with written material or the cost of work that needs to be re-done.

Grossed-up estimates(million pounds)	
Cost of customer orders cancelled through poor basic skills	911
Cost of rectifying customer orders despatched incorrectly through poor basic skills	2,500
Cost of customers lost through errors etc., due to poor basic skills	886
Cost of staff who could be dispensed with if basic skills were better	197
Cost of recruiting employees externally because poor basic skills limits internal promotion	334
Total	4,828

Table 6: Summary of total costs to industry of poor basic skills for companies employing more than 51 persons. (From ALBSU 1993).

The study and its findings have a number of important limitations and have been criticised (e.g. by Robinson, 1997) notably for the fact that the estimated costs to the whole of industry are based on estimates given by only 15% of companies. Moreover, most companies did not hold the view that poor basic skills contribute to financial losses, with 71% of those surveyed responding that their company had never experienced a financial loss that might be largely attributed to poor basic skills and a further 16% responding that this only happens rarely.

The study remains nonetheless the only one in the UK that has attempted to provide an estimate of the costs to industry of problems with basic skills. Ernst & Young use it in their report of the same year on the impact on the UK economy of literacy, education and training (Ernst & Young, 1993). The figure they cite is £8.4 billion, which is a 'grossed-up estimate to take account of companies of all sizes' of the one produced by ALBSU (1993). (No information is given on how they arrived at this estimate.) The Moser report's figure of £10 billion is, we assume, also based on this figure, adjusted for inflation up to 1999.

The potential gain from basic skills improvements (2): generalising from individual returns

Some researchers have also used statistics on returns to skills for individuals to arrive at direct, costed estimates of potential productivity gains for companies. As noted above, such estimates can only be very approximate. They may over-estimate the gains, since they are based on data for individuals who obtained their skills when younger than the target population and who may be different from them in other ways (including cognitive ability and 'soft' skills); moreover, the rates of return used are averages for all those above a given skill threshold, by however far, not simply for those who just exceed it. Conversely, wages are generally found not to capture full productivity gains from training, so to this extent these estimates may understate potential gains to employers.

A comprehensive set of estimates of this type for the UK was developed by Dearden et al. (1999). They provide an estimate of the impact to the economy of completely eliminating poor basic skills below level 1 for the whole of the adult population aged 22 to 59, in terms of effects in wages and employment and changes in tax receipts and benefit payments. To this purpose they use data from NDCS, BCS70 (a survey similar in scope to NDCS but using a cohort born in 1970)⁷ and the Family Resources Survey (FRS), an annual cross-sectional

⁷ The literacy and numeracy level estimates for the BCS70 cohort use results of tests given to 10% of the sample at the age of 21. In the resulting estimates of returns to skills, any wages and hours of work are imputed for given age, sex and education groups.

survey of around 27,000 households that collects data on income and earnings of the respondents. Numeracy and literacy skills are discussed separately below.

The analysis is based on measured differences in the earnings and employment rates of these NCDS and BCS70 cohort members who had literacy skills above level 1, as compared to those below level 1, and, separately, earnings and employment differences for those above and below level 1 numeracy. As noted earlier, the proportions in these groups are very different for the two skills (roughly 80:20 and 50:50). The data on these returns to different skill levels are discussed in Section VI: here, we note that they vary by cohort, as well as by subject. In generalising to the whole adult population, the researchers estimated a (linear) relationship between someone's date of birth and the impact of basic skills, and applied this to the population aged 22 to 59.

The report then examines the impact of skill improvement on the assumption that this would provide the same additional wages and hours of work as were evident for the 'skilled' groups in NCDS and BCS70. Looking at the estimated immediate impact, i.e. during the tax year after the report was written (2000–2001), of totally eliminating numeracy skills below level 1, the authors find that this would increase the overall wage bill by £10 billion, an increase of around 3.2%. In terms of increases in employment, the estimate is that there would be an increase of around 1% (approximately 200,000 people).

The effects of eliminating numeracy skills below level 1 on the government finances are presented both in aggregate terms in terms of increased tax receipts and/or lower benefits payments and per unskilled person. These results show that the government net receipts would increase in the tax year 2000–2001 by a total of just under 5 billion pounds if poor numeracy was eliminated; per unskilled person, this increase in government receipts is estimated to be £383 per annum.

The overall increase in the wage bill resulting from eliminating poor literacy skills (below level 1) was estimated to be £4 billion in 2000–2001, an increase of around 1.3% and slightly more for the years 2000–04. The effects of eliminating poor literacy skills on government finances are estimated to be an increase in net receipts of around £0.61 billion (reflecting the smaller numbers involved). The estimate of increases in receipts per previously unskilled person is approximately £375 per annum, i.e. fairly similar to the estimated effect of improvements in numeracy skills.

So far, the results presented in the report were based on the assumption that everyone in the target group (i.e. people aged 22–59 with below level 1 skills) would improve their numeracy and literacy skills to level 1 and above. The authors further provide estimates of the effects on the economy of achieving the – less ambitious – targets set by the Moser report which were to increase the proportion of the population with level 1 or better literacy from 70% to 90% and those with level 1 or better numeracy from 50% to 70%. These estimates are again based on the assumption that targets would be reached immediately, i.e. within a year (which is of course unrealistic, as the authors note). The total effect of improving numeracy skills to the targets set by the Moser report is estimated to be a nearly £8.4 billion increase in the wage bill, while for literacy it is £1.6 billion. In terms of the effect on employment, it is estimated that implementing the Moser targets would increase aggregate employment by around 130,000 people for numeracy and 70,000 for literacy.

It is important to point out that this is not a cost-benefit analysis, as the costs of the

implementation of such a strategy have not been taken into account in the models. The authors also discuss a number of potential limitations in the study and its underlying assumptions. For example, it is assumed that, within a given sex and education group, there are no systematic differences between those with above and below level 1 skills which might additionally affect their wages (the classic endogeneity problem). No account is taken of the effects of major changes in skills levels on the overall supply and demand for skilled and unskilled workers (and therefore on wages and returns to basic skills). Nor do the estimates take account of changes in the dispersion of wages over time.

Hollenbeck (1996) also provides an estimate of the wage impact of workplace basic skills training for US workers, and, by implication, productivity gains for employers, based on two data sets: that of the 1991 *National Household Education Survey* (NHES), a one-off survey from which he was able to estimate numbers participating in 'basic skills' programmes as opposed to other workplace training, and the *Current Population Survey* (CPS), conducted monthly by the Census Bureau on behalf of the US Department of Labor. His estimates are that, over the entire population (males and females), workplace basic skills training increases earnings by about 17% (NHES) or 11% (CPS). Controlling for type of industry and occupation the effects still remain substantial at 13% and 8% respectively for the two datasets. There are, however, inconsistencies between the two datasets when one examines the effects separately for males and females and Hollenbeck discusses various hypotheses in an attempt to explain them.