Work Skills in Britain 1986-2001

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TABLE OF CONTENTS

FIGURES

TABLES

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GLOSSARY OF TERMS

Term	Description
Broad skills	Skills required at work as measured by the qualifications required to get and do the job, the time taken to learn to do the job well, and the length of prior training for the type of work.
Credentialism	Employers raising their qualification requirements for jobs even though the nature of the jobs remains unchanged.
Centrality of computers	The extent to which the use of computers is an important aspect of the activities involved in jobs.
Complexity of computers	The use to which computers are put at work. The range varies from simple, moderate, advanced and complex uses.
Generic management skills	Job skills used in varying degrees by all those who have managerial or supervisory duties. These skills include coaching staff, developing the careers of others, motivating staff, controlling resources and thinking strategically.
Generic skills	Job skills that are used in varying degrees in all jobs. Generic skills include: literary skills, physical skills, number skills, technical 'know-how', high-level communication, planning, client communication, horizontal communication, problem-solving and checking skills.
Intermediate qualifications	These refer to those attained at Level 3 of the National Vocational Qualification framework or qualifications of equivalence.
Learning Time	The time taken to learn to do current type of work well. The Learning Time Index is used as a summary measure and ranges from one to six.
Over-qualification	This is where an individual has a higher level of qualification than would be required to get their current job.
Particular skills	These refer to the importance of various detailed activities in jobs. These include reading long documents, writing forms, notices or signs, making speeches and presentations, spotting problems or faults, listening carefully to colleagues and so on.
Required qualifications	Highest qualification that would be required to get current job in today's labour market. The qualifications are ranked by the five NVQ categories, with the top category further sub-divided into degrees and non-degrees. The Required Qualifications Index is used as a summary measure and ranges from zero to four.
Task discretion	The extent of employee control over the detailed execution of the job.
Training time	The time taken to train for the current type of work. The Training Time Index is used as a summary measure and ranges from zero to six.
Under-qualification	This is where an individual has a lower level of qualification than would now be required to get their current job in today's labour market.

EXECUTIVE SUMMARY

This report gives findings from the 2001 Skills Survey. This survey is a high quality representative survey of working individuals in Britain aged 20-60. It collected a great deal of information about the skills utilised at work, using an innovative methodology that had previously been developed for an earlier survey in 1997. The report explains how several different aspects of work skill can be measured, and examines the distribution of skills among workers. The report also describes changes that have taken place since 1986, by making comparisons with previous surveys. Finally, the extent to which different types of skills are valued in the labour market is investigated. The report:

a) considers broad measures of skill, namely the qualification level, the training time and the learning time required for jobs;

b) examines several detailed generic skills used across all occupations;

c) devotes separate chapters to computer skills and task discretion.

The findings are as follows:

The Skills Trend

- There is a consistent pattern of generally increasing skills in recent years according to most measures, though there are some exceptions.
- There has been a significant rise in employers' requirements for qualifications. Notably, the proportion of degree-level jobs rose from 10 percent in 1986 to 17 percent in 2001. Fewer jobs have required a cumulative training time of under 3 months: 66 percent in 1986 falling to 61 percent in 2001. And, also indicating a rise in the complexity of jobs, fewer jobs require under one month 'to learn to do well': 27 percent in 1986 compared with 20 percent in 2001.
- Over the last four years, most generic skill requirements of jobs have risen. Nine out of ten of the measures of generic skills show a rise, the exception being the use of physical skills which has not changed. The importance of computer skills rose more rapidly in the last four years than any other job skill. Amongst managers, more than half (53 percent) reported a recent increase in the importance of coaching skills, compared with just 7 percent recording a decrease. The last four years have also seen a substantial rise in the average qualification level required for jobs. However, the required training time has decreased over this period.
- Between 1992 and 2001, there was a modest but significant extension in the perceived requirement to learn new things on the job: this requirement applied to 76 percent of jobs in 1992 and 81 percent in 2001.

The Skills Match

- In aggregate, there is an approximate balance between the supply of high level qualifications (level 4 or above) in the workforce and employers' utilisation of these high level qualifications across the economy. By

contrast, at intermediate qualification levels there are substantial aggregate imbalances between supply and demand. Thus, there are 6.4 million people qualified to the equivalent of NVQ level 3 in the workforce, but only 4 million jobs that demand this level of highest qualification. There are a further 5.3 million people qualified at level 2, but only 3.9 million jobs that require a highest qualification at this lower level. The other side of this same coin is that, whereas there are now only 2.9 million economically active people aged 20-60 who possess no qualifications, there remain 6.5 million jobs for which no qualification would be required to obtain them. This aggregate imbalance suggests that previously reported deficiencies in Britain (by comparison with other countries) in the use of intermediate-level qualifications may be deficiencies of demand as well as of supply.

- The prevalence of workers who hold qualifications at a higher level than would be required for getting their own jobs has risen in the last four years. In the period since 1986 there is also evidence of some 'credentialism' at qualification levels 1 and 3, whereby more employers are requiring qualifications for job-entrants even though those qualifications are not necessary for doing the jobs. However, even allowing for credentialism, the average level of qualifications required both to get and to do jobs has been increasing.

Skills and Gender

- There are substantive differences between the skills being used in jobs held by men and those used in jobs held by women. Amongst women, an important distinction should be made between full-time and part-time workers' jobs. All the measures of broad skills, most of the generic skills measures, and the indicator of 'improving learning and performance' are at lower levels for female part-time workers than for either men or female full-time workers.
- The jobs held by men and women working full-time utilise similar levels of broad skills. Some generic skills are more associated with women's jobs, especially communication skills, while other generic skills, such as physical and number skills and technical know-how, are more associated with men's jobs. Amongst managers, human resource management skills are more important in women's than in men's jobs, while strategic thinking is more important in men's than in women's jobs.
- The gender gap between the skills used in men's and women's jobs has been narrowing between 1986 and 2001. For example, the proportions of jobs held by men requiring no qualifications fell from 31 percent to 24 percent over 1986-2001, while the equivalent decline for women's jobs was from 48 percent to 29 percent.

The Occupational and Industrial Distribution of Skills

- There are considerable skill variations, as expected, amongst the major occupational groups. 'Professional Occupations' tend to require the highest skill levels.

- A narrower but still substantive range of skills is displayed across industries. 'Hotels and Restaurants' is an area of work demanding relatively low average levels of skill; the 'Public Administration' and 'Education' sectors, by contrast, tend to require relatively high levels of broad skills, and utilise high-level communication and literacy skills.

Computer Skills

- There has been a striking and continued increase since 1986 in the number of jobs in which advanced technology is used. There has also been a marked increase over the last four years in the proportion of jobs in which computing is considered to be an essential or very important component of the work. Over 70 percent of people in employment now make use of some type of automated or computerised equipment, and computerised equipment is seen by 40 percent as essential to their work.
- These changes have affected the work of both men and women. There has been a sharp reduction of the gender gap in the use of advanced equipment. Women are now as likely to be using advanced equipment as men, and they are just as likely to consider it essential to their work. Nevertheless, men are more likely to be in jobs involving complex and advanced computer applications. There is also a major difference between women in full-time jobs, who have a high use of computerised technologies, and women in part-time jobs, who are much less likely to use it.
- There are substantial differences in the use of computerised equipment according to occupation. There is widespread use of computers, and computers are especially important to the jobs, in 'Professional', 'Managerial', 'Associate Professional' and 'Administrative and Secretarial' occupations. Computers are much less important for jobs in 'Plant and Machine Operative', 'Skilled Trades', 'Personal Service' and 'Elementary' occupations. Similarly, complexity of use is strongly related to occupational group.
- Computer skills are most commonly acquired through formal training at work. A half of computer users learned in this way, and nearly a half learned also through help from colleagues or through practice at work. Informal learning processes in the home, through the use of home computers, are also important for 40 percent of computer users. However, there are important social class differences in the likelihood of having a home computer. So differences in living standards translate into differential opportunities for work-related learning opportunities.
- Nearly a quarter (24 percent) of those people in jobs where computerised equipment was essential or very important thought that the acquisition of additional computing skills would make their performance much better. There is not a large pool of people with significant computing skills in jobs where computers are not of major importance to the work.

Employee Task Discretion

- More skilled jobs typically require higher levels of discretion over job tasks. Despite this, the rise in skills among employees has *not* been accompanied by a corresponding rise in the control they can exercise over their jobs. Rather there has been a marked decline in task discretion. For example, the proportion of employees reporting a great deal of choice over the way they do their job fell from 52 percent in 1986 to 39 percent in 2001. The proportions reporting a great deal of influence over what tasks are done fell from 42 percent in 1992 to 30 percent in 2001. This decline occurred for both men and women. 'Professional' workers have witnessed a particularly sharp decline in their control.
- In all years the level of job control exercised by women in full-time jobs was substantially greater than that exercised by women in part-time jobs. Moreover, the period saw an increased polarisation of the quality of jobs in this respect. The level of task discretion in jobs declined faster for part-timers than for full-timers.
- Reduced personal discretion in jobs has been partly matched by rises in external sources of control. There was some evidence of an increase of supervision, although there was little increase in close supervisory practices. There was also a rise in the importance of certain non-hierarchical constraints on individual job performance – notably by fellow workers and by clients or customers. For example, the influence of fellow workers expanded from applying to 29 percent of employees in 1986 to being relevant for 50 percent of employees in 2001.

The Value of Skills

- All the broad skills indicators are associated with positive wage premia. Graduate level jobs attract the highest premium, at 57 percent for women, 38 percent for men, compared to jobs that require no qualifications. However, low level qualification requirements are not associated with pay premia in jobs held by men. Jobs with longer learning times before being able to do them well are paid more than jobs that can be learned in a short time.
- Usage of computers continues to be associated with substantial pay premia in the labour market. A job which requires the use of computers at a 'moderate' level, for example to analyse spreadsheets, typically enjoys an average wage premium of around 21 percent for women and 13 percent for men. These premia are in addition to any differences in education requirements and other factors.
- Also well rewarded are high-level communication skills (such as making presentations or writing long reports), and planning skills. None of the other generic skills indices have a positive association with pay, and some have a negative pay premium, most notably physical skills.
- The skill premia did not change significantly between 1997 and 2001.

CHAPTER 1
INTRODUCTION: CONTEXT AND OBJECTIVES

1.1 The Problem of Skills Measurement

This report presents results from a new survey of work skills in Britain, commissioned in 2000 by the Department of Education and Employment (subsequently the Department of Education and Skills). At the beginning of the new millennium, the skills of the workforce have come to be of central importance to policy-makers across all industrialised countries. In Britain, concerns with social exclusion and with skills deficiencies in the workforce have in recent years led to numerous initiatives in education, such as the successful introduction of numeracy and literacy hours in schools. For post-compulsory education and training, a new institutional framework for delivery has been inaugurated, with the establishment of 47 local Learning and Skills Councils and a national body to oversee them (Felstead and Unwin, 2001).

There has also been a renewed quest to base policy-making about education and training on sound and informed judgements about the needs of the economy. The National Skills Task Force was formed in 1997 with this objective and reported priority policy recommendations to the Secretary of State for Education and Employment in 2000. More recently, the Performance and Innovation Unit of the Cabinet Office has published its recommendations for raising workforce development in Britain (PIU, 2001). Both these initiatives have drawn substantially on research information about trends and developments in skills and training at British workplaces. The Department for Education and Skills has maintained this emphasis in 2001 by commissioning a review of the latest research data on workforce skills in England (Campbell *et al*., 2001) which has provided a research framework for the new Learning and Skills Council constituted in April 2001.

Skills also occupy an important place in social science. Sociologists have been concerned for several decades to understand how the quality of working life changes with successive reorganisations of the process of production. In recent years, workplace analysts have noted from many case studies an increasing demand for certain generic skills, such as communication and problem-solving skills (Thomson *et al*., 1995; Darrah, 1996; Appelbaum *et al*., 2000). Surveys have shown that there are many more workers who perceive that their jobs are requiring higher levels of skills than there are workers who perceive that their jobs are being deskilled (Gallie *et al*., 1998). Economists focussing on the increasingly unequal distribution of wages and salaries have attributed a certain amount of this rise in inequality to the increased demand for higher-level skills (Machin, 1999). There is also a body of evidence, which shows that differential levels of skills are associated with differential levels of workforce productivity, and which can explain in part why some countries grow faster than others (examples are Steedman and Wagner, 1989; Gemmell, 1996).

Of particular concern to Britain is some recent formal evidence which confirms what many had suspected even in earlier decades, namely that in important

areas Britain's workforce has relatively low levels of skills. For example, it has been found that Britain's workforce has a disproportionately high number of people with deficient basic skills of numeracy and literacy (Centre for Educational Research and Innovation, 2001: 49). Amongst 25-29 year olds, the United Kingdom ranks 19th out of 26 OECD countries, in terms of the proportions who have completed upper secondary education (ibid.: 48).

Despite widespread acceptance of the importance of skills, and a large number of studies of workplaces which afford much detailed information, for *quantitative* information about the skills in Britain's workforce as a whole analysts have mainly had to utilise data about the formal qualifications which people have gained. Not only are many analyses carried out of trends in qualification levels, but the targets for the education and training system are also mostly couched in these terms. However, sole reliance on qualifications as a measure of the stock of skills in the workforce is far from ideal. Other characteristics are frequently cited by employers as important when deciding whom to recruit. The most important of these is usually relevant prior work experience. Depending on the quality of that experience, many skills are acquired at the workplace and remain uncertified in a formal way. Even when qualifications are needed for getting jobs, there are many other attributes that may be considered important for carrying out the jobs well. Often, the qualifications that people obtain are poorly matched to the jobs that they find themselves doing. For these reasons, qualifications can only be regarded as loose indicators of the real skills of the workforce.

An alternative source of regular quantitative information about changing skills is the formal occupational classification of jobs by National Statistics, and recorded in the Quarterly Labour Force Survey. Information from this source can be used to plot the changing proportions of particular occupational groups known to require high levels of particular skills. Future skills demands can also be forecast, using models that predict the changing industrial landscape and the associated occupations in demand. However, this method has the drawback that skills within occupational groups may also be changing over time. Moreover, they do not generate quantitative information about those generic skills which case studies have suggested to be of rising importance. This gap in knowledge is also a problem for policy makers in many countries, where there is a common concern to address the need for 'key' skills such as information technology, communication, literacy and numeracy skills.

1.2 Some Recent Developments in Skills Measurement

Some recent studies have attempted to fill the need for improved quantitative measures of workforce skills. Regarding qualifications, the main developments have been towards improving the available information for international comparison of qualification levels and educational attainments (Gemmell, 1995; Barro and Lee, 1996a, 1996b, 2001; Krueger and Lindahl, 1998). There has also been use made of standardised tests which, though uncertificated, nevertheless can be used for both internal and external comparisons. The focus here has been on literacy and numeracy tests,

whether for those of school age (IAEEA, 1988) or more recently for adults (OECD and Statistics Canada (1995, 1997)). Data from tests on adults have proved useful, for example, in understanding links between low educational attainment and low literacy levels in Europe (Steedman and McIntosh, 2001), and in understanding international differences in inequality (Freeman and Schettkatt, 2001). However, such studies have hitherto been limited to the relatively narrow range of skills understood by the phrase 'literacy and numeracy', and the associated surveys and tests are typically expensive to administer. Informative quantitative data on a wider range of skills has been gleaned from subjective estimates of personal competences and of the extent to which people's skills are utilised at workplaces (Bynner, 1994; Allen and van der Welden, 2001).[1]

This report builds on another recent development in skills measurement which has proved itself in a number of applications. The idea behind the new method is to focus primarily on the job rather than on the person who fills it. Initially, analysts used data borrowed from job analyses by commercial organisations or have used experts' job skill scores for each occupation (e.g. Cappelli, 1993; O'Shaughnessy *et al*., 2001; Autor *et al*., 2000). Recently, Ashton *et al*. (1999) have developed job analysis methods for measuring skills by adapting the procedures of occupational psychologists and applying them in a survey context. These *generic* skills are used in varying degrees in all jobs. They include literacy skills, number skills, planning, problem-solving and technical 'know-how' (see Glossary of Terms). This approach lay behind the design of the 1997 Skills Survey.[2] Studies based on findings from this survey have been used as research evidence, both in Britain and abroad (DfEE, 2000; Campbell *et al*., 2001; ILO, 1999).

Since it is possible for the skills of jobholder to differ from the skills required to do the jobs, at least in the short term, this method provides a direct measure of job skills but only a proxy measure for the skills of the job-holder. If the job-holder's skills are inadequate for the job, it might be expected that over time he/she acquires the necessary skills through training or on-the-job learning, or else moves to another more suitable job. But it is also possible that poor job performance could be tolerated for some time. Similarly, a job-holder might have skills in excess of what are required for the job. In that case there is an incentive for the job-holder to transform the job, or to move jobs to gain more satisfaction and a greater reward for the skills he/she has, but labour market frictions could prevent such adjustments from happening. Nevertheless, the advantage of this method of measuring skills, as this report will demonstrate, is that it generates valid measures of a wide range of skill types.

Moreover, the survey also extends to 2001 a series of three *broad* indicators

[1] The OECD is also developing internationally comparable measures of competences of school age children, and attempting to develop a wider range of skill tests via its International Life Skills Surveys, currently in progress (OECD, 1998).

[2] The Skills Survey of 1997 was conducted by the National Centre for Social Research, on behalf of the Economic and Social Research Council. The survey was the centre piece of a project entitled 'Learning, Skills and Economic Rewards', directed by Francis Green, with David Ashton and Alan Felstead, which was part of the ESRC's 'Learning Society' programme of research. The current report represents an example of academic research being taken up in the practical context of policy-relevant research.

of skill – derived from the training time, the learning time and the formal qualifications required to get and do jobs (see Glossary of Terms). The measures were originally developed for the Social Change and Economic Life Initiative in 1986. The Employment in Britain survey in 1992 permitted the first use of these measures to look at broad skill trends in the workplace, and the 1997 Skills Survey built on this earlier work. By repetition of identical questions in representative surveys, it has thus been possible to gauge changes in the broad skill levels used at the workplace over a period of time (Penn *et al*., 1994; Gallie *et al*., 1998; Felstead *et al*., 1999; Green *et al*., 2000).

1.3 Objectives of the 2001 Skills Survey

The 2001 Skills Survey employed the same general methodology as in the earlier 1997 Skills Survey. The main intention was to improve and update our knowledge of the skills being used in Britain's changing workplaces. Specifically, the objectives of the survey were:

- To update the statistics for the levels of broad and detailed skill types actually in use in workplaces in Britain. The first guiding principle was to utilise the same questions and interview procedures as in earlier years. The second main principle was to generate a high-quality representative sample covering the whole of Britain. Together, these two principles underpin the comparability of the new statistics with those from earlier years.
- To extend the method of measuring job skills to further skill types. The new skill types include internet use, the key skill of improving learning and performance, and certain prominent managerial skills relevant to the learning society.
- To make incremental improvements in the method of using job analysis for measuring skills. Improvements have been sought in assessing the extent of under-utilisation and over-utilisation of skills, and in several other areas, without compromising the intention of retaining comparability of the central skill measures with earlier surveys.
- To permit an analysis of the distribution of all skill types in use across British workplaces, and to provide a benchmark picture of the skills stock in early 2001, suitable for comparison with future similar surveys. This benchmark date happens to be the beginning of the period from which the Learning and Skills Councils took effect.
- To collect information from jobholder about characteristics of the organisations that they work for that may be relevant to the organisation's demand for and development of skills.
- To collect information about recent changes at the workplace that may be associated, directly or indirectly, with changes in the skill demands of jobs. These last two objectives are intended to facilitate analyses that will

develop understanding of the way skills change at workplaces.

These objectives sharply distinguish the 2001 Skills Survey from other ongoing survey series on subjects related to skills. First, regular information on various aspects of training and learning is collected through the Quarterly Labour Force Survey, through the National Adult Learning Survey, and at the employer level through the Learning and Training At Work surveys. On the assumption that training and learning augment people's skills, these surveys generate indicators of the *flow* of new skills onto the labour market. In contrast, the 2001 Skills Survey focused on the *stock* of skills in use at workplaces, and collected no information about current training activity. Second, the 2001 Skills Survey also differs from the Employers Skills Survey series, begun in 1999 to support the National Skills Task Force, whose emphasis is on skill shortages, skill gaps and skill deficiencies faced by employers.[3]

1.4 Objectives of this Report

Analyses of the data generated by the survey are being carried out by the research team and by some other members of the ESRC Centre for Skills, Knowledge and Organisational Performance (SKOPE) at Oxford and Warwick Universities. This report aims to provide a full account of the survey methodology and outcomes, and then to present a comprehensive description of work skills in Britain in 2001.[4]

The methods of the survey are described in Chapter 2, while the way in which we have derived indicators of skill types are described as they are introduced in subsequent chapters. In Chapter 3 we begin with a description of the levels of broad skill measures based on qualifications required, and on the training time and learning time required for jobs. We include here an analysis of skill utilisation, by examining the balance between the supply of qualifications in the workforce (derived from the Spring 2001 Quarterly Labour Force Survey) and the demand for the same qualifications by employing organisations. The chapter proceeds with quantitative descriptive analyses of many generic skills, including all the key skills.

Chapter 4 presents analyses of skill changes in the workforce as a whole. For the broad skill measures, comparison with the earlier surveys facilitates analyses spanning the period 1986 to 2001. For most detailed and generic skills measures, the ensuing analysis covers the recent period, 1997-2001.

Chapter 5 focuses on what is widely regarded as one of the most important new skills in modern workplaces, namely computer skills. It presents analyses of the distribution of computer skills across workplaces, and looks at changes over time.

[3] Because the focus of the 2001 Skills Survey and its predecessor the 1997 Skills Survey is on the stocks rather than the flows of skills, it makes sense with limited resources to repeat the survey every few years, rather than every year. Stocks of skills can only be expected to change relatively slowly from year to year.

[4] In-depth studies of several specific issues are due to be published by SKOPE, separately from this report.

Chapter 6 describes several measures of task discretion and how they have been changing over recent years. Task discretion is widely taken to be either a direct measure of skill or, if not, something that is also increasing and associated with higher skill levels. The chapter examines and questions this perspective.

Chapter 7 presents findings from an analysis of how different skill types are valued in the labour market. This analysis updates and improves upon a previous analysis based on the 1997 Skills Survey (Green, 1999).

Chapter 8 presents our conclusions.

CHAPTER 2
METHODOLOGY

2.1 Concepts of Skill

Despite the enormous interest in how skills in Britain have changed over time, how they are distributed, and how these trends and patterns compare with competing nations, there is surprisingly little agreement on what 'skills' actually refer to. In practice, different authors often refer to different aspects of skill and are influenced by the theoretical standpoint from which their interest in the phenomenon stems. This variety is evident from the empirical evidence on skills patterns, trends and future trajectories compiled by the National Skills Task Force (DfEE, 2000: chapter two) and recently updated by Campbell *et al*. (2001). These reviews cover various aspects of skill and include: competence or proficiency in carrying out a task, that is the ability to do something well; the notion that skills are hierarchical and that skill levels are determined by the degree of complexity and discretion involved; and the view that there are different types of skills, including generic skills useable across a range of occupations and vocational skills relevant to a particular occupation.

Our aim in designing the 2001 (and 1997) Skills Survey was to collect data of relevance to the measurement of skills that would reflect these multiple aspects of skill.[5] We were keen also that our measures would reflect differing academic traditions each of which have an interest in the study of skills, including economics, sociology and psychology. Our aim was to draw on each of these three disciplines to create a genuinely interdisciplinary approach to the issues surrounding the acquisition and use of skills at work. This meant drawing on three very different theoretical traditions, each with its own set of assumptions and methodologies. These are briefly reviewed below.

In the economics literature, the dominant approach to understanding the incentives for individuals, organisations and even societies to acquire skills has been framed by the human capital approach (Becker, 1964; Stevens, 1994). This approach regards investment in skills in the same way as physical capital (apart from the issue of property rights). Economists working in this tradition regard skills as acquired faculties that generate higher productivity and hence higher wages and/or better employment prospects. However, one of the drawbacks of this approach is that it treats the concept of skill as relatively unproblematic. In general, it is used to refer to those technical attributes of individuals which are automatically rewarded in the labour market. Owing to this relatively narrow conceptualisation and to a preference for 'hard' (ie, quantitative) data, economists have typically used proxies for skill for which such data are easily available. These proxies include qualifications, and years of education, of training, of job tenure and of general work experience. The Skills Surveys have retained this quantitative

[5] Both DfEE (2000) and Campbell *et al*. (2001) note that personal behavioural attributes are sometimes treated by recruiting employers as important aspects of skill. Such attributes, though indeed important to an understanding of labour markets, are not measured or otherwise examined in this report.

approach, but they have done so by broadening the conceptualisation of skill beyond the traditional proxies used by economists.

Sociologists have tended to examine the social context of skills in one of two ways. The first is to focus on the ways in which the system of production is changing, on the changing scope and complexity of work tasks, and on how employers alter the discretion employees can exercise over their work. This has given rise to a tradition of research, stemming in part from the work of Braverman (1974), on the process of deskilling and the links between skills, technology and changes in the workplace (Wood, 1989). This tradition is counterposed to a different position espoused, for example, by Kerr *et al*. (1960), that advanced societies would undergo progressive upskilling along with technological change. Some of the main issues of debate here concern the decline of craft skills under capitalism, the introduction of new technology, and the emergence of new forms of post-Fordist production methods, and their impact on the composition and distribution of skills within the wider society. This debate has recently expanded to incorporate the impact of globalisation on organisational forms and the 'new' skills they demand from the labour force. This has led to a widespread acceptance of the assumption that employers are introducing 'flat hierarchies', smaller units of employment, team work, quality circles and other high performance management techniques (Felstead and Ashton, 2000). Within this tradition, two dimensions of skill – substantive complexity and autonomy/control – both capture the theoretical arguments and describe a number of the empirical studies (Spenner, 1990).

A second focus of sociological interest has been on the social construction of skills and their function in the economy and wider society. Here, skills are used by groups as weapons in their struggle to further sectional interests, be it those of trade unions (Parkin, 1974), professions (Johnson, 1972) or men (Cockburn, 1983). This work has shown how the label 'skilled' can be used as a means of furthering the status, wealth and power of groups independently of the actual content of jobs.

Within psychology, the concept of skill has been examined in more detail than in both the other disciplines. Psychologists have also developed the most detailed techniques for measuring the skills of individuals and those demanded by different types of work (Gael, 1988). These were frequently developed for such immediate practical purposes such as helping improve the selection and matching process and for providing a more 'objective' measure of differences between jobs. The aim was to provide a more 'objective' measure of the responsibilities and skills needed for jobs, in order to inform the payment systems used by large employers. The techniques usually involved a questionnaire but one which was devised after detailed analysis of specific cases. One disadvantage arose because commercial consultants rather than academic psychologists carried out these investigations. The methods developed, while suitable for meeting particular clients' needs and focused on specific occupations, have limited applicability elsewhere.[6]

On occasion, however, it has proved possible for researchers to make good secondary use of data originally gathered for commercial purposes (Cappelli,

[6] For a more detailed review, see Ashton *et al*. (1999: 13-18).

1993; O'Shaughnessy *et al*., 2001). Furthermore, the idea of measuring skill according to what tasks people do in their jobs was developed systematically in the design of the 1997 Skills Survey (Ashton *et al*., 1999). This design principle also lies at the core of the 2001 Skills Survey.

2.2 Survey Methods

The 2001 Skills Survey replicated many aspects of the 1997 Skills Survey, including the research team involved, the market research company and the methods of sample selection. In particular, many of the same questions were used. By these means comparability between the 2001 and 1997 surveys was maximised. Several questions asked in 2001 were also used in a nationally representative survey of the workforce in 1992 – Employment in Britain (EIB) – and in a survey of six contracting localities in Britain in 1986 – the Social Change and Economic Life Initiative (SCELI).

An important aspect of the survey design process was the devotion of sufficient time to reflect on and build successfully on the previous surveys, to draw where appropriate on instruments that had been tested successfully by other researchers, and to develop new questions that would be useful in addressing several issues of interest to policy-makers and academics. We were able to consult widely among many members of the Centre for Skills and Organisational Performance, and we received assistance in specific instances from other outside academics. In addition, we commissioned the survey company, the National Centre for Social Research, to conduct a pre-pilot survey of 28 respondents, using cognitive interviewing techniques. In this survey, interviewers examined in depth the understanding of, and the meaning given to, 12 innovative questions on a range of skills-related issues. As a result, these questions were either confirmed, as likely to convey the meaning intended by the research team, or adapted, or in some cases abandoned as likely to generate misleading responses. The survey also examined responses to a range of survey titles and to the draft survey letter, the aim being to present the survey in a way to maximise response rate. The details are given in the Technical Report (Hales *et al*., 2001). The cognitive interviews were followed by a pilot survey of 79 respondents, which tested the procedures of the survey and led to further refinements of the questions.

The fieldwork for the 2001 Skills Survey was conducted through computer-aided personal interview (CAPI). Households and eligible interviewees were selected randomly. Interviews spanned the period 17 February 2001 to 26 June 2001, with the bulk (87 percent) of interviews taking place in March, April and May. Considerable effort was devoted to maximising response rate, including the re-issuing of 1,386 addresses which initially failed to generate information. A total of 4,470 productive interviews with individuals aged 20-60 years old and in work were conducted. This achieved number of interviews means that there was a 'net response rate' of 66 percent, and a 'gross response rate' of 72 percent, the difference depending on the assumptions made about the eligibility of households that could not be screened (see Technical Annexe A1 for details). This response rate is an improvement on

the rate achieved for the 1997 Skills Survey. The National Centre undertook coding of occupations and industry, coding of open-ended questions and an edit of the interview data. The data were also linked to a range of geographical data, for example, placing each sampled postcode sector within a local authority and within a travel-to-work area.

Weights were computed to take into account the differential probabilities of sample selection according to the number of dwelling units at each issued address and the number of eligible interview respondents (kish weight). Further analysis was carried out on the representativeness of the achieved sample. The distribution of the achieved sample was compared with Spring 2001 Quarterly Labour Force Survey, according to age, ethnicity, working time, occupation and industry, and found to be acceptably close. However, sex weights were added to the sample weights, in order to correct for a slight under-representation of men in the sample (see Technical Annexe A3.2). With this correction, the result is a high quality, randomly drawn and representative, data set.

2.3 Questionnaire Content

The questionnaire was organised in the following 'Blocks' of questions:

A Eligibility (age and whether in paid work in the last 7 days)

B Broad questions about current job

C Detailed job analysis questions

D Computing skills

E The employing organisation

G Pay questions

H Skills five years ago

J Change over the last five years

K Personal details

Q Details of organisation and re-contact

Respondents were encouraged to complete the majority of questions in Blocks C and J on the laptop computer interviewers used to record responses. Most, though not all, chose to do so.

In order that the survey covered the dimensions of skill that were of interest to economists, sociologists and psychologists a range of questions were asked about what respondents' jobs required of them. However, despite the motivation for the survey being the measurement of skills, the word 'skills' was not used in the approach to respondents. Instead, the research study was titled: 'You and Your Work: a Study of Working Life in Britain Today'. Approach letters, leaflets and the telephone helpline referred to the survey in the same way (see Technical Annexe A2) . One reason for this is that some

eligible interviews may consider their work to be 'unskilled' and may be more likely to refuse to be interviewed, while others may associate it with particular occupations and may be keener to be involved. The actual questions posed to respondents and skill measures derived in the analysis are specified in more detail in the individual chapters that follow. Nevertheless, four general themes addressed by the survey are worth highlighting here.

First, information was collected on the qualifications individuals held at the time of interview, a key proxy often used by economists and policy-makers. The 2001 Skills Survey also collected information on a range of less readily available proxies for skill including qualifications required to get jobs, the length of training time needed to do jobs and learning time required do them well. These measures have the additional merit of being asked of respondents to previous surveys (Chapters 3 and 4).

Secondly, the survey collected data on what respondents' jobs actually entailed. This is an aspect of skill in which psychologists have a keen interest. Rather than being tightly focused on one occupation as in the case of commercial job analysis, our questioning inevitably had to relate across the range of jobs held in Britain. This offered two significant advantages: it systematically broadened the focus of the survey; and it provided information on the distribution and trends of generic skills. The data also allow us to investigate the generic skills of managers through a set of questions asked only of those with managerial and supervisory responsibilities (Chapters 3 and 4).

Thirdly, another aspect of the current skills agenda is the importance of computing skills in jobs. It has sometimes been suggested that the advent of the so-called 'knowledge economy' has given the importance of these skills even more relevance to economic success (DTI, 1998). Furthermore, computer literacy has implications for the social inclusion agenda. Previous studies have found that computing skills are highly valued in the labour market (Green, 1999). There is nevertheless some dispute over the magnitude of any impact of the growing demand for computer skills on wage inequality (Krueger, 1993; DiNardo and Pischke, 1997; Entorf and Kramarz, 1997). The 2001 Skills Survey was designed to offer further insights into these debates. Questions were asked of respondents in order to investigate the use of technology at work, the centrality of computing to job tasks, the complexity of computing skills used, and the source of these skills and their association with pay (Chapters 5 and 7).

Fourthly, respondents were asked questions about how much choice they have in carrying out work and the level of influence they have over various aspects of it, including effort, choice of task, method of work and quality standards. These are aspects of skill with which sociologists are commonly associated. Several, but not all, of these questions were also asked of respondents to previous surveys. Building in comparability was a conscious part of the questionnaire design. In this case, trends identified according to this dimension of skill can be contrasted and compared with findings that measure skills from a different standpoint (Chapter 6).

CHAPTER 3

THE DISTRIBUTION OF WORK SKILLS IN BRITAIN

3.1 Introduction

In recent years, much emphasis has been placed on the distribution of skills in the economy. The main motivating force behind such interest has been mounting evidence that the Britain's skill levels compare poorly internationally, especially at intermediate levels (DfEE and Cabinet Office, 1996; Green and Steedman, 1997; Steedman, 1998). Furthermore, research suggests that those with low level skills are more at risk of economic and social exclusion, and as a result they are more likely to experience spells of unemployment and poverty (Elias and Bynner, 1997). Several, now well known, statistics continue to make alarming reading. There are 21 million adults who have not reached NVQ level 3 or equivalent and more than one in five of all adults – around 7 million – have poor literacy and numeracy skills. On both of these counts, Britain lags behind its main international competitors (DfEE, 1998). The distribution of skills has, therefore, become of interest in terms of both Britain's economic performance and the social inclusion agenda.

In this chapter, we examine the distribution of skills using two types of skill measure derived from the 2001 Skills Survey. The first part of the chapter deals with *broad* measures of skill that seek to assess the abilities and capacities of those in employment by focusing on the attributes required for the job. The second part examines the *generic* skills demanded from workers in jobs by assessing the importance of particular activities carried out at work.

3.2 Broad Skills

A common way of measuring skills is to examine the stock of qualifications held by the workforce. Data sets such as the Quarterly Labour Force Survey and their equivalents in other countries make this type of analysis possible on a regular basis. Measuring the stock of qualifications is at the heart of the government's National Training Targets, initially launched in 1991 albeit under a different name.

However, such an approach is focused exclusively on the supply of skills as proxied by qualifications. There is also a need for measuring the skills actually being used in the workplace. Although it is possible to examine the qualifications held by those actually in employment, there is likely to be an imperfect match between the qualifications held by jobholder and the qualifications their employers and their jobs require. We therefore need accurate data on the qualifications that are required for each job. Moreover, an academic or a vocational qualification may be only a loose proxy for the skills and abilities that an individual has. There is a need for other broad measures of job skills to supplement the measure derived from the qualifications needed to get jobs.

The 2001 Skills Survey contains measures both of the qualifications held by

jobholder, and of three separate measures of the broad skills required in the job. Collecting three broad measures of the skills required for jobs recognises that skills are acquired in different ways, and that it is important therefore to have a multi-dimensional picture rather than any single measure. The survey therefore collected information on:

- the qualifications required to get and do the job;
- the length of training;
- the time taken to learn to do the job well.

These broad skill measures have been successfully tested in previous surveys. By repeating the same questions (word-for-word and prompt-for-prompt) a firm basis from which to make comparisons across time was secured (see Chapter 4).

3.2.1 Measurement of Broad Skills

First, each respondent was asked to judge what qualifications would be required to get his or her current job in today's labour market. They were asked: 'If they were applying today, what qualifications, if any, would someone need to *get* the type of job you have now?' A range of qualification options was given. To maximise comparability with previous surveys, new qualifications such as NVQs and GNVQs were integrated as far as possible into this coding framework without lengthening it unduly. From this, the highest qualification level ranked by NVQ equivalents was derived. Hence, the responses were grouped into five categories, with the top category further sub-divided into degrees and non-degrees. As a summary measure of the entire scale, the Required Qualifications Index was derived ranging from zero to four, corresponding to the five qualification levels. From the resulting data, we can examine the changing distribution of skills demand in Britain according to the highest qualifications jobs required at the time of the survey.

However, changes in required qualifications may also follow from the use of qualifications by employers to screen job applicants and hence might not reflect genuine changes in job demands. To assess this possibility, respondents were asked a follow-up question: 'How necessary do you think it is to possess *those* qualifications to *do* your job competently?' The responses to this question can be used to tease out the necessity of the qualifications required to carry out the work tasks involved in the job and has been used in some of the analysis that follows.

The estimates of the qualifications required for jobs can be compared with the supply of qualifications available in the labour market, using evidence drawn from the contemporaneous Spring 2001 Quarterly Labour Force Survey on skills supply among the economically active. By grossing up both surveys to the relevant 20-60 year old British population, it is possible to identify at which levels in the qualification hierarchy the aggregate demand and supply of qualifications are in equilibrium and where, if at all, they are out of step with one another.

However, required qualifications are only one aspect used in recruitment. Other factors such as experience, natural ability and motivation also play a part and give further insights into the demands of the job. In order to estimate their relative importance, respondents to the 2001 Skills Survey were asked to identify from a list of options attributes 'someone would need to get the type job you have now?' Multiple responses to the question were allowed. While 'educational or technical qualifications' were mentioned by 29 percent of the sample as the most or second most important attribute needed to get jobs, the figures for 'motivation' (35 percent) and 'previous experience of similar work' (49 percent) were much higher by comparison. This provides further justification for an approach that measures skills in a variety of ways rather than relying on the required qualifications measure alone. However, as might be expected the importance of qualifications in getting jobs rose with the level of qualification required. For example, it was reported as the most or second most important factor by 55 percent of those in jobs requiring level 4 or above qualifications compared with 17 percent of jobs requiring level 1 qualifications.

A second broad skill measure is based on responses to a series of questions on the length of training time required for the particular type of work respondents did. It is based on the premise that the training time required for different jobs reflects various ability levels and knowledge demanded by contrasting types of work. Respondents were asked: 'Since completing full-time education, have you ever had, or are you currently undertaking, training for the type of work that you currently do?' If 'yes', 'How long, in total, did (or will) that training last?' If training was still on-going respondents were asked to estimate how long it would take. For the purposes of presentation, we examine the proportions reporting 'short' (less than three months) and 'long' (over two years) training times ie, the points at either end of the continuum. We also use a summary measure of the complete range of options allowed, ranging from zero to six, entitled the Training Time Index. We report the average Training Time Index for various groups.

The third broad skill measure is similarly constructed. Respondents were asked: 'How long did it take for you after you first started doing this type of job to learn to do it well?' If they answered 'still learning' they were asked: 'How long do you *think* it will take?' Again, for the purposes of presentation, we examine the proportions at either end of the continuum – 'short' learning time denoting less than one month and 'long' denoting over two years. The learning index is a summary measure of all the answers given ranging from one to six. For comparability with earlier data sets, the results are presented for employees only.

Our basic expectation is that the more skilled jobs take longer to learn. Data collected by the 2001 Skills Survey provides considerable justification for this position. The survey asked respondents who reported that their jobs took less than three months to learn to identify why they thought this was so (multiple responses were allowed). Almost half (49 percent) of those asked this question, said that it was because their job was 'relatively straightforward', 42 percent because they had 'natural aptitude for this type of job' and only 16 percent said that their education prepared them especially well for the tasks they were required to do. Further analysis reveals that very short learning times (less than one week) were closely associated with the straightforward

nature of the jobs held by respondents – nearly two-thirds (63 percent) of these jobholders cited this as a key factor. Nevertheless, some ambiguity still remains. It might be the case, for example, that since a better-educated person could learn to do some jobs well more quickly than a person with less education, a high learning time may be a negative rather than a positive indicator of skill. Alternatively, if the job called for manual dexterity, then perhaps the better educated would be slower learners since they may have put more emphasis on the development of their cognitive abilities at the expense of manual skills. However, the analysis that follows confirms our basic expectation that learning time is positively correlated with other skills indicators and provides a reasonable indicator of the skill level demanded of those in work.

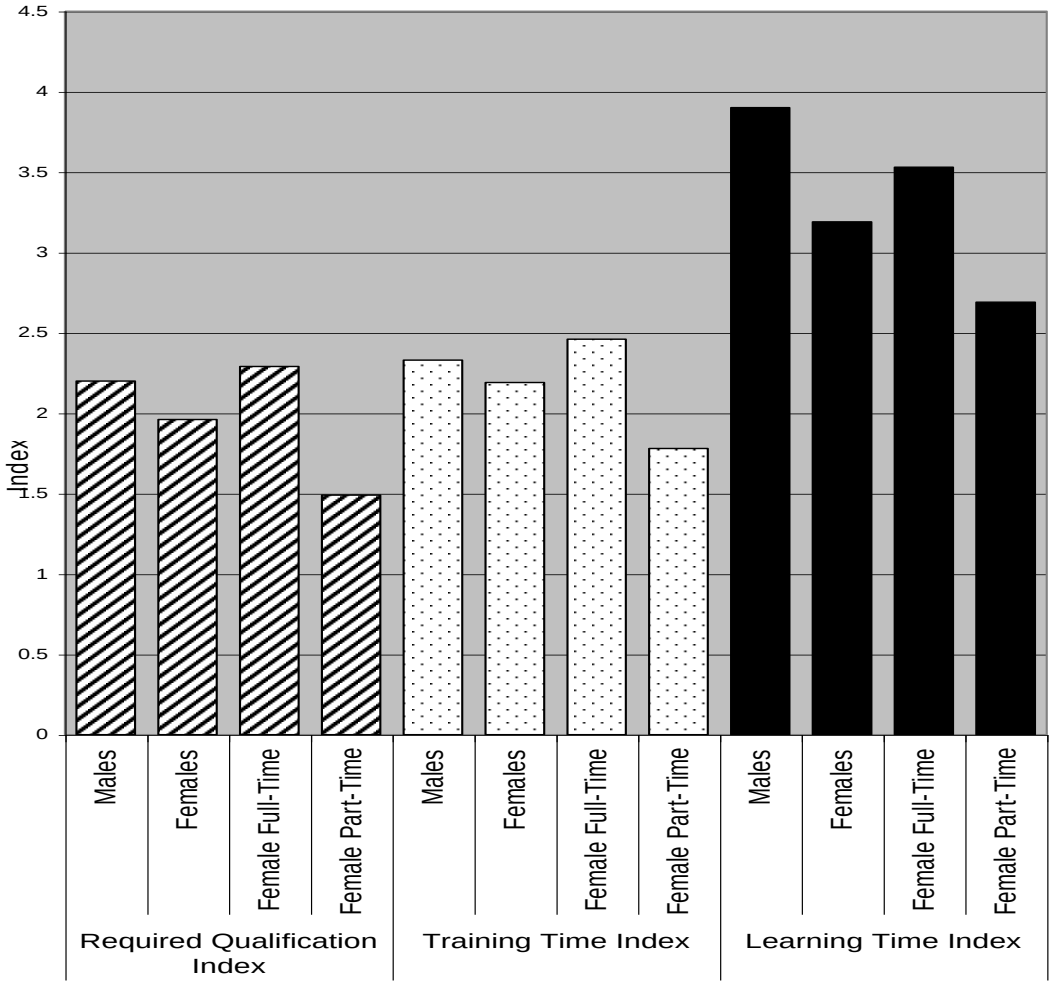
3.2.2 Findings on the Distribution of Broad Skills

Table 3.1 gives the distribution of broad skills according to the gender and job status of the jobholder, as measured in the three ways outlined above. In 2001 29 percent of jobs required level 4 or above qualifications for entry, that is, a professional qualification such as SRN in nursing, or an undergraduate or post-graduate degree. At the other end of the spectrum, 27 percent of jobs required no qualifications at all. The skills demanded of jobs also varied markedly according to the length of time needed to train for the job. Around a quarter of jobs required a training period lasting more than two years (24 percent), yet three out of five jobs (61 percent) required training that lasted less than three months. Similarly, 26 percent of jobs could only be done well after over two years in post compared to 20 percent of jobs that could be learnt in less than one month.

Table 3.1 also reveals a number of significant differences between the skills content of jobs held by men and women. All three broad skill measure indices are significantly lower for women than they are for men suggesting that on average women occupy less skilled jobs than men (see Figure 3.1). These findings confirm similar conclusions arising from the 1997 Skills Survey and from the earlier (Ashton *et al.*, 1999; Felstead *et al*., 2001).

However, these differences are reduced or disappear when the comparison is between men's jobs and women's full-time jobs (this confirms previous analyses, eg, Felstead *et al*., 2000 and 2001). For only one of the indices – the Learning Time Index – do male workers occupy jobs at a significantly higher skill level than female full-timer workers. By contrast, according to all three broad skill measures, female part-timers are on average in lower skilled jobs than their full-time counterparts. For example, 41 percent of female part-timers are in jobs that require no qualifications for entry compared to 22 percent of female full-timers and 24 percent of men. All of the differences between female full-time and female part-timers are statistically significant.

Figure 3.1 Distribution of Broad Skills by Gender and by Full-Time/Part-Time Status, 2001



Source: Table 3.1

Table 3.2 shows the distribution of broad skills by occupation. In general, the evidence suggests that the further up the occupational hierarchy one goes, the higher the skills demand. So, for example, the Required Qualification Index rises from 0.58 for 'Elementary Occupations' to 3.69 for 'Professionals'. Similar patterns are evident for the Training Time and Learning Time indices. However, there are two notable exceptions to this rule – 'Administrative and Secretarial Occupations', and 'Managers'. The former is particularly noteworthy since some analysts include these workers among 'non-manuals' and treat them as more highly skilled than their 'manual' counterparts. Arguably this is invalid as respondents in 'Skilled Trades', for example, record higher training and learning times than their counterparts in 'Administrative and Secretarial Occupations'.

The hierarchy of occupational groups may also be misleading in another respect, in that it rates the jobs of 'Managers' as very highly skilled. However, the indices suggest that these jobs demand more moderate skills. One explanation is that this finding simply reflects the nature of the occupational

grouping, which includes many of the self-employed who are traditionally in lowly skilled jobs but who nonetheless exercise managerial responsibilities. This is partly confirmed by our analysis of the data according to the National Statistics Socio-Economic Classification (NS-SEC) (Table 3.3). This confirms the relatively lowly skilled position of 'Small Employers and Own Account Workers' in the skills hierarchy. Their separate designation also highlights the expected high skill content of 'Higher Managerial and Large Employer' jobs.

Table 3.4 outlines the industrial distribution of broad skills and shows that skills demands vary markedly by industry. Each of the indices covers a wide range of values – from 1.10 to 2.98 for the Required Qualifications Index, 1.23 to 3.18 for the Training Time Index and 2.25 to 4.46 for the Learning Time Index. A number of examples serve to give these figures greater meaning. According to the analysis reported in Table 3.4, the 'Hotels and Restaurant' industry has very low skill demands indeed – 50 percent of jobs in this industry require no qualifications for entry, 64 percent need no training whatsoever and 48 percent can be learnt to do well in less than one month. The skill level of jobs in 'Wholesale and Retail' and 'Transport and Storage' are similarly low. On the other hand, jobs in 'Public Administration' and 'Education' are among the most demanding jobs in Britain. Almost six out of ten (59 percent) positions in the 'Education' industry require level 4 or above qualifications for entry, 29 percent take over two years to train for and 39 percent take more than two years to do well.

Scottish and Welsh devolution and the establishment of nine Regional Development Agencies (RDAs) in England have heightened interest in regional variations in economic performance. Comparisons of regional skills profiles are a key aspect of this debate (Felstead, 2002). Table 3.5 adds to the debate by outlining the broad skill distribution of jobs according to RDA region. Although the differences between regions are not as pronounced as they are for occupation, social class or industry, the differences are nonetheless notable in a number of ways. First, the East Midlands region has on average the lowest skilled jobs across all the regions of Britain as measured by two out of three of the broad skills indices. Second, jobs in the south (South East, South West and London) are among the most skilled according to the three measures, while jobs in Yorkshire and Humberside are highly skilled according to two out of the three indices.

Table 3.6 presents estimates of the numbers of jobs that demand various levels of qualifications required to get and to do the job, alongside the numbers of economically active people holding each level of qualification. In other words, it presents the aggregate demand for and supply of qualifications.

The estimates of demand for qualifications are based on the 2001 Skills Survey evidence for the highest qualification required to get the job respondents occupied at the time of interview. These proportions are grossed up to the numbers of 20-60 year olds recorded to be in work in Britain according to the Spring 2001 Labour Force Survey. It should be remembered that these demand estimates derive from the jobholder' perceptions of the required qualifications, rather than their employers' perceptions. However, evidence from elsewhere suggests that line managers' perceptions of the

qualification requirements of jobs are on average not substantially different from the perceptions of their subordinates (Green and James, 2001). Since the 2001 Skills Survey was designed as, and has been shown to be, representative for Britain as a whole, the estimates should be regarded as reasonably reliable.

Estimates of the supply of qualifications are calculated from the Spring 2001 Labour Force Survey. They are based on all 20-60 year olds who were economically active in Britain at the time of interview. The table gives a breakdown of the supply of individuals qualified at each level, whether in or actively seeking work. These data have been categorised in the same qualification groups as the demand data derived from the 2001 Skills Survey.[7]

A comparisons of the columns in Table 3.6 is illustrated in Figure 3.2, showing where in the qualification hierarchy demand and supply are broadly equal and where there are deficiencies or excesses in demand. A broad aggregate balance is evident at level 4 or above. Approximately 7.1 million jobs require level 4 or above qualifications for entry, while there are 7.4 million individuals in Britain in possession of this level of qualification. For degrees, the figures diverge a little more with 4.2 million graduate jobs compared to 4.8 million graduates.

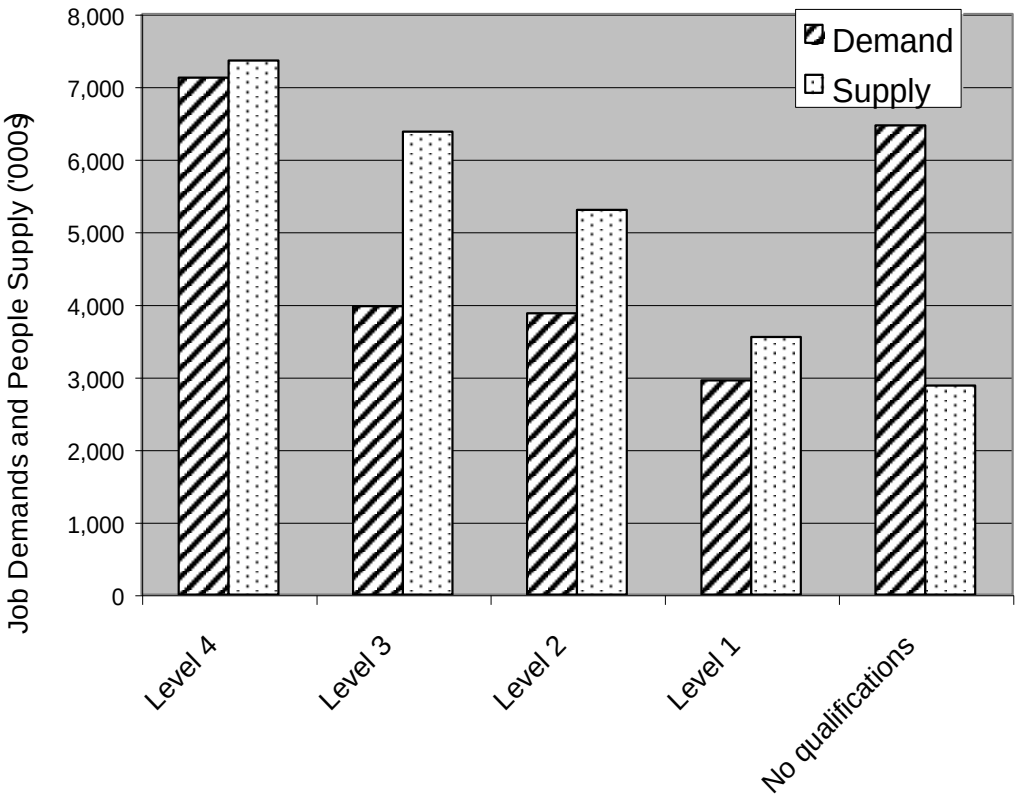
The picture is very different further down the skills spectrum. There are approximately 6.4 million people qualified to level 3 but only 4 million jobs that demand these qualifications on entry. Deficiencies in demand for qualifications are somewhat less at levels 2 and 1 where the gap between requirements and supply is 1.4 million and 0.6 million respectively. The other side of the coin is seen at the bottom of the skills hierarchy. There are 6.5 million jobs for which no qualifications at all would be required to be recruited to them. Yet, there are only 2.9 million economically active people who actually possess no qualifications. Thus, the aggregate evidence is that Britain has an excess of jobs that require no qualifications and a shortage of those that demand intermediate qualifications, but has sufficient numbers of level 4 or above jobs for those qualified at this level.

However, the labour markets at the different qualification levels should not be thought of as completely segmented from each other. It is quite common for people to take jobs which demand a lower level of qualification than the one they possess, and also possible (though less common) for people to be in jobs which now demand higher qualifications than the ones they possess.[8] We examine the match between jobs and qualifications at an individual level in the next chapter.

[7] Details are given in the notes to Table 3.6. These supply and demand estimates do not take account of the supply of economically active people and the available jobs for people aged above 60 or below 20. Nor is account taken of the fact that a small proportion of people (around 6%) hold second jobs.

[8] By construction, the sum of the excess supplies of people with some qualifications, net of the excess demand from jobs requiring no qualifications, is the total unemployed in the 20 to 60 age band.

Figure 3.2 Qualifications Demand and Supply, 2001



Source: Table 3.6

The imbalances in the lower parts of the qualifications spectrum are consistent with the suggestion made in a number of previous studies to the effect that underlying the relatively low levels of intermediate skills in Britain is a low level of demand (Keep and Mayhew, 1996; Green and Ashton, 1992; Glynn and Gospel, 1993). The imbalances are also broadly consistent with studies of the economic value arising from the acquisition of skills. Other things being equal, an excess supply of skills will tend to depress the economic return to skills. There is little reason to expect a significant positive economic premium to level 1 qualifications. The aggregate excess of level 1 qualifications is compounded by the fact that many of those with level 2 or level 3 qualifications are also available to take level 1 jobs.[9] The formal evidence confirms that the returns to level 1 qualifications are insignificantly above zero (Dearden *et al.*, 2001). In addition, the returns to many vocational qualifications are zero or even, in some cases, negative (e.g. NVQ qualifications) at both levels 1 and 2.

3.3 Generic Skills

[9] Approximately half those qualified at levels 2 and 3 are under-utilising their qualifications – see Table 4.6 and the analysis in the next chapter.

Considerable attention has been paid in recent years to the proposition that several identifiable generic skills have risen in importance in the modern workplace. This putative growing importance has led to attempts to improve the acquisition of certain generic skills in the education system. There has been a policy focus on 'key skills', namely: 'communication skills', the 'application of number', 'information technology skills', 'problem-solving skills', 'working with others', and 'improving one's own learning and performance'. The government has inserted key skills into both the school and the university curriculum. It introduced a separate Key Skills Qualification from September 2000, and has explicitly embedded key skills within other qualifications.

There have been few attempts so far, however, to investigate the extent of usage of these 'key skills' and other generic skills across the British economy. Generic skills are not easily quantified, and are frequently defined in slightly different ways by different researchers. Recently, however, two approaches have proved to be informative. The OECD developed the International Adult Literacy Survey (IALS), in which Britain participated in 1995. This survey measured the frequency of usage of literacy and numeracy skills at the workplace, and also tested respondents on their levels of these skills. Two notable findings are: first, quite high proportions of British workers were seriously deficient in their literacy and numeracy skills (OECD, 1995, 1997); second, no matter what skills they held, the skills that they had to use at work were robust and strong determinants of the pay that they received (Green, 1999). One drawback with the IALS method is that such surveys are expensive to administer and not conducted very often. A second drawback is that they do not cover a very wide range of generic skills. These problems were addressed initially through work on the first Skills Survey in 1997. Using the job analysis approach, measures of a wide range of generic skills were obtained. Through questions asking respondents to recall earlier jobs, some idea of trends in generic skills was also obtained (Ashton *et al*, 1999).

3.3.1 Measurement of Generic Skills

With the 2001 Skills Survey, we are now able to examine the distribution and, later, the changes in generic skills in a comprehensive manner. Respondents were asked a series of detailed questions about what their job comprises. This section of the questionnaire was prefaced by the following: 'You will be asked about different activities which may or may not be part of your job. At this stage we are only interested in finding out what types of activities your job involves and how important these are'. Respondents were asked: 'in your job, how important is [a particular job activity]'. The response scale offered was: 'essential', 'very important', 'fairly important', 'not very important' and 'not at all important or does not apply'. Examples of the activities included working with a team of people, working out the causes of problems or faults, making speeches or presentations and planning the activities of others. The questionnaire focused on 36 activities designed to cover the tasks carried out in a wide range of jobs (see Table 4.12). One of these concerned the use of computers, and we shall discuss computer skills separately below (Chapter 5). The remaining 35 items provide the main source for our analysis of all

other generic skills. These items were measured in identical ways in 1997 and 2001.

The 35 items were first changed into 35 variables. We transformed the ordinal scale of 'importance' for each variable into an increasing cardinal scale, running from 0 (meaning 'not at all important') to 4 (meaning 'essential'). Then, using 'factor analysis', we generated ten generic skill measures. Factor analysis is a statistical technique which estimates a number of factors, which are a weighted combination of the 35 variables. The factors are chosen in such a way as to capture sub-sets of the 35 variables which vary closely together, and which conform to theoretical concepts – in this case, to our concepts of generic skill types. To carry out this analysis, we pooled the data for the 1997 and 2001 surveys, since it was important to construct the same set of factors and therefore allow comparability of the skills between the years. We chose ten factors because, after 'rotation', the resulting factor scores were easily interpretable as skill types, and because ten factors were consistent in this case with the accepted criteria for factor analyses. Moreover, it was re-assuring that the same set of factors were found whether we used just males, just females or the whole sample. The same 10 factors also emerged if we restricted the sample to either 1997 or 2001 only.[10] A brief description of these types is as follows:

Literacy Skills: both reading and writing forms, notices, memos, signs, letters, short and long documents etc..

Physical Skills: the use of physical strength and/or stamina.

Number Skills: adding, subtracting, divisions, decimal point or fraction calculations etc., and/or more advanced maths or statistical procedures.

Technical 'Know-How': knowing how to use tools or equipment or machinery, knowing about products and services, specialist knowledge and/or skill in using one's hands.

High-level Communication: top-down communication skills, including persuading or influencing others, instructing, training or teaching people, making speeches or presentations and writing long reports. This skill is also linked to the importance of analysing complex problems in depth.

Planning: planning activities, organising one's own time and thinking ahead.

Client Communication: selling a product or service, counselling or caring for customers or clients.

Horizontal Communication: working with a team of people, listening carefully to colleagues.

Problem-Solving: detecting, diagnosing, analysing and resolving problems.

Checking Skills: noticing and checking for errors.

These ten generic skill measures, emerging from this analysis, are defined to

[10] In Ashton *et al*. (1999), only eight factors were shown. Here, a small variation on the method of factor analysis was deployed, but the main reason for the difference is that two of the factors have here been divided into two, while the remaining factors have the same interpretation here as before.

have an average of zero across all the data. Thus, any negative score indicates that the skill is being used less than average, and vice versa. In each case the score is based on all the variables in the analysis, but the description above indicates those activities that are the most heavily weighted in the determination of each factor.

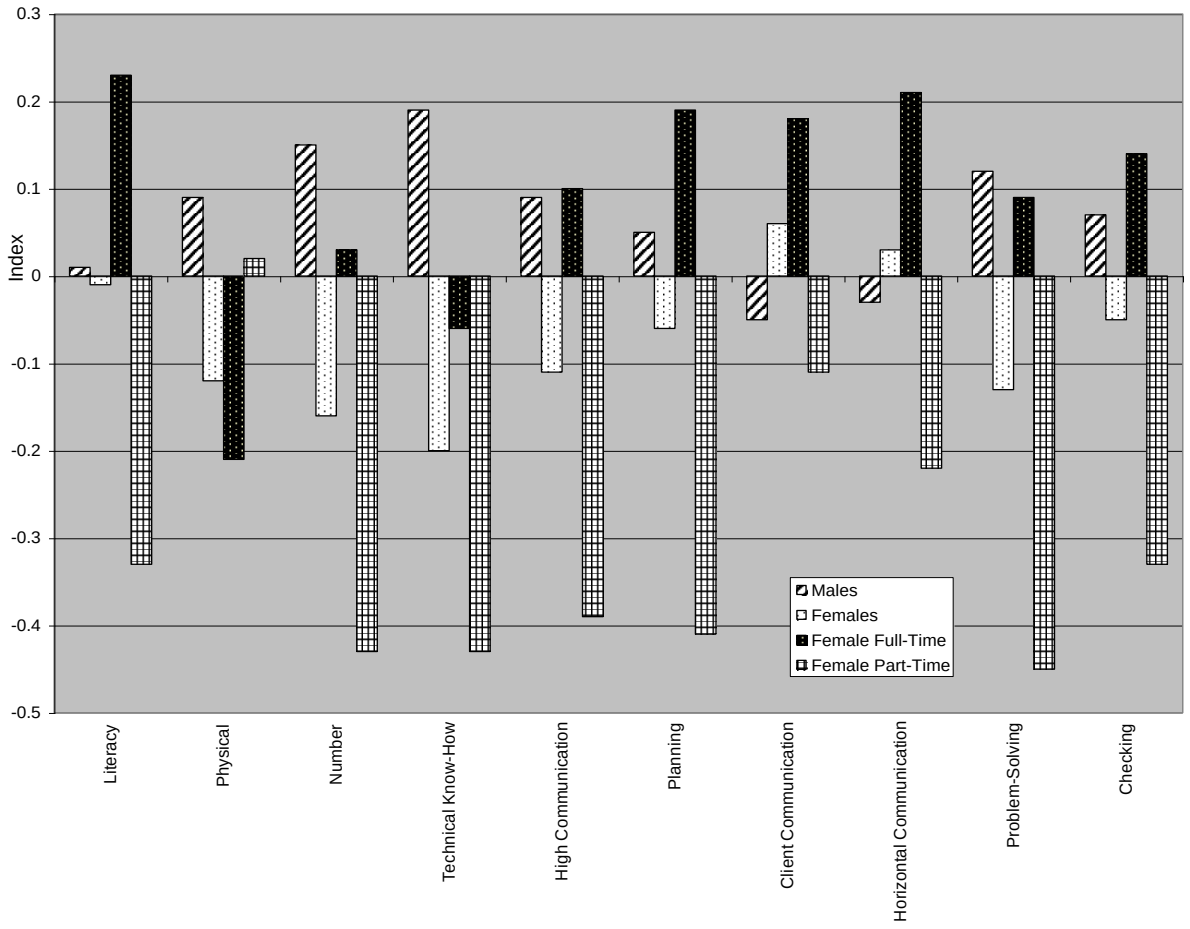
Together with computing skills, these ten generic skill types cover a wide range of the skills that may be used to varying degrees in all sectors of the economy. However, such a list is unlikely to be exhaustive. One of the government's official key skills, namely 'improving one's own learning and performance', is not included. It is not possible to derive such a measure that would be similar to the other skill types so far discussed. Nevertheless, respondents were asked to describe aspects of their job which affected their obligation or their opportunity to learn and make improvements. Thus, respondents were asked: 'Does your employer expect you to find better ways of doing your job?' They were also asked whether they agreed with the statement: 'My job requires that I keep learning new things'. The responses to these two questions provide estimates of the extent to which jobs require and utilise this key skill. Assuming that the requirements are approximately met, this in turn gives a picture of the prevalence (though not the depth) of learning and improvement skills.

3.3.2 Findings on the Distribution of Generic Skills

Table 3.7 and Figure 3.3 show the distribution of each generic skill according to the gender and job status of the job-holder. As revealed by the first two rows of the table, there are a number of significant differences between the skills utilised in jobs held by men and those held by women. With the exception of client communication skills and horizontal communication skills, all other skills are higher in men's than in women's jobs. Although the differences in averages for men and women are not large, they are nevertheless statistically significant.

However, the skills in men's jobs do not differ systematically from those in the full-time jobs for women. Rather, full-time women's job skills exceed those in men's jobs in 5 out of 10 categories (including all types of communication skills), while men's job skills are significantly larger in just 3 skill types (physical, number and technical know-how). Part-time jobs for women, by contrast, require lower skills than both full-time women's jobs and men's jobs for all skill types except physical skills. This pattern of average generic skills by gender and job status is similar to that for broad skills, where again it is the part-time jobs for women that score lowest on all the measures.

Figure 3.3 The Distribution of Generic Skills by Gender and by Full-Time/Part-Time Status, 2001



Source: Table 3.7

Table 3.8 shows how generic skills are distributed across occupation groups. In general, generic skills are needed more in the higher-ranking occupational groups. This finding gives additional credence to the measures of generic skills that we use, since an important criterion for the ranking of occupational major groups is the putative general level of skill required to do the job. Some occupational groups are bipolar in their skill requirements: for example, 'Elementary Occupations' require high levels of physical skill, but especially low levels of all other skill types. Other occupational groups, such as 'Associate Professionals' show a broad spread of generic skills. Alternatively, examining the table vertically, one can see that all generic skills are required across a range of occupations, rather than in any one single occupation.

Table 3.9 presents the industrial distribution of generic skills. It shows that all generic skills are fairly well spread across industries. Nevertheless, there are some concentrations of particular skill types in particular industries. Thus, the 'Construction' industry utilises well above average levels of physical skills and of technical know-how (an unsurprising finding). The 'Hotels and Restaurants' industry also utilises high levels of physical skills, but in addition is unusual in utilising especially low levels of literacy skills – a finding confirmed by the low

broad skill demands of the sector (cf. Table 3.4). 'Manufacturing' industry utilises a mixed bag of skills, neither high nor low, except in the case of client communication skills which are especially rare in that sector. The 'Finance' industry utilises high levels of number and literacy skills, but especially low levels of physical skills. The 'Real Estate and Business Services' industry has similar but more modest requirements. 'Public Administration' utilises high levels of literacy skills, while 'Education', also needing literacy skills, utilises high levels of high-level communication skills. The 'Health and Social Work' industry utilises a mix of above average literacy and horizontal communication skills, but much lower number skills than average. Finally, the 'Personal Services' industry utilises relatively low literacy skills, but moderate or average levels of all other skill types.

Table 3.10 shows how generic skills are distributed across different regions of the economy. Most generic skills are widely used in all the regions, and indeed the differences between regions are mainly less than the differences between occupational groups or industries. This confirms a similar finding for the regional distribution of broad skills (cf. Table 3.5). Nevertheless there are some distinct patterns. Jobs in the London region especially require high-level communication skills and planning skills, and utilise few physical skills. By contrast, physical skills are especially prominent in jobs in the East Midlands, Yorkshire and Humberside, the North East and Wales. Jobs in the North East, in particular, require relatively few planning and high-level communication skills.

Table 3.11 presents estimates of the prevalence of the requirement to learn and improve job performance, as perceived by jobholder. Over three quarters (76 percent) of workers in 2001 felt an obligation to continually improve their job performance, indicating that the need for this key skill has diffused broadly across British workplaces. This conclusion is backed up by the second set of responses which reveal that most jobs require that the job-holder keeps learning new things. Over four fifths (81 percent) agreed or strongly agreed that this requirement applied to their job.

The data also show that there is a significant difference between the jobs held by men and women. While full-time jobs held by women are no different from the jobs held by men, the prevalence of the obligation for improvement is considerably lower among female part-timers jobs. Only three fifths (62 percent) of employers expect improvements in their jobs held by part-timers, and three part-timers' jobs in ten (30 percent) are perceived to require no learning.

Table 3.12 shows that these obligations, while found across all occupational groups, are much more important in the more skilled occupations. Thus, in 'Managerial' and 'Professional' occupations, more than nine out of ten jobs carry with them the perceived requirement to improve job performance and to learn new things. By contrast, at the other end of the scale, in 'Elementary' manual jobs, these obligations are relevant in not much more than half of jobs. This finding is consistent with the fact that the distribution of training opportunities tends to be skewed towards the already more skilled occupations. In the lesser skilled occupations, the fewer opportunities for improvement match the perceived lower requirements.

3.4 Generic Management Skills

There is considerable recent interest in the nature and extent of management skills used at work. It is often argued that management skills are not just something to be deployed only by those classed as managers or administrators in the Standard Occupational Classification. Rather, it is hypothesised that increasingly a wide range of employees are being expected to take on what would previously have been regarded as management functions. In addition to the traditionally low levels of average educational attainment levels of managers in Britain, concern is also expressed that there may be widespread deficiencies in management skills amongst this wider range of workers that are called upon to exhibit management functions. The past decade has seen, therefore, the development of the Management Standards framework of management competences, and other similar models (Johnson and Winterton, 1999), designed to aid and structure management development.

Yet, there is a dearth of quantitative information about the importance of different types of managerial skills. For the most part, commentators have been obliged to use the occupational classification of 'manager' as their basis for analysing changing management skills (Bosworth, 1999). That classification is quite heterogeneous, and neglects altogether the managerial skills exercised by those not classified as managers. Moreover, this method of measuring the importance of management skills in the economy does not allow an understanding of the changing importance of different managerial functions, either amongst those classed as managers or among the wider workforce.

Generic skills are, *ipse facto*, in principle usable to varying degrees in all jobs across the economy. For the most part, therefore, we have asked questions that might be applicable and understandable for all respondents to the survey. Some of the generic skills identified above might be classified as 'managerial'. Examples are planning and high-level communication, and even skills like problem-solving are sometimes seen as also part of the management portfolio (Johnson and Winterton, 1999).

In addition, we also directed a limited sequence of five questions only at those respondents who identified themselves as having either managerial or supervisory duties. There were 1,708 such cases in the sample, of whom 1,008 had managerial duties and 700 supervisory duties. Approximately 69 percent of those with managerial duties and 56 percent of those with supervisory duties are male.

This group of respondents was much wider than the occupational group classified as 'Managers'. Thus, only half (52 percent) of those claiming managerial duties were managers. Another third were classified instead as 'Professionals' or 'Associate Professionals', and those with supervisory duties were spread widely across the occupational groups. In focusing on this wider group of workers, the aim was to measure the prevalence of certain important management skills, while avoiding asking respondents with no managerial or

supervisory duties questions which were not appropriate to their jobs. It was not intended to capture a comprehensive range of management functions within this survey. Rather, the focus was on selected important functions, with an emphasis on functions associated with skill acquisition. Using the same scale of 'importance' as for the other generic skills, the questions concerned three activities thought to be central to the human resource function, namely coaching staff, developing their careers, and motivating staff. Another question addressed the importance of controlling resources, while the fifth question addressed the importance of strategic thinking.

The intention was to map out, for the first time, the quantitative distribution of these managerial job skills in British workplaces, and to provide a benchmark against which future changes in these functions can be assessed. The measures of the importance of these activities constitute a start in the measurement of management skills. They are subject to the caveat that the individual's management skills can differ from those required in the job, and that there may be reporting bias. Moreover, the measures do not cover the full range of managerial functions. Below, we analyse responses to these questions individually.

3.4.1 Findings on the Distribution of Generic Management Skills

Table 3.13 examines the distribution of various management skills amongst those employees that identified themselves as having managerial or supervisory functions, and amongst self-employed respondents who employ others. Each of the first four activities is 'very important' or 'essential' for the majority of respondents. Notably, motivating the staff whom they manage or supervise is a vital skill for the large majority (84 percent). Also remarkable is that as many as 72 percent of managers and supervisors see themselves as having a coaching role. This finding suggests that work-based skills development is an important function in British workplaces. By contrast, strategic thinking about the future is an activity largely confined to a minority of less than 1 in 4 supervisors, only one half of male managers and just 43 percent of female managers.

Not unsurprisingly, both staff development and staff motivation appear to be more widespread amongst employees with managerial or supervisor duties than among the self-employed, whereas strategic thinking is generally much more important for the latter than the former. Three quarters (77 percent) of self-employed managers said that strategic thinking was 'very important' or 'essential', compared with only one in three (34 percent) employees. There is also more importance attached to resource control amongst the self-employed than amongst employees (82 percent compared with 70 percent).

There is a systematic difference in the managerial job skills reported by males and females. Those functions associated with human resource management are more prominent among female managers. For example, 73 percent of female supervisors thought that coaching was a 'very important' or 'essential' activity, compared with 64 percent of male supervisors. The equivalent figures for motivating staff are 88 percent for females, 78 percent for males. The

gender differences as regards staff development were, however, small and statistically insignificant. By contrast, strategic thinking and resource control are more important for male managers than for female managers (though there are no significant gender differences amongst supervisors).

As we have found earlier, however, there are also important differences among females between full-time and part-time employees. In every case, full-time managers and supervisors deploy a greater level of managerial skill than part-time managers and supervisors. Taking just the females in full-time jobs, they are found to exercise higher levels than males for all the human resource management skills (coaching, staff development and motivation). Nevertheless, amongst managers, strategic thinking is more important for males than for females in full-time jobs.

3.5 Summary of Main Findings

This chapter has examined the distribution of skills being used in jobs in Britain. It has also examined the aggregate balance between the supply of qualifications at various levels in the workforce, and the requirements for those qualifications in jobs. The main findings are:

- In aggregate, there is an approximate balance between the supply of high level qualifications in the workforce and employers' utilisation of these high level qualifications across the economy. By contrast, at intermediate levels there are substantial aggregate imbalances between supply and demand. There are 6.4 million people qualified to the equivalent of NVQ level 3 in the workforce, but only 4 million jobs that demand this level of highest qualification. There are a further 5.3 million people qualified at level 2, but only 3.9 million jobs at this lower level. The other side of this same coin is that, whereas there are now only 2.9 million economically active people aged 20-60 who possess no qualifications, there remain 6.5 million jobs for which no qualification would be required to obtain them. This aggregate imbalance is consistent with the view that deficiencies in Britain in the use of intermediate-level qualifications may be deficiencies not only of supply but also, even more so, of demand.
- There are substantive differences between the skills being used in jobs held by men and those used in jobs held by women. Amongst the latter, an important distinction should be made between full-time and part-time workers' jobs. All the measures of broad skills, most of the generic skills measures, and the indicator of 'improving learning and performance' are at lower levels for female part-time workers than for either males or for female full-time workers.
- The jobs held by men and by women in full-time jobs utilise similar levels of broad skills. Some generic skills are more associated with women's jobs, especially communication skills, while other generic skills, such as physical and number skills and technical know-how, are more associated with men's jobs. Amongst managers, human resource management skills are more important for women's than for men's jobs, while strategic

thinking is more important for men's than for women's jobs These findings formally confirm something that is widely appreciated by labour analysts, namely that jobs are gendered.

- Amongst the major occupational groups, 'Professionals' tend to require the highest skill levels, according to most of our measures. 'Managers' also utilise high levels of skill, though a distinction should be made according to the type of manager. Owner-managers in small firms report relatively low measures of broad skills. Nevertheless, these findings are in line with expectations about the skill ranking of occupational groups.
- A narrower but still substantive range of skills is displayed across industries. 'Hotels and Restaurants' are an area of work demanding relatively low levels of skill, on average; the 'Public Administration' and 'Education' industries, by contrast, tend to require relatively high levels of broad skills, and utilise high-level communication and literacy skills.
- Our measures of broad skills utilisation differed less across regions than across industries or occupational groups. Nevertheless, the South West, the South East, and London, tend to utilise higher levels of skills than other regions of the country.

CHAPTER 4
SKILL TRENDS

4.1 Introduction

This chapter examines how skills have changed over time. To do this, we draw on data collected on broad skills in four nationally representative sample surveys: the 1986 Social Change and Economic Life Initiative survey (SCELI); the 1992 Employment in Britain survey (EIB); the 1997 Skills Survey; and the 2001 Skills Survey.[11] They surveyed 4047, 3855, 2467 and 4470 individuals in employment aged 20-60 years old respectively. Each survey asked some identical questions of its respondents. These included the qualifications respondents would require to get their current job and their importance in carrying out the work, the length of training time required, and the period of learning time needed to do the job well. These variables have been defined and discussed in Chapter 3. By comparing the responses given we are able to track trends in broad skills over the last fifteen years. These results are outlined in Section 4.2. Section 4.3 investigates further the issue of mismatch between the qualifications that workers hold and the qualifications actually required to get and do their jobs, and considers how the extent of this mismatch has changed over time.

The 1997 and 2001 Skills Surveys also both collected data on the detailed skills used by individuals at work. From this information, we are able to measure how job demands have changed over time, albeit over a shorter four-year period from 1997 to 2001. These results are presented in Sections 4.4 and 4.5. Sections 4.6 and 4.7 consider how the learning requirements and management skills of jobs have changed.

4.2 Broad Skills Trends, 1986-2001

Table 4.1 outlines the distribution of broad skills at each of the four data points. The overall trend is an increase in the levels of required skill over the last fifteen years. This is confirmed by a strong perception among respondents that the skills they use at work have increased – in all four surveys over half of the sample reported that their skills had increased over the previous five years. In 2001, the figure was 59 percent.

At the beginning of the period, one in five (20 percent) jobs required level 4 or above qualifications for entry, but by 2001 this had risen to three out of ten (29 percent). The most rapid increase was in the demand for degrees, up from 10 percent in 1986 to 17 percent in 2001. The same pattern is repeated at the other end of the scale, where there was around a twelve percentage point drop in the proportion of jobs requiring no qualifications for entry over the fifteen-year period. The Required Qualification Index also reflected these

[11] Whereas the 1992, 1997 and 2001 surveys were designed to be representative, the 1986 SCELI survey focussed on six areas of Britain with a range of social and economic characteristics. Nevertheless, analysis has shown that the SCELI sample was closely representative of Britain as a whole according to key socio-economic criteria (Green *et al*., 2000).

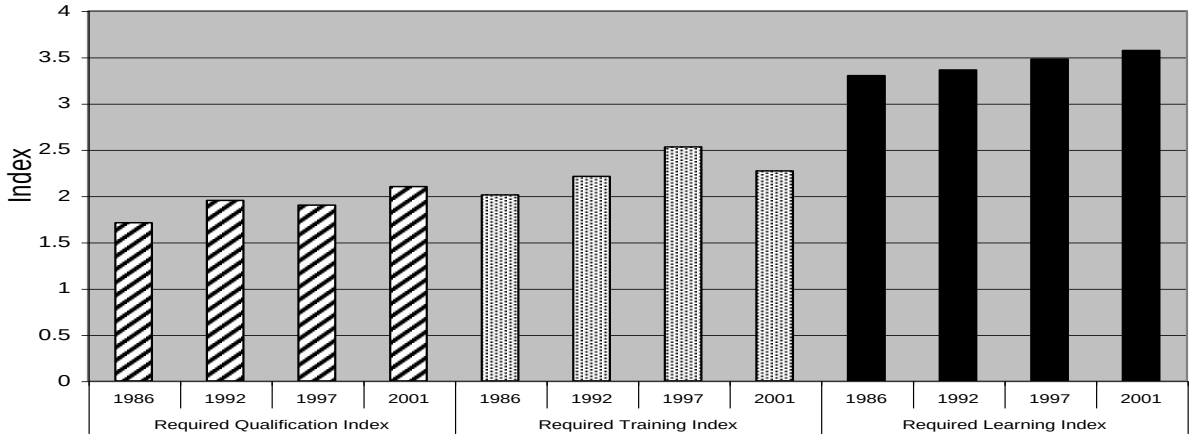
trends, rising from 1.71 in 1986 to 2.10 in 2001.

Trends in training time over the period also suggest that skills demand in Britain have increased. Comparing the results in 1986 with those in 2001 shows that training times have lengthened – greater proportions of the employed workforce reported that training periods for the type of work they were now doing lasted over 2 years, while smaller proportions reported that their training lasted less than 3 months. The Training Time Index rose from 2.01 in 1986 to 2.27 in 2001.

Similarly, the length of time needed to do jobs well rose considerably throughout the 1986-2001 period. Lengthy learning times accounted for more of the jobs in 2001 than in 1986 and shorter learning times for less. This was reflected in a consistent rise in the Learning Time Index over the period – rising from 3.30 in 1986 to 3.57 in 2001.

By examining the changes in broad skills in each of the sub-periods – 1986-1992, 1992-1997 and 1997-2001 – it is possible to investigate when significant skills changes took place, and whether upskilling continued strongly in recent years. The first row of Table 4.2 summarises the findings. None of the three measures has risen significantly within all of the sub-periods. The Required Qualifications Index rose significantly in 1986-1992 and 1997-2001 but changed little between 1992-1997. The Learning Time Index rose in all three sub-periods, but only rose significantly in the years 1992-1997. The pattern of change in the Training Time Index is different again, displaying significant increases in 1986-1992 and 1992-1997, but significantly falling back almost to 1992 levels by 2001 (see Figure 4.1).

Figure 4.1 Trends in Broad Skills, 1986-2001



Source: Table 4.1

Table 4.2 also shows how the distribution of broad skills has changed over time according to the gender and status of the jobholder. The skill level of women's jobs has risen faster than men's, thereby serving to narrow the gap between the skills of men's and women's jobs. This change applies on each measure and in every sub-period studied. An example underlying the change in the indices is the decline over 1986 to 2001 in the proportion of jobs requiring no qualifications: from 48 percent to 29 percent for women, and from 31 percent to 24 percent for men. Thus, the gender gap narrowed from 17 to just 5 percentage points.

Female part-timers have, on the whole, been the main beneficiaries of the narrowing of the gender gap. It is notable, for example, that while the Training Time Index and the Learning Time Index imply a fall in skills in recent years (1997-2001), female part-timers appear to have bucked the trend with a significant increase. While female full-timers had only a small, insignificant, increase in the Learning Time Index, for part-timers the increase was substantial and statistically significant.

A question of interest regarding the role of employment in ensuring social inclusion is whether overall skill change is spread throughout all occupation groups, or whether it is confined to some groups instead of others. Table 4.3 provides the answers. For many occupational groups, skill change in certain sub-periods is insignificant. A major reason is that the numbers in each cell are insufficient to capture significant changes. Where this applies the relevant cell in Table 4.3 is left empty; instead only significant ($p<0.10$) changes are recorded. The table shows that upskilling was relatively widely spread throughout the occupational hierarchy in both 1986-1992 and 1992-1997 with four and seven groups respectively experiencing significant increases in skills according to at least one of the three broad skills measures. In a similar fashion, the mixed picture of the four years since 1997 applies widely – seven out of nine occupational groups, for example, saw their Training Time Indices decline significantly, while four groups saw significant rises in their Learning Time Indices.

Similarly, the changes in broad skills recorded nationally have been felt fairly evenly across industrial groupings. Over the entire period eight out of eleven industrial groups have seen their skills rise significantly on two out of three measures. The exceptions are 'Transport and Storage', 'Financial' and 'Health and Social Work'. Table 4.4 presents results for individual sub-periods. Over half of the industrial groups experienced a significant increase in the skills of their jobs according to at least one measure in 1986-1992 and 1992-1997, while a similar proportion reported a significant fall in skills in 1997-2001 according to the Training Time Index. However, in the latter period two industries stand out. 'Wholesale and Retail' and 'Health and Social Work' both recorded a significant increase in the skills they demand according to the Required Qualification Index and Learning Time Index.

4.3 Trends in Qualifications Held and Required, 1986-2001

In the previous chapter, it was shown that in 2001 there were greater numbers of economically active people who held intermediate level qualifications than there were jobs where these qualifications were required. In this section, we extend the analysis. We investigate ways in which the match between qualifications required and qualifications held has changed over time. We examine the match between qualifications held and required at the level of the individual. We also examine perceptions about the necessity of the required qualifications for actually doing the jobs and, if these perceptions are changing, whether that undermines our prior conclusion that job skills have been increasing.

4.3.1 Qualifications Required and Supplied: Aggregate Imbalances

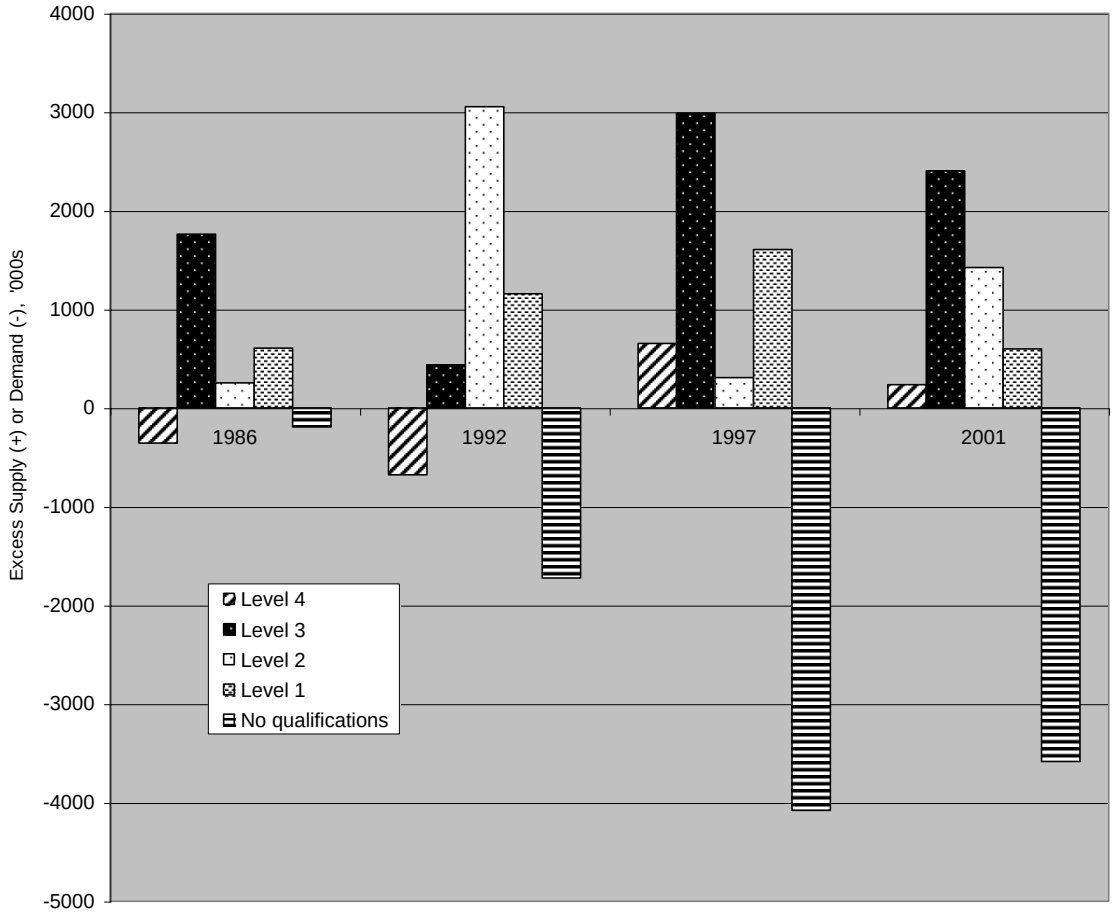
First, we examine the aggregate supplies and demands for qualifications at the various levels over time. We repeat the analysis for 2001 in the previous chapter (shown in Figure 3.2 and Table 3.6) for the earlier years. The estimates, given in Table 4.5, are illustrated in Figure 4.2.

The phenomenon of large excess numbers of jobs for people with no qualifications requirements emerged in the 1990s. This excess arose, not because the numbers of jobs that do not require any qualifications rose, but because the number of people holding no qualifications fell substantially. At the end of the decade, there is an indication of a small fall in the total of the excess, largely resulting from the fact that the 1997-2001 period saw a fall of over one million in jobs needing no qualifications.

The balance of supply and demand for level 3 qualifications has fluctuated considerably. In 1986, the supply of level 3 qualifications appears to have been substantially greater than the number of jobs requiring them. By 1992, this excess had largely disappeared, following a rise in demand at this level, and a fall in supply as more people moved up the qualification ladder and less qualified older workers retired. However, the 1990s re-opened up an excess supply at level 3, as more people moved up to this level from below.

At level 4 or above, there has been an approximate balance of supply and demand for most of the period. The exception is 1997, which saw a small excess supply emerging but this was diminished by 2001. This stable balance over time has arisen from supply and demand at this level growing together at broadly similar rates from a similar starting point.

Figure 4.2 Trends in the Balance of Supply and Demand for Qualifications



Source: Table 4.5. The excess supply (+) or demand (-) at each level is the difference between the number of people holding highest qualifications at that level and the number of jobs with highest qualifications requirements at that level.

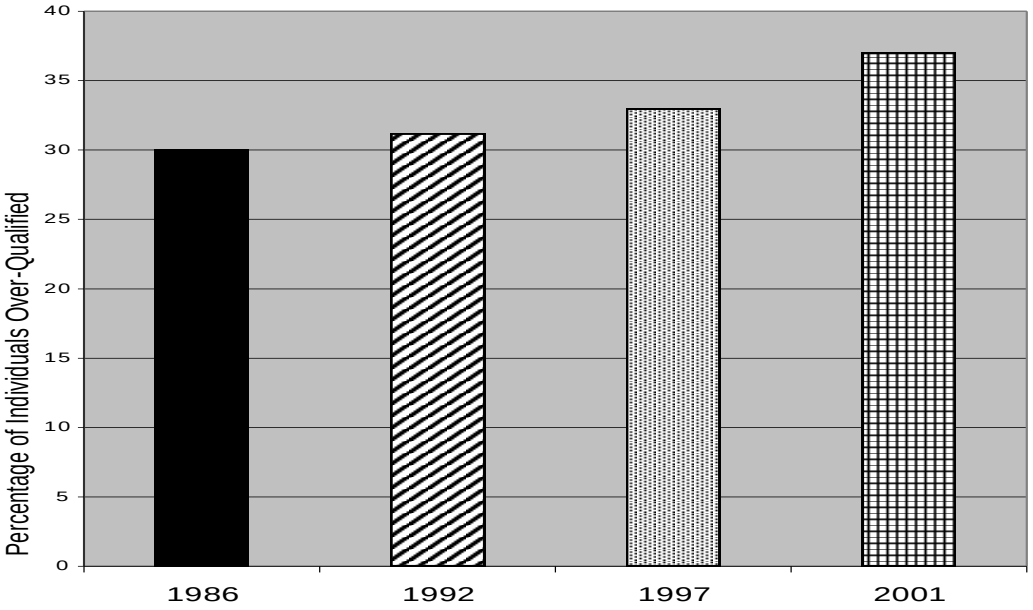
4.3.2 Workers Who Are 'Over-Qualified' Or 'Under-Qualified' For Their Job

Imbalances in the aggregate supplies of workers and numbers of jobs at each qualification level are an important factor underlying mismatches at the individual level, in which workers may have too high or too low qualification levels for their jobs. To obtain, therefore, a fuller picture of the utilisation of qualifications in the economy, we investigate the match between each individuals' qualifications and

their job's requirements, and how this match has changed over time. For each respondent to the surveys, we compare their own qualification levels with the qualification levels someone would need to get the job they are doing. From this we can calculate whether the respondent is 'over-qualified' in relation to their current job – they have a higher level of qualification than is required – or whether they are 'under-qualified' – their qualifications fall short of those now required.

It should be noted that the term 'over-qualified' does not mean that a person has received too much education. First, the qualifications may yet be necessary for a job that the person will do in the future. Some 'over-qualified' people may be currently constrained by their domestic circumstances from taking a job that would better use their qualifications, but would still hope to use the qualification in the future. Second, there are in any case many wider benefits of education, that are not just to do with their jobs. The cultural and social benefits of education, both to the person being educated and to others in society, are hard or impossible to quantify, but should not be ignored. Third, qualifications can vary substantially in the skills that they stand for, even within the same level and type of qualification. Indeed, as we have noted in Section 3.2.1, employers are frequently concerned with other attributes besides qualifications when assessing whether job applicants have the right skills for jobs. Equally, if people are 'under-qualified', this does not imply that they are under-skilled for the job. Rather, it is likely that they have increased their skills in other ways as job demands have changed. Any new person undertaking the job might require now to have a qualification. Moreover, some older workers may have professional or vocational qualifications that have since been formalised as higher academic qualifications. Nevertheless, the changing prevalence in the workforce of people who are 'over-qualified' or 'under-qualified' for their jobs can be regarded as a useful indicator of how well the job system is being matched with the qualifications system.

Figure 4.3 Workers 'Over-Qualified' for their Job, 1986-2001



Source: Table 4.6

In previous analyses it was observed that the prevalence of 'over-qualified' workers in Britain, while increasing in the 1970s and early 1980s, had remained fairly stable in the ensuing period until 1997 (Green *et al*., 2002). Table 4.6 brings the analysis up to date and also looks at the recent trend in the prevalence of 'under-qualified' workers.

As can be seen from the table, during the 1986 to 2001 period, between 1 in 6 and 1 in 5 workers were 'under-qualified' in the sense we have just described. There was no substantial trend over this period. As expected, the prevalence of 'under-qualified' workers is greater amongst older workers. In analyses not shown in the table, it was found that only about 10 percent of 2001 workers in their 20s were 'under-qualified', compared with 23 percent for those in their 50s.

In contrast, the prevalence of 'over-qualified' workers has been increasing since 1986. The increase up to 1997 was only small, and was not statistically significant. But the change was more rapid over the 1997-2001 period. In these last four years the proportion rose from 33 percent to 37 percent. It is also notable that in 2001 around half of those qualified to levels 2 and 3 are in jobs that do not require these qualifications for entry compared to around a quarter (28 percent) with level 4 or above qualifications and 34 percent of graduates. Being over-qualified, therefore, appears to be concentrated among those holding levels 2 and 3 qualifications. This finding is consistent with the aggregate imbalances reported above.

Taking the proportions of 'over-qualified' and 'under-qualified' workers together, and subtracting from 100 percent, it may also be noted that the proportion of workers whose qualification level exactly matches the

requirements of the job they do was only one in two in 1986, and has since fallen somewhat to 45 percent. This loose qualifications match is consistent with the evidence given in Section 3.2.1, which showed that qualifications are often not the most important factor in recruitment to jobs, especially among jobs requiring lower level credentials.

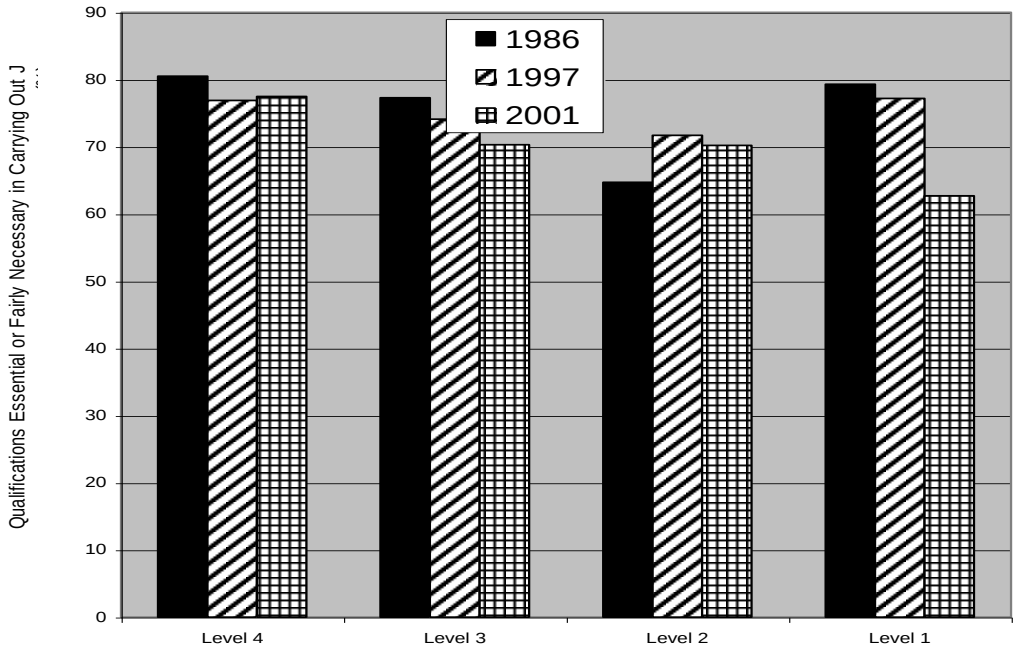
4.3.3 Credentialism

The usefulness of required qualifications for job performance, as opposed to recruitment, can be examined by analysing the highest qualification required data alongside the responses to the question 'How necessary do you think it is to possess *those* qualifications to *do* your job competently?' The changing responses over time can also be used to assess the extent to which rising qualification requirements – as indicated in Table 4.1 – are associated with credentialism on the part of employers. By 'credentialism' is meant employers' raising their qualification requirements for jobs even though the nature of the jobs remains unchanged. If fewer respondents over time say that the qualifications requirements are necessary, we take this as an indicator of credentialism taking place.

Overall, the results outlined in Table 4.7 provide reassurance that the qualifications that jobs require are useful in carrying out the work. In general, around three-quarters of respondents say that their qualifications are 'essential' or 'fairly necessary' to do the job. Relatively few say that they are 'totally unnecessary'.

Nevertheless, the extent to which level 3 and level 1 qualifications are regarded as necessary fell significantly, especially over the last four years. The proportions who reported that level 3 qualifications were 'essential' or 'fairly necessary' to do the job fell from 77 percent in 1986 to 70 percent in 2001 (see Figure 4.4) and the proportions who regarded them as 'unnecessary' rose from 4 percent to 10 percent. At level 1 the proportions who reported their qualifications were important in carrying out their work fell by 15 percentage points over the last four years, while the proportions who regarded them as irrelevant rose by 9 percentage points. The implication of Table 4.7, therefore, is that job demands were not rising quite as fast as the required qualifications data shown in Table 4.5 seem to suggest, especially at levels 3 and 1. By contrast, there is no evidence of credentialism for qualifications at level 2. For higher level qualifications – levels 4 or above – together there is also no significant evidence of credentialism. Non-degree level qualifications at level 4, taken on their own, do however exhibit a significant amount of credentialism over the 1986 to 2001 period.

Figure 4.4 Credentialism, 1986-2001



Source: Table 4.7

4.3.4 Qualifications 'Used'

To what extent does this evidence of credentialism at levels 1 and 3 undermine our earlier findings about skill rises? To investigate this question we examine the percentage of each sample that 'used' qualifications at the various levels. We define the qualification level that a job 'uses' as follows. If the required qualifications are reported as 'fairly necessary ' or 'essential' then that is the level of qualification that is 'used'. But if the respondent indicates that a qualification is unnecessary for doing the job, we take the next highest qualification level to be the one used in the job. In this way, we can make an approximate estimate of the effect that changes in required qualifications and credentialism have overall.

The results of this analysis are presented in Table 4.8. This shows a gradual increase in the 'use' at work of level 3 and 4 qualifications. Thus, the proportion of jobs where a high level qualification (level 4 or above) is both required to get the job and deemed to be 'fairly necessary ' or 'essential' to do the job competently, rose from 16 percent in 1986 to 23 percent in 2001. The proportion of jobs 'using' level 3 qualifications rose from 16 percent to 18 percent over the same period, a small but statistically significant change. The proportion of jobs which did not 'use' any qualifications fell from 40 percent to 31 percent. These findings imply that even though credentialism has occurred to some extent over the fifteen year period, this has been more than compensated for by the increased qualifications requirements of jobs. Thus, the evidence of credentialism does not nullify our earlier conclusion that, in

line with our other findings, the skills demanded at work have increased markedly in Britain over the last fifteen years.

4.4 Changes in Generic Skills, 1997-2001

Table 4.9 shows how generic skills have changed over the recent 4-year period. For every skill type except physical skills, there has been a small but significant rise in the level of skill being used at work. This remarkable finding provides formal confirmation of the continuing rise in the skills levels used in British workplaces, although broad skill trends suggest that the increase has slowed down over the last four years (cf. Table 4.2). A similar finding was obtained with the 1997 survey alone, but there the source of information was ultimately the respondents' recall of the jobs that they had done five years earlier. Here, the finding is on even firmer footing, in that it derives from comparing two high quality, randomly drawn, representative surveys conducted with very similar methodologies by the same team. The exception, physical skills, shows a fall for jobs held by males. By contrast, in females' jobs the point estimate of the level of physical skills rose, but the change was not statistically significant. This left no significant change in the overall level of physical skills.

Generic skills other than physical skills were increasing both for males and for females, whether in part-time or full-time jobs, with the result that there was no systematic significant tendency for the gap between the generic skills of jobs held by males and those held by females to narrow. Only in the case of physical skills did the gap narrow significantly.

While the generic skills gap between men and women appears to have remained stable, further interest lies in the question as to whether the increase in skills has been spread throughout all occupations, or whether it has been confined to certain groups. Have there been any occupations that have suffered any substantive deskilling in recent years?

The pattern of change in different occupational groups is presented in Table 4.10. For many occupations, most of the skill changes are statistically insignificant, and hence the relevant cell is left blank. This result derives largely from the fact that the numbers of observations in each cell can be quite small; hence small changes in skills cannot be measured precisely enough to be sure that any change has occurred at all. Despite the relatively small numbers, the table shows nevertheless that the jobs classified as 'Elementary Occupations', traditionally requiring the least levels of skill, have experienced significant rises in the utilisation of 7 skill types. Similarly, 'Sales' jobs, also a fairly low skilled group as witnessed by Table 3.7, have experienced increases in the use of four skill types. By contrast, 'Professional Occupations' record small but significant falls in number and client communications skills.

The pattern of skills change across industries is presented in Table 4.11. As with the pattern of change by occupational class, many cells are blank because the small numbers lead to insignificant changes. Nevertheless, three industries stand out as having experienced significant upskilling in recent

years. First, the 'Wholesale and Retail' industry's utilisation of generic skills increased along six dimensions. The Health industry has also shown signs of raising its skill levels, with eight skill types increasing in that sector. These trends are consistent with our findings above in respect of broad skills measures. The 'Wholesale and Retail' industry had for some time been relatively stable in its demand for skills: in 1997 it had not shown an increased demand for qualified workers, or for workers with substantive training. Nor had it generated many complex jobs that took a long time to learn. However, between 1997 and 2001, two out of three of the broad skills measures rose significantly in both the Wholesale industry and the 'Health and Social Work' industry (cf. Table 4.4). The 'Transport and Storage' industry also shows signs of raising its skill requirements, particularly for planning, problem-solving and checking skills and technical know-how. For other industries, there were relatively few significant changes, or none at all, in the generic skills requirements between 1997 and 2001.

4.5 Changes in Particular Skills, 1997-2001

While the previous analysis has shown the patterns of change in generic skill indices, it is also informative to look in more detail at changes in the activities which are used to derive the skill indices. To summarise the change in each particular skill, we first calculate the average index value across the sample for each skill in each year, ranging from 5 ('essential') to 1 'not at all important/does not apply'. We then subtract the 1997 skill average from the 2001 average. Table 4.12 below gives the results of this calculation in column (2), while column (3) indicates whether the change between 1997 and 2001 is statistically significant. To gain an idea of how substantial the implied changes are, note that changes of around 0.1 on an index which ranges from 1 to 5 are relatively modest. To give an example, as a proportion of the average skill level, the 0.1 rise in the average index for 'reading long documents …' is approximately 4 percent of the 1997 level. A change in any index of 0.1 is roughly equivalent to, for example, a 3 percentage point rise in the proportion saying that this skill is 'very important' in their jobs, matched by a 3 percentage point fall in the proportion for whom the skill is 'not very important'.

The evidence of Table 4.12 expands the picture that was obtained previously of rising generic skills, as demonstrated in Table 4.9. For 26 out of the 35 skills underlying the earlier analysis, there is a significant rise in skill. Furthermore, there are no activities which show a statistically significant fall in skill level. Notably, the uses of physical strength and stamina exhibit no change.

By some way the largest change is in the index for the importance of using computers at work. There is a rapid ongoing increase in computer usage, which we examine in more detail in the next chapter. Somewhat smaller rises are recorded for 'listening carefully to colleagues', 'counselling, advising or caring for customers or clients', 'skill or accuracy in using hands or fingers', 'specialist knowledge or understanding', 'knowledge of how your organisation works', 'thinking of solutions of problems or faults', 'writing short and writing

long documents', and medium or advanced number skills. Other skill rises are yet more moderate, showing a high degree of stability in the nature of British jobs. It is not surprising to find relatively small changes when looking at a period of just four years. Nevertheless, the consistency of the direction of change is suggestive of a steady ongoing transformation of jobs. Only regular monitoring will enable us to be confident that the changes are sustainable and not a product of swings in the economic cycle.

4.6 Changes in Improving Learning and Performance, 1992-2001

In the previous chapter, we approximated the key skill of 'improving own learning and performance' by the responses to two relevant questions. To fully gauge the change over time in the utilisation of this key skill, it would have been helpful to have both questions in earlier surveys. Nevertheless, our question concerning the job's requirement to 'keep learning new things' was asked in identical ways in 1992 and 2001. The responses are compared in Table 4.13.

The table shows that there has been a modest but significant increase in this requirement over the decade. The proportions agreeing or strongly agreeing with the statement that 'My job requires that I keep learning new things' rose from 76 percent to 81 percent. Since, as we have seen, this requirement is associated with higher skills, this picture of change over 1992 to 2001 is consistent with the trend increase in job skills reported above.

4.7 Changes in Management Skills

Since the questions addressed to those with managerial responsibilities in the 2001 Skills Survey were not asked in the previous surveys, it is not possible to compare responses given to each survey. Nevertheless, there are some indications that management skills are gaining in importance in the British workplace. First, planning skills, which are important for those with managerial and supervisory duties, have been increasing, alongside the other generic skills reported above (Table 4.9). Second, we examined respondents' personal experience of change in the importance of coaching skills. The level of coaching skills is found, if anything, to be negatively related to age. Hence, a reasonable inference is that if individuals perceive an increase over five years in the importance of coaching skills, this reflects a trend in the workplace rather than a natural evolution over the life-cycle.

Respondents were asked 'would you say that there has been a significant *increase* between [their job five years previously], a significant *decrease* or little or no change in the importance of coaching the staff whom you manage'. Of 1444 responses from those who had been in employment either five, or if not four or three, years previously, 53 percent reported an increase in the importance of coaching skills, and only 7 percent reported a decrease. Although this method of questioning does not indicate the extent of change for each individual, the finding suggests that there is an increasingly widespread

obligation being placed on those with managerial or supervisory duties to coach their staff. Future surveys may be able to confirm this trend.

4.8 Summary of Main Findings

- No one indicator, on its own, can provide a satisfactory measure of the changing skills required in British workplaces. Taken together, however, the measures described in this chapter show a consistent pattern of generally increasing skills, with some exceptions.
- The broad measures of skills required by jobs paint a picture of upward change over fifteen years. There has been a significant rise in employers' requirements for qualifications. Notably, the proportion of degree-level jobs rose from 10 percent in 1986 to 17 percent in 2001. Fewer jobs have required a cumulative training time of under 3 months: 66 percent in 1986 falling to 61 percent in 2001. And, also indicating a rise in the complexity of jobs, fewer jobs require under one month 'to learn to do well': 27 percent in 1986 compared with 20 percent in 2001.
- Over the last four years, several measures show rising generic skill requirements of jobs. Nine out of ten of the measures of generic skills show a rise, the exception between the use of physical skills which has not changed. The importance of computer skills rose more rapidly in the last four years than any other job skill (see next chapter). Amongst managers, more than half (53 percent) reported a recent increase in the importance of coaching skills, compared with just 7 percent recording a decrease. The last four years has also seen a substantial rise in the average qualification level required for jobs. However, the required training time has decreased over this period.
- Between 1992 and 2001, there was a modest but significant extension in the perceived requirement to learn new things on the job: this requirement applied to 76 percent of jobs in 1992 and 81 percent in 2001.
- The aggregate supplies of workers with high level qualifications (level 4 or above) have kept pace with the numbers of jobs requiring high level qualifications, maintaing a broad aggregate balance. But imbalances have emerged at lower qualification levels. The current 3.6 million excess of jobs with no qualification requirements over numbers of people with no qualifications arose during the 1990s. This followed rapid growth in the supply of workers holding qualifications, and insufficient growth in the numbers of jobs requiring a qualification.
- Despite generally rising skill requirements, the proportion of people who hold qualifications at a higher level than would be required for getting their own jobs has risen in the last four years. The proportions 'over-qualifed' rose from 33 percent to 37 percent. There is also evidence of some 'credentialism' at qualification levels 1 and 3, whereby more employers are requiring qualifications for job-entrants even though those qualifications are not necessary for doing the jobs.

- The gender gap between the skills used in men's and women's jobs has been narrowing between 1986 and 2001. For example, the proportions of jobs held by men requiring no qualifications fell from 31 percent to 24 percent over 1986-2001, while the equivalent for women's jobs was from 48 percent to 29 percent.

CHAPTER 5
COMPUTING SKILLS

5.1 Introduction

This chapter focuses on what is widely considered to be the most far-reaching generic skill of the modern era – computing. Over the past three decades, the advent of computers in the workplace has accompanied a fundamental re-alignment of the mix of skilled and unskilled workers (Bresnahan, 1999). In particular, the upskilling reported in British jobs between 1986 and 1997 has been shown to be associated strongly with the expansion of computer usage (Green *et al*., 2001).[12] Rather than being confined to a relatively small sector of highly skilled information technology experts, the direct impact of computers has spread through a very diverse range of jobs. Policy in recent years has been developed to ensure that school and college students can all acquire sufficient computer skills, and there is also concern that adults also have sufficient access to the new technology. However, there is a scarcity of information about just how widespread computer usage is in Britain, how fast this is changing, how workers are coping with the changes and whether they are doing so adequately. There is, therefore, a strong need for accurate, representative, data about the expansion of computer usage at work.

We present estimates of the spread of computing skills in recent decades and of their current distribution. We then examine how workers in Britain have been acquiring computing skills, look at the relationship between home computer ownership and the usage of computers at work. We also report indicators of the extent to which their computing skills are either insufficient for maximum job performance or, conversely, being underutilised.

5.2 The Growth of Use of Advanced Technology

A number of different measures point to a striking increase in the importance of computing skills in work over the last decade. Our broadest and longest trend indicator on the use of advanced technology in jobs is a question that asks employees : 'Does your own job involve use of computerised or automated equipment?'. This was asked in the Social Change and Economic Life survey of 1986, the Employment in Britain Survey of 1992 and the Skills Survey of 2001.

As can be seen in Table 5.1 and Figure 5.1, there has been a rapid and continuing expansion of the use of computers and automated equipment in work. Taking employees there was a 16 percentage point increase between 1986 and 1992 and a similar increase (18 percentage points) between 1992

[12] At the same time, some studies have also attributed to computers a substantive role in the changing distribution of wages, though this claim is contested and the evidence is mixed. We report some relevant findings in Chapter 7.

and 2001. The proportion has risen from just over half of all employees in 1992 to just under three quarters in 2001.

The increase in the second period has been even more notable among the self-employed : 25 percentage points. However, the self-employed are still substantially less likely than employees to be using such equipment (54 percent compared with 74 percent).

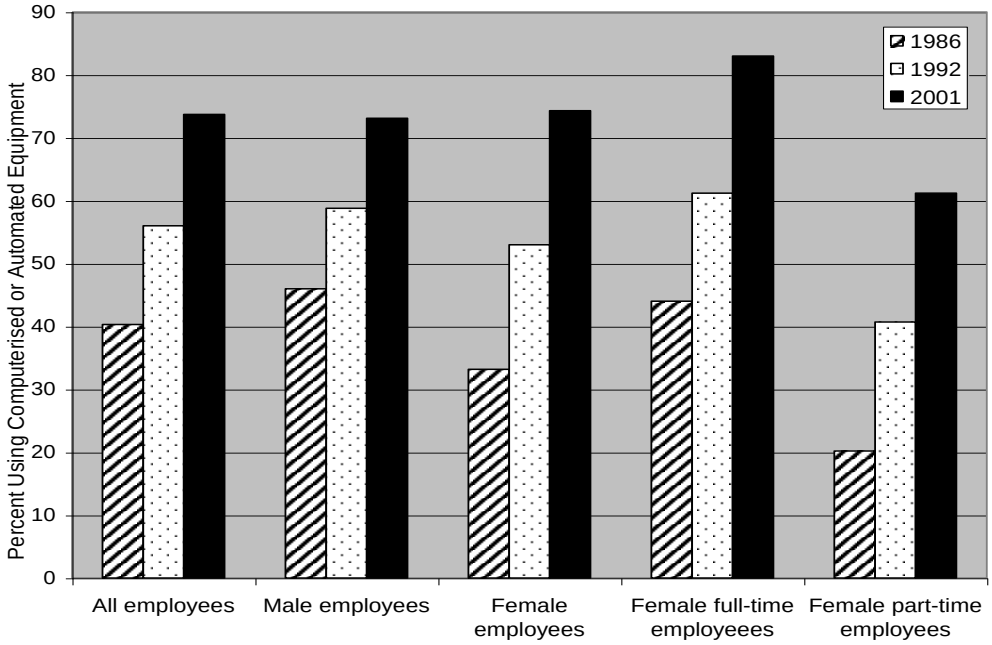
There has been a marked convergence between men and women in the use of advanced equipment. In 1986 there was a gender gap of 13 percentage points. This fell to 5 points in 1992. By 2001 the gap had disappeared, with women now at least as likely to be using such equipment as men (74 percent compared with 73 percent). It is notable however that there is a very substantial difference between women in full-time and women in part-time jobs (22 percentage points). Women in full-time jobs are substantially more likely than men to be using computerised or automated equipment, whereas the reverse is the case for women in part-time jobs. While both female full-timers and part-timers substantially increased their use of advanced technology, there has been little change in the 'contract' differential between 1986 and 2001.

The increased use of advanced technology is evident in all age groups. As in earlier periods older workers are less likely to be using advanced equipment. However, the age threshold at which such use declines has changed over time. Whereas the decline was very notable in both the 45-54 and 55 + age categories in 1986 and 1992, it is now only the oldest workers (55+) that stand out from the predominant pattern.

As can be seen in Table 5.2, the use of advanced technologies has varied substantially depending on a person's occupational group from the mid-1980s to the present. It was most common among 'Administrative and Secretarial' employees and among 'Professionals', followed by 'Managers' and 'Associate Professionals'. In contrast, even in 2001, only half of 'Plant and Machine Operators' used such equipment and less than half of those in 'Skilled Trades', 'Personal Service' and 'Elementary' occupations. The *growth* in use over these years affected all occupational groups. However, it was generally stronger among those in higher skilled than among those in lower skilled occupational positions. The major exception was the very sharp rise among those in 'Sales' occupations.

By 2001 it is clear that computerised equipment had come to have a major impact on the great majority of industrial sectors (Table 5.3). In 'Finance', 'Public Administration' and 'Real Estate and Business Services' it was relevant to the jobs of more than 85 percent of employees. It was only in 'Construction' and 'Hotels and Restaurants' that it affected the work of less than half of employees, and even in these industries the growth of computer usage was substantial after 1992. Over the whole period between 1986 and 2001 there were substantial variations between industries in the extent of growth. The increase in 'Finance', for instance, was relatively small, possibly reflecting its early lead in adopting computer technologies in the 1980s. In contrast, there were particularly marked increases in the 'Real Estate and Business Services', 'Public Administration', 'Education', 'Transport and Storage', and 'Wholesale and Retail'.

Figure 5.1 The Use of Advanced Equipment in Jobs



Source: Table 5.1.

5.3 The Increasing Centrality of Computing to Job Tasks

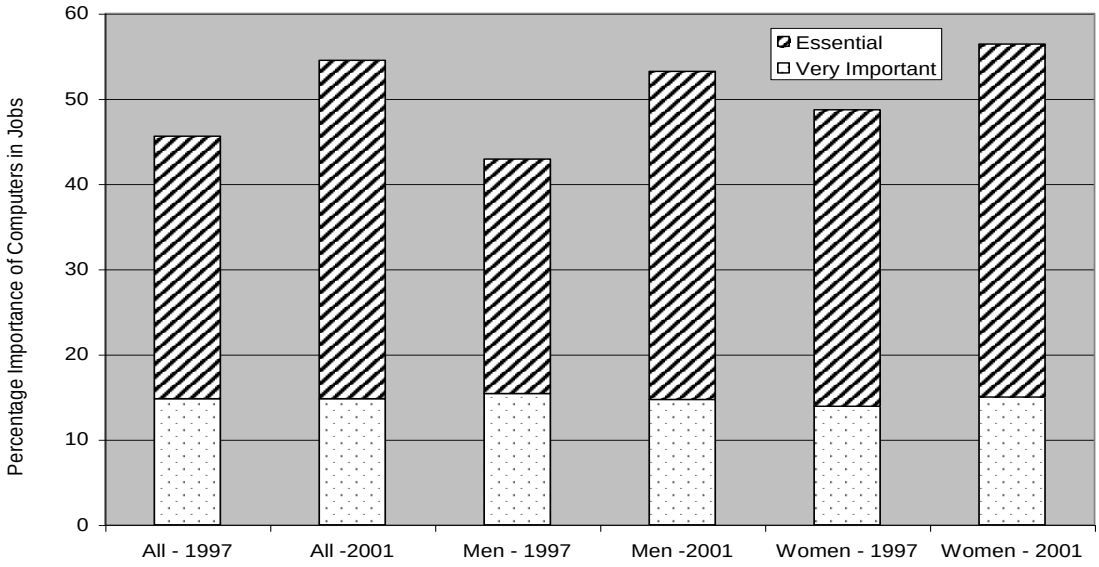
The measure discussed above covers jobs that vary substantially in terms of the centrality of computing work to task activities. A further question helps to explore whether computing has not only come to affect a wider range of jobs, but also has become more important to the nature of tasks. In both 1997 and 2001, a question was included asking people how important 'Using a computer, PC or other types of computerised equipment' was to their job (Table 5.4). This comparison also provides a close focus on recent changes over the last four years.

The overall use of computers can be measured as the sum of the responses ranging from 'essential' to 'fairly important'. This gives a very similar estimate to the previous question, with 69 percent saying it was of importance in 2001, a rise of approximately ten percentage points from 1997. If the estimate of some type of use is taken to include the response 'not very important', the increase remains very similar, but the proportions rose from 70 percent in 1997 to 79 percent in 2001. Thus the extent of computer use had by no means reached saturation point in the late 1990s.

Taking those who said that the use of such equipment was either 'essential' or 'very important' as an indicator of the centrality of computer skills to the work task, as Figure 5.2 shows, there was also a marked growth (9 percentage points) in work where computing activities constituted a central component of the job. In 2001 approximately 40 percent of all people in employment reported that the use of computing equipment was 'essential' and a further 15 percent that it was 'very important'. Women were a little more likely than men

to consider it essential (41 percent compared with 39 percent), but again the much sharper divide is between women in full-time employment and women in part-time work. Among the former, 50 percent reported that the use of such equipment was essential to their job, whereas among the latter the proportion was only 29 percent.

Figure 5.2 The Centrality of Computers in Jobs



Source: Table 5.4

The relative importance of computerised equipment to the job was strongly affected by the type of work as reflected by occupational group. For instance, by 2001, three-quarters of 'Administrative and Secretarial' workers regarded it as essential and this was also the case for approximately half of 'Managerial', 'Professional' and 'Associate Professional' workers (Table 5.5). In contrast, only 40 percent of 'Sales' workers and less than 20 percent of those in 'Skilled Trades', 'Plant and Machine Operative' and 'Elementary' occupations thought it essential. Similarly, while the proportions making some use of such equipment rose in all occupational groups, it is notable that it was only among 'Managers', 'Professionals', and 'Clerical and Secretarial' workers that there were substantial rises (by 15, 14 and 18 percentage points respectively) in the proportions for whom it was an essential component of work.

This variability in the increased centrality of computerised technology to jobs is also evident from industry comparisons (Table 5.6). There was almost no change between 1997 and 2001 in the proportions regarding the use of computerised equipment as essential to the job in 'Manufacturing', 'Wholesale and Retail' and 'Hotels and Restaurants'. In contrast, the proportions rose substantially in 'Transport and Storage' (19 points), 'Real Estate and Business

Services' (16 points), 'Education' (12 points), 'Public Administration' (12 points), and 'Health and Social Work' (6 points).

The overall picture of the increasing importance of computers in work was also confirmed by individuals' reports of their own recent experiences. We asked people in the 2001 survey to compare the computing skills in their current job with those in the job they were doing five years earlier (Table 5.7). The question was: 'Would you say that there has been a significant increase between then and now, a significant decrease or little or no change in the importance of computing skills in your job?'

The most frequent response was that the importance of computing skills had increased. This was given by half (52 percent) of all those in work. In contrast, only 6 percent thought that the importance of such skills in their work had decreased. The growing importance of such skills was mainly evident for employees, whereas the self-employed were more likely to say that there had been no change. Thus, the rising importance of computers over time is not attributable to younger people replacing older people in the workforce.

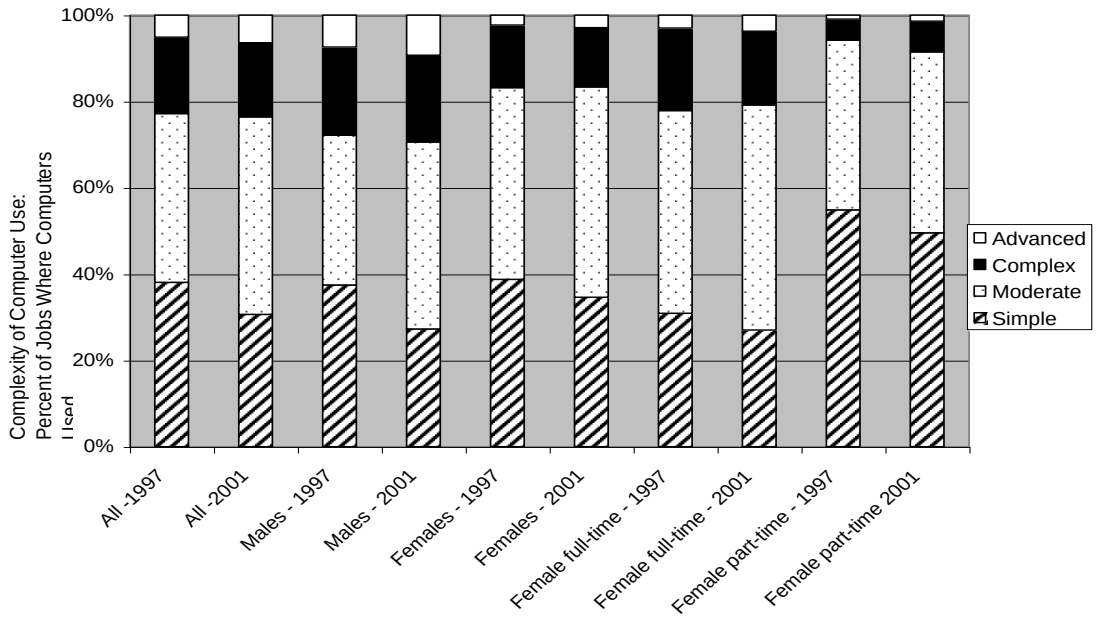
The rising importance of computing skills was evident for both men and women, although it was even more the case for women (55 percent) than for men (50 percent). However, as with the use of computerised equipment, the experience of women varied very sharply depending on their contract status. While nearly two-thirds (63 percent) of women in full-time work reported an increase in the importance of computing skills in their job, this was the case for less than half (41 percent) of those in part-time work.

Overall, not only did the number of jobs affected by computerised technology increase substantially but the technology became more crucial for job performance. However, its importance for the work task varied sharply both by occupational group and by industry.

5.4 The Complexity of Computer Use at Work

Our broad measure of the prevalence of the use of computerised equipment also covers a wide range of tasks of very different levels of complexity. To what extent has the growth been primarily in terms of routine types of computer use as against more advanced use? To address this issue, those who used computers were given a set of statements about possible types of use and asked which best characterised their own job. The four broad types of use given were: 'Simple' (for example, using a computer for straightforward routine procedures such as printing out an invoice in a shop); 'Moderate' (for example, using a computer for word-processing and/or spreadsheets or communicating with others by e-mail); 'Complex' (for example, using a computer for analysing information or design, including use of computer aided design or statistical analysis packages); and 'Advanced' (for example, using computer syntax and/or formulae for programming). The results are presented in Table 5.8 and illustrated in Figure 5.3.

Figure 5.3 The Complexity of Computer Use in Jobs



Source: Table 5.8

The most frequent type of computer use in 2001 was at a 'moderate' level of complexity (46 percent). The next most frequent category was 'simple' use (31 percent). This general pattern was the case for both men and women, although not for female part-timers who were predominantly in the simple use category. There were relatively small proportions involved in complex (17 percent) or advanced (6 percent) types of use. Moreover, the marked growth of use of computerised equipment between 1997 and 2001 was not accompanied by a substantial change in the relative importance of more complex and simpler types of use. In 1997, 23 percent of those who used such equipment were 'complex' or 'advanced' users, while in 2001 the proportion was 24 percent. (The absolute numbers involved in such work, however, have increased with the overall rise in computer use). At the other extreme, there had been some decline in the relative importance of 'simple' use (from 38 percent to 31 percent), and some growth in use at 'moderate' levels of complexity (from 39 percent to 46 percent).

In 2001 (as in 1997) men were notably more likely to be making both complex and advanced use of computers than women. While 29 percent of men made either complex or advanced use of such equipment, this was the case for only 17 percent of women. Despite the fact that there is again a very substantial difference between women in full-time and women in part-time work, it is notable that with respect to the type of use, even women in full-time work were considerably less likely to be making complex or advanced use of computerised equipment than men.

Complexity of use was strongly related to occupational group (Table 5.9).

Those in Professional Occupations were the most likely to use computerised equipment in an advanced or complex way – indeed, this was the case for more than a third (36 percent). They were followed by 'Managers' (31 percent) and then by 'Associate Professionals' (27 percent). While less than a quarter of people in these occupations (and indeed among those in 'Administrative and Secretarial' occupations) were classified as making 'simple' use of their equipment, the proportion rose to 60 percent among 'Sales' workers, 68 percent among 'Plant and Machine Operatives' and 65 percent among those in 'Elementary' occupations. There was also an interesting difference in the trend across time. In 'Managerial', 'Professional', and 'Administrative and Secretarial' occupations there was a rise in the proportion making advanced or complex use of computerised equipment, and a sharp decline among those making simple applications. In contrast, an opposite trend occurred for 'Sales' workers, 'Plant and Machine Operatives' and those in 'Elementary Occupations'. Here the spread in the use of advanced equipment at work was primarily related to relatively simple job tasks. Complexity of use was also strongly related to industrial sector (Table 5.10), with the strongest concentrations of more advanced types of use in 'Real Estate and Business Services', 'Finance', 'Manufacturing' and 'Transport and Storage', while 'Hotels and Restaurants' and 'Wholesale and Retail' stood out for the very high proportion making simple use of computerised equipment.

Another indicator of more complex use is the importance and type of use of the internet. We have no data over time for internet use, but the indicator was introduced as an important benchmark for establishing future trends. In 2001 just under a quarter (24 percent) of those in work said that use of the internet was either essential or very important for their job (Table 5.11), while just over a third (39 percent) made some use of the internet in their work. The proportion using the internet was slightly higher on both measures for men than for women, and for employees compared to the self-employed. However, the sharpest divide was between women in full-time and women in part-time work. Whereas 46 percent of women in full-time work reported that the internet had some importance for their job, this was the case for only 22 percent of part-timers.

In terms of the earlier definition of complexity, use of the internet is one aspect of the moderate or higher complexity categories of use. In order to further differentiate levels of complexity, we asked people about what they did when their job involved use of the internet. They were given the following set of options: communicate with colleagues by e-mail, communicate with others outside your organisation by e-mail, seek information about your organisation, seek information about products or services from potential suppliers, deliver information or knowledge to clients or customers, deliver a product or service to clients or customers, buy or sell products or services, update web pages, and design or construct web-sites. Respondents could mention as many uses of the internet as they chose. The results for all answers are presented in Table 5.12. These confirm that the use of computerised technology is predominantly of a 'moderate' level of complexity.

Communication with colleagues within the organisation by e-mail was overwhelmingly the most commonly cited use – mentioned by two-thirds of internet users. The next most frequently mentioned type of use (given by 58

percent of users) was external communication by e-mail. Over a third mentioned that they used it to get information about their own organisations (36 percent), to get information from suppliers (44 percent) and to deliver information to clients (39 percent). More active e-business was much less frequent. Only 20 percent used the internet to deliver products to customers and 16 percent to buy or sell products. Also less frequent was internet use which involved programming – either to update web pages (9 percent of internet users) or to update them (13 percent). As with computer use more generally, men were more likely to make advanced use of the internet than women. The self-employed, while slightly less likely to use the internet than employees, were notably more likely to be using it in a complex way.

As with computerised equipment more widely, there were marked occupational group and industry differences in internet use. As can be seen in Table 5.13, it was most central to the work of those in 'Professional' occupations– indeed nearly half (48 percent) reported that use of the internet was either essential or very important for their job. Just over a third of 'Managers' (37 percent) and 'Associate Professionals' (38 percent) also considered it vital for their work. In contrast, less than 10 percent of those using it at work in 'Skilled Trades', 'Personal Service', 'Plant and Machine Operative' or 'Elementary' occupations saw it as of major importance for their job. In terms of industrial sector, it was most crucial to people's work in 'Real Estate and Business Services', 'Finance', 'Education' and 'Public Administration' – where more than 30 percent of users regarded it as essential or very important for their job (Table 5.14). In contrast this was the case for only 9 percent of those using the internet in the 'Hotel' industry. It is clear that figures of general prevalence of internet use conceal major variations in its function and importance in the work process.

In short, the use of computerised equipment covers a very wide span of effective skill requirements. More complex use of such equipment is primarily to be found among those in higher occupational groups and among the self-employed.

5.5 How Computing Skills are Learned

Given the rapidity of change in the proportion of people using advanced equipment and the growth in the importance of computing skills, what have been the main ways in which such skills have been acquired? How far have learning needs been met by formal training and how far have people depended on informal mechanisms of skill acquisition? People were asked 'Thinking about the computing skills that you use in your job, how did you learn to use computers or computerised equipment in this way?' A range of options was given. The choices were: by the training provided where I work, by watching others at work, by being helped by colleagues at work, by practising with a computer at work, by doing a training course outside of work paid for by my employer, by the training I received while I was in full-time education, by using manuals, books, videos or on-line materials, by practising with a home computer, and by being helped by a member of my family.

Respondents were allowed to mention as many sources of learning as the wished. The results for all sources mentioned are given in 5.15.

Formal training at work was the most commonly mentioned way in which computing skills were acquired (50 percent). In addition, training off the job paid for by the employer was mentioned by 20 percent. But informal learning processes at work were also very important. A third mentioned that they learned by watching others at work and 48 percent that they learned through being helped by colleagues. Training in full-time education was mentioned relatively rarely as a source of computing skill acquisition (15 percent).

An interesting feature is the importance of the use of computers at home for learning work-relevant computing skills: 41 percent cited practice at home and 17 percent help from other members of their family. This reflects the very wide prevalence of the use of computers at home (Table 5.16). A separate question showed that half of respondents used a computer at home (59 percent). The figure was slightly higher for men (61 percent) than for women (57 percent). The self-employed were particularly likely to have a home computer (64 percent compared with 58 percent among the employed).

Not only was there a very high prevalence of home computers, but for the most part people had had the time to build up considerable familiarity with their use. Nearly two-thirds of home computer users had been using it for at least three years, with the proportions of longer-term users again higher among men than among women and among the self-employed than the employed. In short, it is clear that learning in the workplace is crucially connected with more informal learning in the home, a process made possible by the multi-functional nature of PC technology.

There is a substantial difference between the predominant ways in which employees and the self-employed learn their computing skills (Table 5.16). It is primarily the employed that benefit from formal training. The self-employed are more heavily reliant on picking up their skills through trial and error at work, through self-training using manuals and books and above all through practice on their home computers. The learning processes appear to be broadly similar for men and women, though men are more likely to claim that they are self-taught through manuals and books and through practice on their home computers, while women more frequently mention the help they receive from other members of the family.

Learning processes vary considerably depending on the level of complexity of the computing skills used (Table 5.18). While training at work and informal learning at work are important for all levels of complexity, those using complex and advanced skills are substantially more likely to mention the importance of training off the job, training in full-time education, self-instruction through manuals and books, and practice on their home computers.

A wide range of factors then contribute to the development of the computing skills needed at work. But a particularly interesting feature of the data is the way in which skills learned at home, in the context of the domestic and leisure use of computers, provide a rich source of work-related skills. This reflects the unusually multi-functional nature of computer technologies.

However, access to home computers is heavily conditioned by income and

hence by occupational group. As can be seen in Table 5.17, 83 percent of 'Professionals' and over 70 percent of 'Managers' and 'Associate Professionals' had home computers. In contrast, less than half had home computers in 'Skilled Trades' (46 percent), 'Sales' (46 percent), 'Plant and Machine Operative' (36 percent) and 'Elementary' occupations (35 percent). Quite apart from differences in workplace learning opportunities, differences in domestic living standards are likely to translate into differential opportunities for skill acquisition in an era in which work is so heavily affected by computer technologies – thereby reinforcing the training deficit of low-skilled groups.

5.6 Skill Match Problems and Computing Skills

To obtain a picture of how adequately people thought their existing computing skills matched the requirements of their jobs, two questions were asked. The first focused on those in jobs with substantial computing skill requirements (ie where such skills were essential or very important) and asked: 'Would it make a significant difference to your job performance if you possessed additional computing skills? If so, how much?' The second asked people, who currently were *not* in jobs where there were substantial computing skill requirements, how far they agreed with the statement that 'I possess skills in using computers which could be used better in some job other than my current one'.

The results (Table 5.19) suggest that there is a significant requirement within the existing workforce for an increase in computing skills. Only 32 percent of those in jobs where the use of computers was either essential or very important thought that they had the skills needed to maximise their job performance: 44 percent thought that the acquisition of additional skills would make their performance a little better and approximately a quarter (24 percent) thought that it would make it much better. The pattern was broadly similar for men and women. The view that increased computing skills could bring significant benefits was not confined to specific occupational groups, but was very widely spread over the different occupational groups (Table 5.20). It was similarly widely dispersed across industrial sectors (Table 5.21).

Tables 5.19 to 5.21 also show the extent to which computing skills are being under-utilised at work. It turns out that there is not a very large pool of computer-skilled people currently in jobs with low computing requirements. Only 28 percent of people who were in jobs where computers were not of major relevance for their work agreed or strongly agreed they had computing skills that could be better used. The pattern was very similar for men and women. There were also relatively small differences between occupational groups in the prevalence of under-utilised computing skills, as Table 5.20 shows, although there were particularly high proportions in sales (40 percent) and in 'Administrative and Secretarial Occupations' (32 percent).

5.7 Summary of Main Findings

- There has been a striking and continued increase since 1986 in the number of jobs in which advanced technology is used. There also has been a marked increase over the last four years in the proportion of jobs in which computing is considered to be an essential or very important component of the work. Over 70 percent of people in employment now make use of some type of automated or computerised equipment, and computerised equipment is seen by 40 percent as essential to their work.
- These changes have affected the work of both men and women. There has been a sharp reduction of the gender gap in the use of advanced equipment. Women are now as likely to be using advanced equipment as men, and they are just as likely to consider it essential to their work. Nevertheless, men are more likely to be in jobs involving complex and advanced computer applications. There is also a major difference between women in full-time work, who have a high use of computerised technologies, and female part-timers, who are much less likely to use it.
- There are substantial differences in the use of computerised equipment according to occupation. There is widespread use of computers, and computers are especially important to the jobs, in 'Professional', 'Managerial', 'Associate Professional', and 'Administrative and Secretarial' occupations. Computers are much less important for jobs in 'Plant and Machine Operative', 'Skilled Trades', 'Personal Service' and 'Elementary' occupations. Similarly, complexity of use is strongly related to occupational group.
- Most frequently computer use is at a 'moderate' level of complexity – for instance for word processing or communicating by e-mail. This type of use has increased in importance over time relative to simpler applications; but there has been little change in the relative importance of more complex types of use (for instance data analysis or programming).
- Computer skills are most commonly acquired through formal training at work. Informal learning processes in the home, through the use of home computers, are also very important. However, there are important class differences in the likelihood of having a home computer. So differences in living standards translate into differential opportunities for work-related learning opportunities.
- There is evidence of a need for increased investment in the training of computer skills. Nearly a quarter of people (24 percent) in jobs where computerised equipment was essential or very important thought that the acquisition of additional computing skills would make their performance much better. There is not a large pool of people with significant computing skills in jobs where computers are not of major importance to the work.

CHAPTER 6

EMPLOYEE TASK DISCRETION

6.1 Introduction

It is often argued that rising skills will be accompanied by higher levels of task discretion for employees – that is to say greater control over the detailed execution of the job. This is thought to reflect the need to motivate employees who are carrying out more complex work and greater difficulties in externally monitoring more skilled work. Discretion affords the potential productive advantages of flexibility, but requires the exercise of judgement and hence some skill. This putative connection between task discretion and skill has been assumed or proposed in a long-standing social scientific traditions (e.g. Blauner, 1964; Braverman, 1973; Zuboff, 1988). In recent years, the connection is bolstered by the idea common among management commentators that many ordinary workers may be (and should be) becoming more 'empowered', as their skills and responsibilities are broadened.

It has been seen in earlier parts of the report that skills have risen in Britain over the last decade. In this chapter we examine the proposed connection between skill and discretion, and consider whether there has there been a corresponding increase in the extent of task discretion.

The survey included a general question asking 'How much choice do you have over the way in which you do your job?', which allowed comparison between 1986, 1997, and 2001. In addition four more detailed questions were asked to assess how much personal influence people thought they had over specific aspects of their work: how hard they worked, deciding what tasks they were to do, how the task was done, and the quality standards to which they worked[13]. These permitted comparison over the period 1992 to 2001. The results for employees are presented in Table 6.1.

6.2 Change in Task Discretion

The first indicator was designed to provide a general picture of people's autonomy on the job, covering the range of different possible dimensions. Taking their overall judgements about the choice they could exercise in their work, it is clear that the majority of employees felt that they had some opportunities for initiative on the job. But only a minority of employees (39 percent) in 2001 thought that they had a great deal of choice over the way they did their job. A further 44 percent reported that they had some choice. The extent of choice was, as expected, related positively to other broad

[13] The question format was : 'How much influence do you personally have on …how hard you work; deciding what tasks you are to do; deciding how you are to do the task; deciding the quality standards to which you work?'

measures of job skills. For example, in those jobs which required a qualification of at least level 3, some 45 percent reported a great deal of choice, whereas jobs requiring less or no qualifications afforted only 33 percent a great deal of choice. The choice variable was also positively related to the extent of previous training, and to the Required Learning Time index.

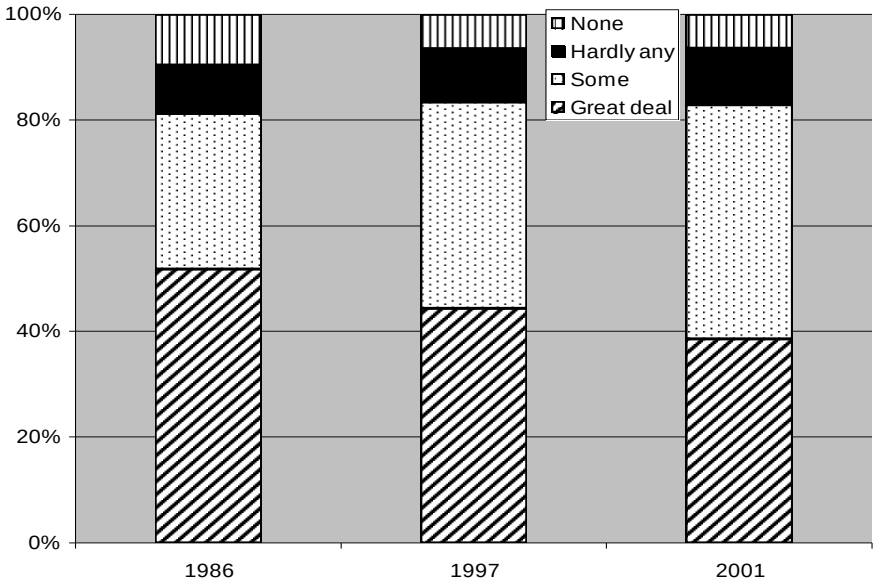
The more detailed questions enable us to assess the influence that employees had over specific aspects of their work task. These show that influence was felt to be highest with respect to work effort and quality standards, where half of all employees thought they had a great deal of influence, and lowest with respect to decisions about which tasks were to be done and how to do the task, where this was the case for only 30 percent and 43 percent respectively. All these other indicators of task discretion are also positively correlated with the broad measures of skill. This finding confirms again the view that skill and task discretion are related as expected.

Despite the fact that discretion is positively correlated with skill, comparison of the pattern for 2001 with that for earlier years points not to a rise, but to a considerable decline, in employee task discretion over time. Between the 1986 and 2001, there was a decline of 14 percentage points in the proportion feeling that they had a great deal of choice in the way they did their job – see Figure 6.1. Between 1992 and 2001 there is also a marked decline in employees' perception of their influence over each of the specific aspects of the work task. To provide an overall picture from these items, a summary index was constructed by giving a score ranging from 0 (no influence at all) to 3 (a great deal of influence) and then taking the average of the summed scores.[14] As can be seen in Figure 6.2 and in the last row of Table 1, the index score for task discretion declined from 2.43 in 1992 to 2.25 in 1997 to 2.18 in 2001.

The decline in control was sharpest with respect to work effort (20 percentage points) and quality standards (19 percentage points). For the first three aspects of task control - over work effort, decisions about which tasks to do and how to do the task - the decline was continuous between the three surveys, although control over work effort declined particularly sharply between 1997 and 2001. With respect to control over work quality, the change occurred primarily between 1992 and 1997.

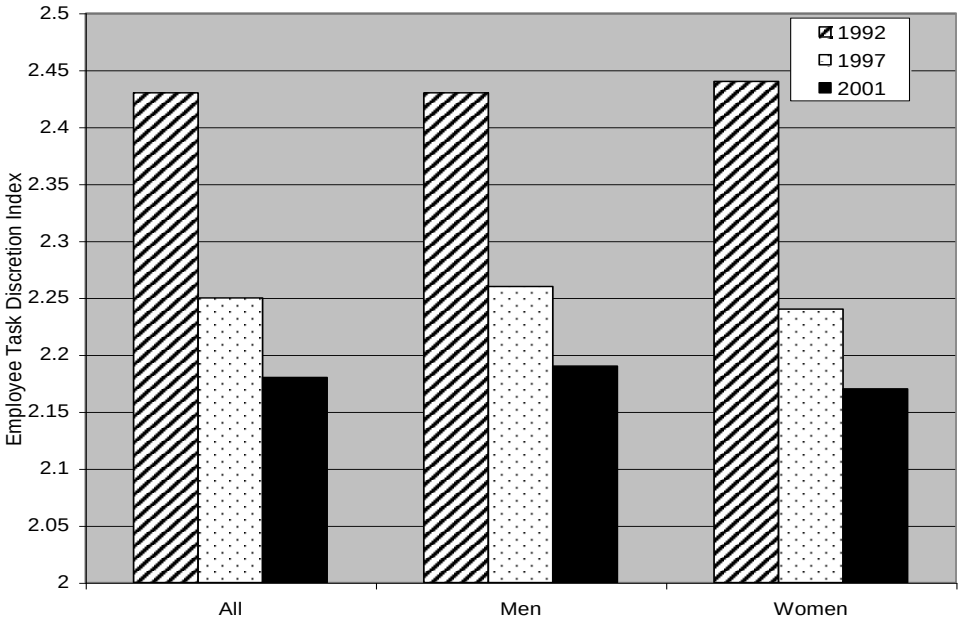
[14] The index was statistically robust, with an overall alpha of .78.

Figure 6.1 Choice Over Way of Carrying Out Jobs



Source: Table 6.1

Figure 6.2 Task Discretion Index



Source: Table 6.1

6.3 Sex, Contract Status and Control

This decline in task discretion is evident for both men and women. The overall measure of 'choice over how the job is done' indicates that women felt they had a lower level of control than men in each of the years (Table 6.2). However, the percentage point decline between 1986 and 2001 was very similar for men and women (14 and 12 percentage points respectively). Taking the items tapping particular aspects of control, there was little difference between the sexes on any of the measures in 1992 and this remained the case in 2001, except for control over 'how to do the task' where men had a somewhat higher level of job control than women (45 percent reporting a great deal of influence compared with 40 percent). The decline in the overall task discretion index is however very similar indeed for both sexes (see Figure 6.2). For men, it was reduced from 2.43 to 2.19 and for women from 2.44 to 2.17.

The figures for female employees however conceal a substantial difference by contract status (Table 6.3). On all measures and in all years, apart from the overall item on choice in 1986, female part-timers had considerably lower levels of job control than female full-timers. Taking 2001, the point difference ranged from 6 percentage points with respect to influence over what tasks to do to 10 percentage points with respect to how to do the task. Moreover, taking the trend over time, part-timers had witnessed a sharper reduction of influence over their job than full-timers. For instance, taking the overall item on choice over the way of doing the job, there was a decline of 9 percentage points between 1986 and 2001 with respect to full-timers who reported a 'great deal' of choice, but of 17 percentage points with respect to part-timers. Similarly, the summary index for the specific aspects of control shows a decline between 1992 and 2001 of 0.24 for female full-timers compared with 0.30 for female part-timers. The period, then, has seen an increased polarisation in this respect between the work situation of women in full-time work on the one hand and part-time work on the other.

6.4 Occupation and Industry

Job control is strongly related to occupational group. For instance, in 2001, whereas 63 percent of 'Managers' reported 'a great deal' of choice over the way they did their job, this was the case for approximately 30 percent of those in 'Personal Service', 'Sales', 'Plant and Machine Operative' and 'Elementary' occupations. Similarly, the task discretion index ranged from 2.58 among 'Managers' to 1.86 among 'Plant and Machine Operatives'. This finding is also consistent with the argument that task discretion and skill are positively associated.

But the decline in job control occurred across all occupational groups. This is the case whether one takes the measure of 'choice' over the way the job is done (Table 6.4), which covers the period 1986 to 2001 or the task discretion index, which covers the period 1992 to 2001 (Table 6.5). There were

variations in the extent to which this was the case. Both measures indicate that those in 'Skilled Trades' occupations were the least affected. 'Managers' experienced a marked decline in job control between 1986 and 1997, but the trend then levelled out between 1997 and 2001. In contrast, over the entire period 1986 to 2001, 'Professionals' experienced a particularly striking loss of job control. In 1986, the proportion of 'Professionals' reporting 'a great deal' of choice was relatively close to that of 'Managers' (72 percent compared with 80 percent), and well above that of other occupational groups. By 2001 it had fallen to 38 percent, a figure very close to the average for employees in general. The task discretion index, which covers the period 1992 to 2001, also shows that the professionals were very heavily affected, although several other occupational groups had similar experiences. 'Personal Service' employees, sales employees and those in 'Elementary' occupations also experienced very substantial losses of task discretion over this period.

The reduction of job control was widely spread across different industrial sectors. Both the measure for 1986 to 2001 (Table 6.6) and that for 1992 to 2001 (Table 6.7) show a particularly high loss of job control in 'Education'. In 1986, 'Education' ranked with 'Real Estate and Business Services' as the sector with the highest proportion of employees saying that they a great deal of choice in the way they did their job. Indeed this was the case for nearly two-thirds of 'Education' employees (63 percent). However, by 2001, just over a third (34 percent) reported that this was the case with their job – a proportion a little less than the average for all employees. Other sectors that saw a very sharp erosion of task discretion were 'Public Administration', 'Finance' and 'Real Estate and Business Services'. Two industries have rather different patterns depending on which measure is taken. Employees in 'Health and Social Work' and 'Transport and Storage' experienced little change in job control in terms of the choice measure, but a substantial loss in terms of the task discretion index. A more detailed examination of the components of the task discretion measure shows that in both cases reduction of job control was particularly notable with respect to control of work effort, which is perhaps less well caught by the 'choice' measure.

6.5 External Control Over Work Performance

If individuals' own control over the job task has been reduced, what types of external control have become more important? The view that increased skills would be accompanied by greater employee task discretion was usually linked to the view that detailed monitoring by supervisors would become less close. The balance of control was largely understood as lying between the relative discretion of the individual and the supervisor. Given that employee task discretion diminished, was this then reflected in tighter supervisory control?

A question was included in the survey to examine this. It asked people : 'How closely are you supervised in your job?' The response options were very closely, quite closely, not very closely and not at all closely. The question replicated items that had been placed in surveys in 1986 and 1997. The

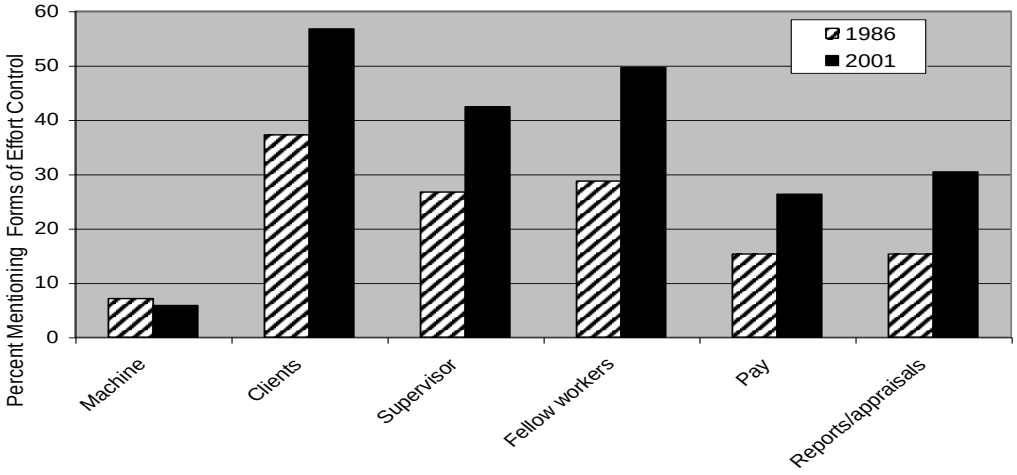
results for the three dates are given in Table 6.8.

A first point to note is that there is little evidence that tight supervisory control increased substantially between 1986 and 2001. Taking those who said that they were either very or quite closely supervised, the proportion was 35 percent in 1986 and 39 percent in 2001. Where there was a more marked change was in the proportions at the other end of the scale, that is those who were either 'not very closely' or 'not at all closely supervised'. There was a continuous decline in the proportion of employees who received almost no supervision. In 1986, these constituted just under a third (31 percent) of all employees, whereas by 2001 they were only 18 percent. The period then was characterised by an increased influence of supervision, but mainly involving a shift away from work situations where there was a virtual absence of supervision and a growth instead of relatively relaxed forms of supervision.

Although supervision has received particularly close attention as a constraint on task discretion, there are clearly other factors that can limit people's capacity to carry our their jobs in the way they want. To examine this, people were asked which of a range of factors were 'important in determining how hard you work in your job'. These included a machine or assembly line; clients or customers; a supervisor or boss; pay incentives; and reports and appraisals. They were asked to choose as many factors as were relevant. This question can be compared with results from 1986, 1992 and 1997 (Table 6.9).

Figure 6.3 contrasts these sources of influence at the beginning and end of the period. With one exception, all forms of external control were more frequently mentioned in 2001 than had been the case in 1986. The only factor that had declined in importance as a constraint on job performance was that of the constraints of machinery or of an assembly line. The strongest rise had been in the influence of 'fellow workers' – an increase of 24 percentage points between 1986 and 2001. This was followed by the influence of clients (20 percentage points), of supervisors (16 percentage points) and reports and appraisals (15 percentage points). The loss of a sense of individual job control by employees appears then to be related to a growth in a wide variety of external constraints that have affected job performance.

Figure 6.3 Sources of Control Over Effort, 1986 and 2001



Source: Table 6.9.

6.6 Summary of Main Findings

- More skilled jobs typically require higher levels of discretion over job tasks. Despite this, the rise in skills among employees has *not* been accompanied by a corresponding rise in the control they can exercise over their jobs. Rather there has been a marked decline in task discretion. For example, the proportion of employees reporting a great deal of choice over the way they do their job fell from 52 percent in 1986 to 39 percent in 2001. This decline occurred for both men and women.
- However, in all years the level of job control exercised by women in full-time jobs was substantially greater than that exercised by women in part-time jobs. Moreover, the period saw an increased polarisation of the quality of jobs in this respect. The level of task discretion in jobs declined faster for part-timers than for full-timers.
- The reduction of task control was general across occupational groups, but there were considerable variations in the extent to which it occurred. 'Skilled Trades' workers were relatively unaffected, whereas 'Professionals' witnessed a particularly sharp decline in their control between 1986 and 2001.
- The decline of task discretion was also evident across all industries. But it was particularly notable in 'Education', 'Public Administration', 'Finance' and 'Real Estate and Business Services'.
- Reduced personal discretion in jobs has been partly matched by rises in external sources of control. There was some evidence of an increase of supervision, although there was little increase in close supervisory practices. There was also a rise in the importance of certain non-hierarchical constraints on individual job performance – notably by fellow workers and by clients or customers. For example, the influence of fellow workers expanded from applying to 29 percent of employees in 1986 to being relevant for 50 percent of employees in 2001.

CHAPTER 7
THE VALUE OF SKILLS

7.1 Introduction

Thus far in this report we have examined the distribution and trends of a range of skills used in British workplaces. An important implication of both the distribution and the trend concerns pay. It is to be expected that different skills are variously rewarded in the labour market, reflecting both their relative scarcity and institutional factors. Changes in skills, and in their rewards, are thus associated with changes in the pay distribution.

In a previous study (Green, 1998 and 1999), the 1997 Skills Survey was used to generate estimates of the values of several skills indicators. In this chapter we present estimates of the values of the skills indicators derived from both the 1997 Skills Survey and the 2001 Skills Survey. We examine the associations with pay of each of the broad skills measures and of the ten generic skills measures described in Chapter 3, plus measures of computing skills described in Chapter 5, and of employee task discretion described in Chapter 6. We also examine whether the valuations have tended to change between 1997 and 2001.

In earlier studies elsewhere there was a particular focus on the premium associated with computer skills. It was first claimed that, since computer usage at work was associated with higher pay (after allowing for differences in education levels), the advent of computers had helped to generate changes in the inequality of pay in the United States (Krueger, 1993). Subsequent studies have cast doubt on this claim, asserting an alternative interpretation, that firms tended to assign their more skilled and higher paid workers to use computers (Entorf and Kramarz, 1997). In other words, the association of computer usage with pay remained, but instead of concluding that computer usage generated higher pay one could only infer that both computers and pay were linked to another variable ('skilled') that was otherwise difficult to measure at all accurately. In that case, one could not attribute any of the rise in wage inequality to computers.

In our estimates, we are able to include the role of many types of skill and other job characteristics. Arguably, therefore, we are better able to investigate the separate effects of each skill, than in earlier studies that could only measure one or a few dimensions of skill at the most. Nevertheless, we do not claim to have captured all dimensions of skill, or all other variables that might be related to both pay and to skills. It remains the case that we cannot confidently deduce a causal link between computer skills and pay. Instead, we speak throughout this chapter of an association of skills with pay, rather than of any causal impact.

7.2 Measurement and Method

We measured wages as hourly pay. Where an employee's employer contributed to the employee's pension fund, we augmented pay by 10 percent.[15]

All measures of skill types are as used and described in earlier chapters.

To find out the market value of each skill, it is necessary to combine all the measures in a simultaneous analysis of pay determination. In this way, one can calculate the association between, say, planning skills and pay, while holding all other skills the same. The statistical technique for achieving this is called 'multiple regression'. The essence of this technique is that it measures the *simultaneous* associations of pay with the many skills (and other factors). The findings provide answers to questions like: 'Suppose one job involved ten units more of planning skills than another job, with all other skills and other characteristics the same, what would be the difference between the two jobs in terms of their pay?'. One can regard this measure as the value of planning skills as revealed in the labour market. Simultaneous answers are provided for all the skills involved.

We included also in our analysis some 'control variables', designed to capture possible spurious influences on pay that were not properly attributable to the skills indices. These were industrial sector, whether full time or part-time, the gender mix of the job, and whether in the public sector.

Because there is reason to expect from earlier studies that wages may be determined in different ways for men's and women's jobs, we looked at the valuations of job skills separately for men and women. To see whether the valuation of skill had changed over the last four years, we conducted both separate analyses for 1997 and 2001, as well as a joint analysis with both years included.

7.3 Findings on the Value of Skills

Our first finding is that the valuation of skills did not significantly change between 1997 and 2001. This stability is perhaps unsurprising, though if there had been a rapid change in the demand for any particular skill it might have led to a change in valuation. We conclude tentatively that there has been no sudden change in demand for particular skills in the recent period. The stability in the estimates means that it is efficient to combine the data from the two surveys, in order to obtain the best estimates of skill values.

The findings derived from the combined surveys are shown in Table 7.1. Taking first the broad skills indicators, it may be seen that these are related to pay in the expected direction. For females, a job that requires a degree level qualification has a substantial 57 percent pay premium over one that has no qualification requirement, after allowing for all other skill measures. The equivalent premium for males is rather less, at 38 percent. For males, level 1

[15] The findings are not sensitive to this assumption.

or 2 qualification requirements have no significant impact on pay, a finding that chimes with the evidence presented in Chapters 3 and 4, to the effect that there are considerable surpluses of workers with lower and intermediate level qualifications. Nevertheless, level 3 qualification requirements do carry a premium, and all qualification requirements carry a premium for females.

Whether a job requires high levels of previous training was also used as a separate indicator of skill in Chapters 3 and 4. Table 7.1 shows that, for women, this indicator is also associated with higher pay, in that jobs with more than two years previous training have a small premium; but for men the effect is small and insignificant.

The third broad skill indicator is the length of time required to learn to do the job well. As Table 7.1 shows, for both women and men this indicator is positively related to pay. For example, for men jobs that require over 2 years to learn to do well have a pay premium of 18 percent (9 + 9) over jobs that require less than a month.

Consider next the generic skills indices, as described in section 3.2.1 in Chapter 3. It may be seen that both high-level communication skills and planning skills carry a substantial positive independent premium. After allowing for all other skills, as well as other factors, a 10 point rise in the planning skills index is valued at around 4 percent for both women and men. The value of high-level communication skills is approximately the same as for planning skills in the case of women, but for men the value is considerably higher at 8 percent.

By contrast, neither literacy skills, nor technical know-how, nor horizontal communication skills, nor problem-solving skills, nor checking skills are found to have a separate association with pay, after controlling for other skills. This finding suggests that, although these skills may be important aspects of jobs, the rewards associated with them are fully captured by the other indicators of skill (not least, the broad skills indicators).

Physical skills have a negative association with pay, a finding that is unsurprising. A partial explanation is that many physical skills have a relatively low supply price. Some manual activities, for example those that require physical stamina, could be seen as a by-product of daily living, with an effectively zero cost of acquisition, so that the supply price depends only on the individual's attitudes and preferences about manual tasks in relation to alternative activities (such as being out of the labour force). However, the likely reason for the negative association is that where a job deploys a good deal of physical skills it is probably deploying less of some more highly valued skills. Although the method of analysis allows for the association of many other skills, there are a number of unnoticed skills which cannot easily be quantified and allowed for through any survey. A similar argument can account for the (smaller) negative premium associated with client communication skills for women. The latter are important in many of the 'Sales' occupations which, otherwise, are often considered among the least skilled of the non-manual occupations.

That number skills attract a small negative premium for men, and no premium for women, is on the face of it more surprising. The answer to this apparent

puzzle lies in the substantial positive impact of computing skills and the fact that number skills are very highly correlated with computing skills. The relationship of computer skills with pay is greatest in the case of women's jobs. Here, a woman doing 'advanced' work with computers can expect a premium of 32 percent over a woman who does not use computers. This premium is over and above any education premium. There is also a substantial premium for 'complex' levels of usage – 20 percent for women and 17 percent for men. Interestingly, this premium is not substantially different from that for 'moderate' usage, whether for men or women. Finally, even usage at a simple level carries a pay premium, compared with no usage at all.

Finally, we investigated whether the indicators of task discretion were independently linked with pay. As the table shows, for men there is a small positive premium associated with greater task discretion. However, with our other measure of choice over the way the job is done we could detect no association with pay. Moreover, for women, neither measure of task discretion is linked with pay. This lack of an association with pay might seem surprising if task discretion is thought of as an adjunct of skill, even if many other elements of skill have been controlled for. Yet given that, as we have shown in Chapter 4, the extent of task discretion has gradually been reduced since the 1980s, it is likely that employers have been reducing their demand for this aspect of jobs (rather than employees initiating the reduction). It is possible also that any positive association might be being balanced by the fact that discretion is likely to be a desirable attribute of many jobs, for which many people would be prepared to accept lower wages.

7.4 Summary of Main Findings

- All the broad skills indicators are associated with positive wage premia. Graduate level jobs attract the highest premium, at 57 percent for women, 38 percent for men, compared to jobs that require no qualifications. However, low level qualification requirements are not associated with pay premia in jobs held by men. Jobs with longer learning times before being able to do them well are paid more than jobs that can be learned in a short time.
- Usage of computers continues to be associated with substantial pay premia in the labour market. A job which requires the use of computers at a 'moderate' level, for example to analyse spreadsheets, typically enjoys an average wage premium of around 21 percent for women and 13 percent for men. These premia are in addition to any differences in education requirements and other factors.
- Also well rewarded are high-level communication skills (such as making presentations or writing long reports), and planning skills. None of the other generic skills indices have a positive association with pay, and some have a negative pay premium, most notably physical skills.
- The skill premia did not change significantly between 1997 and 2001.

CHAPTER 8

CONCLUSION: THEMES AND IMPLICATIONS FOR SKILLS RESEARCH

8.1 Themes

In this report, we have demonstrated a viable method for assessing the stocks of a range of skill types being used at work in Britain, and we have reviewed many key findings from the 2001 Skills Survey that was based on this method. Moreover, we have been able to use this data to derive reliable comparisons of skills stocks over time. Comparisons of broad indicators of job skills are possible going back to 1986, while changes in generic skills indicators can be examined since the 1997 Skills Survey, which was the first survey to develop and apply this method of measuring generic skills.

The survey provides information to address several key themes in our understanding of the changing market for skills. The data confirms that there has been a sustained increase in the utilisation of skills in British workplaces over the last 15 years. This finding might not seem surprising to many observers, accustomed to seeing an ever rising tide of qualified workers emerging from the nation's education system and entering the workforce, and aware of ongoing change at workplaces. Nevertheless, there is also awareness that the rising supply of qualifications need not necessarily have signalled a transformation of jobs. There are many jobs for which having the right qualifications is not considered the most important thing that an applicant has to offer the employer, and even a considerable proportion where qualifications do not count at all, in comparison to other qualities such as appropriate prior experience and work attitudes. Thus, to understand what is going on needs a range of alternative measures of job skills to capture different aspects of jobs that may be changing. The remarkable finding is that, over the long period since 1986, *all* the different measures are indicating a rise in job skills. The only indication contrary to the picture of rising job skills is the fall between 1997 and 2001 in our index of the amount of training time which workers report having received to prepare them for the type of work they are currently doing. In contrast, since 1997 all generic skills (with the exception of physical skills) are showing a rise. For the most part, the rise is only small, as is to be expected over a relatively short period. Overall, the survey confirms that it is appropriate to focus attention on the rising skill needs of the economy.

Nevertheless, the survey also confirms that simply supplying increasing numbers and higher levels of qualifications is unlikely to be the full answer to raising the skills that are exercised in British workplaces. As we have seen, there are aggregate imbalances between the total supply of qualified workers and the numbers of jobs where these qualifications are really wanted, with the former exceeding the latter by considerable amounts for intermediate and lower level qualifications. This 'excess supply' sits oddly alongside reports of continued recruitment difficulties faced by employers, and ongoing reports of skills gaps whereby firms' workforces are reported as lacking in certain skills (Campbell *et al*., 2001). The apparent paradox is resolved once it is recalled

that qualifications are often only loose indicators of the skills actually required at work. The imbalance in qualifications suggests that it may be important for employers to begin to make more use of the available supply of qualified workers. Having an excess supply of qualified workers could indeed be advantageous, if it encourages employers to go for higher skilled production processes and products which previously they had been reluctant to follow for lack of skilled labour. From the individual's point of view, gaining lower and intermediate levels of qualifications remains advantageous in that this increases their chances of gaining employment, and is the route through to acquiring higher level qualifications.

Amongst the rising generic skills, the rate of expansion of computing skills stands out: they appear to have been increasing in the very recent past as fast as ever. There is no indication, as yet, that the usage and importance of computers in the workplace are even beginning to approach saturation point. Eventually, such a saturation point is sure to be approached, in that less than 100 percent of the workforce is likely to be using computers even in, say, 20 years time. Nevertheless, currently usage has been expanding at a rate of roughly two percentage points every year. Even more workers are affected by computers, if we include those who work in workplaces that use computers extensively but do not actually use one directly. Although there are regional, occupational and industrial differences, the diffusion of new technology is pervasive throughout the economy. It is now reaching all groups in the economy, including older workers who previously had been slow to undertake work using computers. The arrival of the Internet as a new communications technology affecting the work lives already of more than a quarter of the entire workforce adds to the impact of computers.

Given this rate of expansion of new technology, it is not surprising that a considerable proportion of existing computer users express the need for further improvement to their skills in order to keep up with job requirements. As the survey has shown, there are multiple routes through which computing skills tend to be acquired. Improving the supply of computing skills from schools and colleges is likely to remain just one, albeit important, avenue for meeting this skills need in the foreseeable future. Having the opportunities to learn the necessary skills at work and home is also essential for adult workers who are already in the workforce and having to cope with implementing the new technologies.

The fact that computing skills demand is rising so fast also makes it not surprising that computing skills are strongly associated with the receipt of a pay premium above what is predicted from other factors such as education and prior work experience. Amongst all the generic skills, computing skills stands out, along with professional communication skills, as attracting a substantive reward in the labour market.

The survey has also revealed continued differences between the skills exercised by men and women in workplaces. Notably, part-time women are in jobs which, on average, use lower levels of skills, according to almost all the skill indicators. There are also some expected differences between the types of skills that female and male workers exercise at work. For example, men's jobs tend to require more technical know-how, while women's jobs require

more communication with clients and fellow workers. There are few indications of recent change in this form of gender differentiation at work. Nevertheless, over the longer period since 1986 there is a remarkable narrowing of the gender gap in respect of the broad measures of job skills, and the gender gap that existed in the 1980s in the usage of advanced equipment at work was eliminated by 2001. These findings suggest that there has been some progress, albeit slow progress, in the integration of women into the workforce over the last decade and a half. But the findings also imply continued concern over the overall job quality of female part-time workers.

A further theme developed in this report is the link between the development of skill and other aspects of change at the workplace. Most notably, it has been conventional to link skill with the extent of discretion and choice that workers are able to exercise in their jobs. Typically, it has been felt that more complex jobs required workers to be left somewhat more to their own devices, to exercise their own judgement as to what to do, how to do it and so on. Our survey confirmed that those who do have more task discretion do indeed have substantially higher levels of skill, according to many other indicators. Remarkably, however, the rising skill levels since 1986 have not at all been matched by rising levels of task discretion. Far from it, the trend in task discretion, according to all our measures, is downwards. It seems likely that economic and social pressures are weakening the traditional link between skill and discretion. Nowhere is this change more evident than among the ranks of professional workers, whose discretion at work has been substantially curtailed since the 1980s.

8.2 Implications For Further Research On Skills

We have only been able to touch on many of the implications of our findings for policy and for understanding of the skills market in Britain. Further implications will need to be considered elsewhere. There remain also important further areas of research into skills that are possible to undertake with the data, a number of which are in progress.[16]

The methods used with the 2001 Skills Survey provide a means of tracking a wide range of skills used at workplaces over time, in a comprehensive and affordable manner. An important aspect of the study is the devotion of sufficient resources to achieve a reasonable response rate on a randomly drawn and representative survey of the whole economy, rather than either concentrating on just one sector or occupation, or relying on quota-based sampling. Yet, the comparative stability of many of the skills indicators (and their prices) over the 1997 to 2001 interval confirms our expectation that there is little added value in repeating such a survey every year on a national basis. There is less need for regular annual or quarterly information about the *stocks* of skills than there is for such regular data on training and education, which

[16] Areas under study include: the under-utilisation of skills, the link between skill and autonomy at the workplace, the skills of non-standard workers, the valuation of skills (an extension of the findings given in Chapter 7), and the links between skill upgrading and intensification of work effort and work strain. The findings from these studies will be published initially as SKOPE working papers.

should be adding to those stocks. Thus, a survey of skill stocks every three or four years, deploying a core of unchanged questions and procedures, provides a reasonably cost-effective means of acquiring highly useful labour market information. The 2001 Skills Survey in fact arrived at a convenient time, coinciding as it did with the inauguration of the Learning and Skills Council, thus providing a benchmark of the utilised skills stock at that time.

There is, however, an opportunity in the intervening period for an extension of the Skills Survey method to assist in the collection of labour market information at the regional or local level. A certain amount of regional information is potentially available for analysis, utilising the current and previous surveys. However, further and up-to-date information would require application of the same principles to the design of regionally based surveys.[17]

Finally, it would be of considerable interest if the methods of the 1997 Skills Survey and 2001 Skills Survey could be extended to other countries. Direct international comparisons of individual-based surveys, some of which rely on subjective interpretations of questions about job activities, raise difficulties, but the problems are not insuperable. Moreover, certain features of the labour market could be compared across countries with few conceptual difficulties. For example, a notable finding from this study has been the discrepancy between the numbers of workers qualified to intermediate and lower levels and the numbers of jobs where employers are demanding them (see Chapters 3 and 4). Thus, although Britain's supplies of intermediate skills tend to lag behind those of other similar countries in Europe, the numbers of jobs demanding these qualifications is substantially less than the supplies available in the workforce. Is this imbalance also the case in other countries, with supplies greatly exceeding the numbers of jobs demanding them, or are the qualifications and job requirements more closely matched? Relatedly, are qualifications taken more or less seriously than in Britain when it comes to recruitment, or is there as much emphasis for many jobs on prior experience, rather than achieved qualifications? Answers to such questions, obtained with specifically designed comparable methods, could substantially assist governments in the design and benchmarking of their skills policies.

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REFERENCES

Allen, J and van der Velden, R (2001) 'Educational mismatches versus skills mismatches: effects on wages, job satisfaction, and job search', *Oxford Economic Papers*, 53(3): 434-452.

Appelbaum, E, Bailey, T and Kalleberg, A L (2000) *Manufacturing Advantage: Why High-Performance Work Systems Pay Off*, Ithaca and London: Cornell University Press.

Ashton, D, Davies, B, Felstead, A and Green, F (1999) *Work Skills In Britain*, Oxford: SKOPE, Oxford and Warwick Universities.

Attewell, P (1990) 'What is skill?', *Work and Occupations*, 17, 422-448.

Autor, D H, Levy, F and Murnane, R J (2001) 'The skill content of recent technological change: an empirical exploration', MIT/Harvard University, Cambridge, Massachusetts, mimeo.

Barro, R J and Lee, J W (1996a) 'International measures of schooling years and schooling quality', *American Economic Review, Papers and Proceedings*, 86: 218-223.

Barro R J and Lee, J W (1996b) 'Sources of economic growth', *Carnegie-Rochester Conference Series on Public Policy*, 40: 1-46.

Barro, R J and Lee,. J W (2001) 'International data on educational attainment: updates and implications', *Oxford Economic Papers* 53(3): 541-563.

Becker, G S (1964) *Human Capital*, New York: National Bureau of Economic Research.

Blauner, R (1964) *Alienation and Freedom. The Factory Worker and his Industry*, Chicago: University of Chicago Press.

Bosworth, D (1999) 'Empirical evidence of management skills in the UK', *Skills Task Force Research Paper 18*, Nottingham: DfEE Publications.

Braverman, H (1974) *Labor and Monopoly Capital*, New York: Monthly Review Press.

Bresnahan, T F (1999) 'Computerisation and wage dispersion: an analytical reinterpretation', *Economic Journal*, 109: June, F390-F415.

Bynner, J (1994) 'Skills and occupations: analysis of cohort members' self-reported skills in the fifth sweep of the National Child Development Study', Social Statistics Research Unit, City University mimeo.

Campbell, M, Baldwin, S, Johnson, S, Chapman, R Upton, A and Walton, F (2001) *Skills in England 2001: Research Report,* London: Department for Education and Skills.

Cappelli, P (1993) 'Are skill requirements rising – evidence from production and clerical jobs', *Industrial and Labor Relations Review*, 46: 515-530.

Centre for Educational Research and Innovation (2001) *Education Policy Analysis*, Paris, OECD.

Cockburn, C (1983) *Brothers: Male Dominance and Social Change*, London: Pluto Press.

Darrah, C N (1996) *Learning and Work: An Exploration in Industrial Ethnography*, New York: Garland Publishing.

Dearden, L, McIntosh, S, Mych, M and Vignoles, A (2001) 'The returns to academic and vocational qualifications in Britain', *Bulletin of Economic Research* forthcoming.

DiNardo, J E and Pischke, J S (1997) 'The returns to computer use revisited: have pencils changed the wage structure too?', *Quarterly Journal of Economics*, CXIII(1): 291-304.

DfEE (1998) *The Learning Age: A Renaissance for a New Britain*, London: Department for Education and Employment.
DfEE and Cabinet Office (1996) *The Skills Audit Report: A Report from an Interdepartmental Group, Occasional Paper*, London: HMSO.
DfEE (2000) *Skills for All: Research Report from the National Skills Task Force*, London: Department for Education and Employment.
DTI (1998) *Our Competitive Future: Building the Knowledge Driven Economy*, Cm 4176, London: HMSO.
Elias, P and Bynner, J (1997) 'Intermediate skills and occupational mobility', *Policy Studies*, 18(2): June, 101-124.
Entorf, H and Kramarz, F (1997) 'Does unmeasured ability explain the higher wages of new technology workers?', *European Economic Review*, 41(8): 1489-1509.
Felstead, A (2002) 'Putting skills in their place: the regional pattern of work skills in late twentieth century Britain', in Evans, K, Hodkinson, P and Unwin, L (eds) *Working to Learn: Transforming Learning and the Workplace* , London: Kogan Page.
Felstead, A and Ashton, D (2000) 'Tracing the link: organisational structures and skill demands', *Human Resource Management Journal*, 10(3): July, 5-21.
Felstead, A and Unwin, L (2001) 'Funding post-compulsory education and training: a retrospective analysis of the TEC and FEFC systems and their impact on skills', *Journal of Education and Work,* 14(1): 91-111.
Felstead, A, Ashton, D, Burchell, B and Green, F (1999) 'Skill trends in Britain: trajectories over the last decade', in Coffield, F (ed.) *Speaking Truth to Power: Research and Policy on Lifelong Learning*, Bristol: Policy Press.
Felstead, A, Ashton, D and Green, F (2000) 'Are Britain's workplace skills becoming more unequal?', *Cambridge Journal of Economics*, 24(6): November, 709-727.
Felstead, A, Ashton, D and Green, F (2001) 'Paying the price for flexibility? Training, skills and non-standard jobs in Britain', *International Journal of Employment Studies*, 9(1): April, 25-60.
Freeman, R and R Schettkat (2001) 'Skill compression, wage differentials and employment: Germany vs the US', *Oxford Economic Papers,* 53(3): 582-603.
Gael, S (1988) (ed.) *The Job Analysis Handbook for Business, Industry and Government, Volume 1,* New York: John Wiley.
Gallie, D (1991) 'Patterns of skill change: upskilling, deskilling or the polarization of skills?' *Work, Employment and Society*, 5(3): September, 319-351.
Gallie, D, White, M, Cheng, Y and Tomlinson, M (1998) *Restructuring the Employment Relationship*, Oxford, Clarendon Press.
Gemmell, N (1996) 'Evaluating the impacts of human capital stocks and accumulation on economic growth: some new evidence', *Oxford Bulletin of Economics and Statistics,* 58(1): 9-28.
Glynn, S and Gospel, H (1993) 'Britain's low skill equilibrium – a problem of demand?' *Industrial Relations Journal,* 24(2): 112-125.
Green, A and Steedman, H (1997) *Into the Twenty First Century: An Assessment of British Skill Profiles and Prospects*, London: Centre for

Economic Performance, London School of Economics.
Green, F (1998) 'The value of skills', *University of Kent at Canterbury, Studies in Economics, Number 98/19*.
Green, F (1999) 'The market value of generic skills'*, Skills Task Force Research Paper 13,* Nottingham: DfEE Publications.
Green, F and Ashton, D (1992) 'Skill shortage and skill deficiency: a critique', *Work, Employment and Society*, 6(2): 287-301.
Green, F and James, D (2001) 'Do male bosses underestimate their female subordinates' skills? A comparison of employees' and line managers'perceptions of job skills', *University of Kent at Canterbury Studies in Economics, Number 01/07*.
Green, F, McIntosh, S and Vignoles, A (2002) 'The utilisation of education and skills: evidence from Britain', *The Manchester School of Economic and Social Studies*, forthcoming.
Green, F, Ashton, D, Burchell, B, Davies, B and Felstead, A (2000) 'Are British workers getting more skilled?' in Borghans, L and de Grip, A (eds) *The Over-Educated Worker? The Economics of Skill Utilisation*, Cheltenham, Edward Elgar.
Green, F, Felstead, A and Gallie, D (2001) 'Computers and the changing skill-intensity of jobs', *Applied Economics,* forthcoming.
Hales, J, Shaw, A and Woodland, S (2001) *Skills Survey 2: Technical Report*, report by the National Centre for Social Research.
International Association for the Evaluation of Educational Achievement (1988) *Science Achievement in Seventeen Countries*, Oxford: Pergamom Press.
ILO (1999) *World Employment Report, 1998-99: Employability in the Global Economy- How Training Matters,* Geneva: ILO.
Johnson, T J (1972) *Professions and Power*, London: Macmillan.
Johnson, S and Winterton, J (1999) 'Management skills*', Skills Task Force Research Paper 3*, Nottingham: DfEE Publications.
Keep, E and Mayhew, K (1996) 'Evaluating the assumptions that underlie training policy', in Booth, A an Snower, D (eds) *Acquiring Skills. Market Failures, Their Symptoms and Policy Responses*, Cambridge: Cambridge University Press.
Kerr, C, Dunlop, J T, Harbison, F and Myers, C A (1960) *Industrialism and Industrial Man,* Cambridge, Massachusetts: Harvard University Press.
Krueger, A B (1993) 'How computers have changed the wage structure – evidence from microdata, 1984-1989', *Quarterly Journal of Economics*, CVIII(1): 33-60.
Krueger, A B and Lindahl, M (1998) 'Education for growth: why and for whom?', Department of Economics, Princeton University, Princeton, NJ, mimeo.
Machin, S (1999) 'Wage inequality in the 1970s, 1980s and 1990s', in Gregg P and Wadsworth, J (eds) *The State of Working Britain*, Manchester: Manchester University Press.
OECD and Statistics Canada (1995) *Literacy, Economy and Society, Results of the First International Adult Literacy Survey*, Paris and Ottawa: OECD.
OECD, Human Resources Development Canada and Statistics Canada (1997) *Literacy Skills for the Knowledge Society – Further Results from the International Adult Literacy Survey*, Paris: OECD.

OECD (1998) *Human Capital Investment*, Paris: OECD.
O'Shaughnessy, K C, Levine, D I and Cappelli, P (2001) 'Changes in managerial pay structures 1986–1992 and rising returns to skill', *Oxford Economic Papers* 53(3): 482-507.
Parkin, F (1974) 'Strategies of closure in class formation', in Parkin, F (ed.) *The Social Analysis of Class Structure*, London: Tavistock.
Penn, R, Rose, M and Rubery, J (1994) (eds) *Skill and Occupational Change*, Oxford: Oxford University Press.
Performance and Innovation Unit (2001) *In Demand: Adult Skills in the 21st Century*, Report prepared by the Performance and Innovation Unit, Cabinet Office.
Spenner, K I (1990) 'Skill, meanings, methods and measures', *Work and Occupations*, 17: 399-421.
Steedman, H (1998) 'A decade of skill formation in Britain and Germany', *Journal of Education and Work*, 11(1): 77-94.
Steedman, H and Mcintosh, S (2001) 'Looking into the qualifications 'black box': what can international surveys tell us about basic competence', *Oxford Economic Papers*, 53(3): 564-581.
Steedman, H and Wagner, K (1989) 'Productivity, machinery and skills: clothing manufacturing in Britain and Germany', *National Institute Economic Review*, 128: May, 40-57.
Stevens, M (1994) 'A theoretical model of on-the-job training with imperfect competition', *Oxford Economic Papers*, 46(4): 537-562.
System Three Social Research (2001) *Working in Britain in the Year 2000: Technical Report*, prepared for the Policy Studies Institute, University of Westminster.
Thompson, P, Wallace, T, Flecker G and Ahlstrand, R (1995) 'It ain't what you do, it's the way that you do it: production organisation and skill utilisation in commercial vehicles', *Work, Employment and Society*, 9(4): 719-742.
Wood, S (1989) (ed.) *The Transformation of Work?*, London: Unwin Hyman.
Zuboff, S. (1988) *In the Age of the Smart Machine: The Future of Work and Power,* New York: Basic Books.

TECHNICAL ANNEXE

A1 Sample Design[18]

The 2001 Skills Survey aimed to comprise 4,360 interviews productive interviews. In the event, however, this was exceeded by 110 with an achieved sample of 4,470 available for analysis. The sample was based on the Postcode Address File (PAF) and involved random probability methods. Stratification was used to ensure the sample points were spread throughout Britain. Sub-regions were identified (counties or sets of counties), each of which was divided into three bands, based on the percentage of household heads in non-manual Socio-Economic Groups (SEG 1-6 and 13). In each of the resulting 105 units, individual postcode sectors were listed in order of the percentage of males of working age who were unemployed. This ordered list was converted to a cumulative count of postal delivery points (addresses) and sectors were identified for the sample by identifying the sector in which a specific address was located, based on a random start and a fixed interval (total delivery points divided by the 218 sectors required). Addresses were then selected randomly within each of these postcode sectors.

Interviewer assignments consisted of 64 addresses within 218 postcode sectors, so the issued sample was 13,952 addresses. The expectation was that just over half the addresses would be found to be eligible in meeting three criteria:

- residential and currently occupied,
- containing someone aged 20-60 years of age,
- and at least one person in paid work of one hour per week or more.

Based on the proportion of eligible addresses in the 1997 Skills Survey (51 percent), which adopted the same sample design and selection process, it was anticipated that 64 addresses per assignment would yield about 33 eligible addresses per sample point. Based on the 1997 Skills Survey response rate of 67 percent, it was anticipated that assignments consisting of 64 addresses would each produce just over 20 productive interviews.

Interviewers first had to determine whether there was an eligible individual to interview at each of the addresses they were given. For our purposes, they needed to be in work and aged 20-60 years old. When the interviewer was faced with more than one eligible interviewee per household, a 'Kish grid' method of selection was adopted. A 'Kish grid' refers to a table of randomly-generated numbers. In aggregate, the effect of using a Kish grid is to give each eligible person an equal chance of selection. It is used both for selection of the dwelling unit, where the postal delivery point contains more than one, and, far more often, for selection of a single adult person, when the dwelling unit contained two or more eligible for selection. The process of selection was fully documented on an 'Address Record Form' (ARF), a paper document

[18] This section and the next are adapted extracts from the technical report of the survey company (Hales *et al*., 2001).

used by the interviewer to record all attempts to contact those at the address. As a measure to protect the identity of sample members' the ARF is returned by interviewers to the office, separately from the computer data file. The data set supplied contained a kish weight designed to take into account the differential probabilities of sample selection according to the number of dwelling units at each issued address and the number of eligible interview respondents. In other words, those from households with more eligible members for interview were given a slightly higher weight than those from smaller households where their chances of interview were, by definition, higher.

A2. Data Collection and Fieldwork Management

A2.1 Interviewer Briefings

The great majority of interviewers undertook a whole 'assignment' of 64 addresses, although in some cases a 'sample point' was split between two interviewers. All interviewers attended one of a series of briefing sessions on the survey, which were held at various locations around the country. These briefings were each conducted by one of the National Centre's researchers, following an agreed briefing plan and using a common set of materials.

Personal briefings of interviewers play various roles. Although much of the attention is devoted to practical aspects of a given survey, they have an important motivating function. By seeing that interviewers are aware of the purpose of the research, they are able to explain the study effectively to members of the sample. Standard procedures, such as reporting to the police in advance of interviewing, are also reinforced by attendance at briefings. Personal briefings are standard on virtually all of the National Centre's surveys.

Briefings started on 15 February and were completed on 14 March 2001.

The briefings covered:

- the background to the study and its aims;
- the survey population, what constitutes 'paid work' to determine eligibility;
- introducing the survey to members of the public, use of the advance letter and leaflet;
- sample selection procedures, using some worked examples;
- questionnaire structure;
- practice interviews;
- survey administration (led by an Area Manager or experienced interviewer).

All interviewers were provided with a copy of the project instructions for the survey.

A2.2 Respondent Letter and Leaflet

A letter on Department for Education and Employment letterhead was prepared for each address in the sample. For each address, the interviewer also had an envelope, over-printed with a pre-paid postage mark. Interviewers were instructed to send these letters in batches which they could follow-up personally within a couple of days. It is felt that timely contact following a letter of this type is likely to contribute to a high response rate. However, the letters made it clear that the survey was voluntary, and explained whom to contact if the members of the household were unwilling to take part in the survey. A freephone number was provided at the National Centre for any inquiries which members of the public wished to make.

A2.3 Second Letter

The initial letter was necessarily addressed to 'The Resident', as we did not have a named person to interview at this stage. One of the innovative procedures which was used to try to maximise response rate was a personally addressed letter to introduce the survey to the selected respondent. This letter was posted by the interviewer when the selected person had not been present at the time of selection. The idea behind this letter was that it would help to reinforce the importance of taking part in the survey, and would minimise possible problems of the interviewer's call not being mentioned to the person selected as respondent, or the purpose of the interview not being explained adequately.

It is recorded that some 800 second letters were issued. It is difficult to judge their effect on the response rate from booking-in data, because it may well be that interviewers were more likely to use the letter when they felt some uncertainty about whether the selected person would agree to be interviewed. Records show that 460 productive interviews were conducted in these cases.

A2.4 Fieldwork Dates

Interviewing started immediately after the first briefing session (17 February) and continued to 26 June, in order to maximise the response rate – although 87 percent of interviews were completed within a three-month period (March-May). Allowing contacts to continue over a period of weeks is important to minimise non-contact with people who are often away from home or absent for a period of time. In some cases interviewers had an area in which a relatively high proportion of the addresses included someone who was eligible for interview. In these cases, the interviewing work needed to be spread across a number of weeks.

In addition to allocation of addresses to interviewers at the outset of the project, selected cases that had initially failed to generate a productive

interview were ‘re-issued’, usually to a very experienced interviewer, both to ensure that reasonable response rates were achieved in more difficult areas and to maximise the overall response rate. The addresses selected for re-issue were determined on the basis of judgement as to the likelihood of achieving a positive outcome. In all, 1,386 addresses were re-issued and they resulted in an additional 260 interviews being achieved (19 percent). In all, the re-issuing of addresses added approximately 4 percentage points to the response rate (see below).

A2.5 Supervision and Quality Control

One of the key methods of quality control on data collection is regular accompaniment of each interviewer by a supervisor. A total of 46 interviewers were accompanied during assignments on this project.

A second quality control measure is recontact with members of the sample, to check on certain details of the information collected by the interviewer. Ten percent of the productive interviews (467 cases) were back-checked, of which 441 were conducted by telephone and the remainder by post. A single case was considered unsatisfactory.

A further postal check was made on 370 addresses which were identified as out of scope. This was necessarily conducted by post, and 139 responses were received. Of these, four possible discrepancies were identified and were referred to the operations team for re-issue to a different interviewer.

A2.6 Self-Completion Questions

Blocks C and J contained questions which respondents were encouraged to answer by self-completion, keying a numeric answer on the computer. The questions were suitable for this approach because they followed a simple pattern.

Three-quarters (77 percent) of respondents completed block C on the computer.

A2.7 Interview Length

In estimating the workloads of interviewers, it was planned that interviews should have a median length of 50 minutes. We allowed for some variation in the length of interview according to factors such as whether respondents had been working in the past, in which case they would qualify for additional questions (in Blocks H and J). In the event, the median length of interviews

was 51 minutes[19]. This is based on the time difference between the start and finishing times, as recorded on the interviewers' computers. Interviewers also entered their own record of interview length, and this was slightly longer due to the time required at the start and end of the interview, for example in setting up the computer.

The distribution of interview lengths shows considerable variation around the median. There was some variation in length according to past work experience and by whether the interviewer or the respondent completed the main self-completion section in Block C. Various timings are presented in Table A2.1

Table A2.1 Length of Interview

Type of interview	Mean length (minutes)	Median length (minutes)	Unweighted base
Full productive interviews	52.7	51.1	4,271
12 to 29 minutes	25.3	26.3	172
30 to 44 minutes	39.0	39.7	1,192
45 to 59 minutes	52.1	51.9	1,755
60 to 74 minutes	66.3	65.9	816
75 minutes and over	84.7	81.3	336
Block C by respondent	53.0	51.2	3,310
Block C by interviewer	51.3	50.7	961
Respondent in same job 5/4/3 years ago	52.6	51.1	2,108
Respondent in different job 5/4/3 years ago	53.9	52.1	1,937
Respondent was not in work	42.0	40.9	226

A3 Survey Outcomes

A3.1 Response Rate

The response rate is an indicator of survey representativeness. If the response rate is high, one can be confident that any bias in the achieved sample is likely to be small. The key problem with survey non-response is that

[19] This calculation excludes some cases with very high apparent lengths, which can arise where the interviewer has conducted the interviews on different occasions or has re-entered the interview to check the information (e.g. to correct any spelling mistakes in open-ended answers).

often one knows little about the non-responding case. The nature and extent of bias can be estimated using other statistical data relating to the employed population. Such data may allow corrections to be applied to the survey data, using weighting in the analysis (see below).

However, response rates can be measured in several ways. First, it is important to monitor the fieldwork performance of the market research company commissioned to carry out the work. Here, the focus is on the extent to which the National Centre completed the screening of households and, where appropriate, conducted full interviews with eligible respondents. This is sometimes referred to as the gross response rate. Secondly, the reliability of the results generated by the survey can be influenced by the extent to which sample households with eligible respondents participated in the survey. This is known as the net response rate and is based on estimates about the proportion of households with eligible respondents who refused to be screened. Both response rates were calculated and compared to surveys with a similar target group.

At the outset the sample consisted of 13,952 addresses. The postcode address file contains some addresses which are not residential or which are not occupied, in this case 8.7 percent of the issued sample fell into this category (Table A3.1). The remaining addresses are referred to as the in-scope sample, even though in some cases there must be doubt about whether they were residential or currently occupied, especially where the interviewer was unable to contact anyone at the address.

The first contact was a letter sent by interviewers in advance of any call at the selected addresses. Nearly 800 of the recipients of these letters contacted the National Centre, often explaining why they considered they were inappropriate to take part in the survey (e.g. no-one living at the address was in paid work) or that they were unwilling to be interviewed. Where the reason for the call could be established, the case has been coded accordingly. There remain 94 cases where, where it could not be established whether the residents at the address would have been eligible for an interview. Although labelled ‘office refusals’, in practice there were probably various motives for these calls, but insufficient information could be coded to justify assigning them to another code. In cases with contact at the office following the initial letter, the interviewer assigned the address would be advised of the contact and usually told not to approach the address in person.

In many cases, interviewers were able to contact the residents and established by screening whether or not an occupied, residential address contained an eligible respondent. Screening was carried on 11,658 in-scope addresses (91.5 percent). The first stage in the screening process was to ask about the number of occupied dwelling units at the address. In a small percentage of cases, where there were two or more, the interviewer selected one dwelling unit (using a Kish grid method to ensure equal probabilities across all addresses), and then proceeded to enumerate the adult residents who were within the age range 20-60 and who were in paid work. Again, the Kish grid was used to select one person from those eligible for interview. At each of these stages in the process, some people declined to provide the information necessary to complete the screening – 1,079 addresses (8.5

percent) fell into this category. However, of those screened, interviewers were successfully able to identify 6,179 addresses (53 percent) containing an eligible respondent for interview.

Not all of the 6,179 eligible individuals agreed to be interviewed. About a fifth personally refused to take part in the survey (18 percent), some broke interview appointments (4 percent) and some had participation refused on their behalf (3 percent). In other cases interviews could not take place for other reasons such as illness or absence from the place of residence during the survey period. Nevertheless, 4,470 productive interviews were completed. This represents a gross response rate of 72.3 percent of those identified as eligible for interview (Table A3.1).

Table A3.1 Gross Response Rate Analysis

	N	%	%	%	%
Original issued addresses	13,952	100.0			
Out of scope addresses:	1,215	8.7			
- insufficient address	*8*	*0.0*			
- not traced	*103*	*0.7*			
- not built	*22*	*0.2*			
- derelict/demolished	*72*	*0.5*			
- empty dwelling	*674*	*4.8*			
- business premises	*183*	*1.3*			
- institution	*28*	*0.2*			
- holiday home	*65*	*0.5*			
- other out of scope	*60*	*0.4*			
In scope of screening	12,737	91.3	100.0		
Not screened:	1,079		8.5		
- no contact with an adult	*985*		*7.7*		
- refusal (including head office)	*94*		*0.7*		
Screened	11,658		91.5	100.0	
No-one aged 20-60	3,662			31.4	
No-one aged 20-60 in paid work	1,817			15.6	
Selected eligible respondent	6,179			53.0	100.0
Refusal after screening:	1,517				24.6
- personal refusal	*1,111*				*18.0*
- proxy refusal	*189*				*3.1*
- broken appointment	*217*				*3.5*
Other unproductives:	192				3.1
- ill during survey	*15*				*0.2*
- away/in hospital	*89*				*1.4*

- senile/incapacitated	*15*				*0.2*
- inadequate English	*14*				*0.2*
- other unproductive	*48*				*0.8*
- not covered/lost on laptop	*11*				*0.2*
Productive interviews	4,470				72.3

It is also important to be aware of the net response rates to any survey since they also take into account the extent to which market research companies are able to successfully screen addresses. This is bound to reduce reported response rates since it is often not possible to screen all the addresses issued. However, some of those addresses not screened are likely to contain individuals eligible for interview. To calculate the net response rate one needs to make an adjustment which takes this into account. Certain assumptions have to be made to do so. For one thing, we simply do not know what proportion of those addresses not screened contain individuals eligible for interview. However, it is reasonable to assume that the proportion is similar to the proportion of addresses successfully screened in field. In our case the figure was 53 percent. In other words, of the 1,079 addresses not screened by the National Centre for this survey one can assume that 572 contained individuals who were eligible for interview. Were the screening of households 100 percent successful, therefore, we would have had 6,179 + 572 eligible individuals to interview (Table A3.2). The fact that the National Centre successfully interviewed 4,470 of them suggests that the net response rate was 66.2 percent (4,470/(6,179+572)). Even though the screening of households was completed in the overwhelming majority of cases (91.5 percent), failure to screen even a small percentage of households has an impact on the net response rate recorded. One should, therefore, be wary about comparing response rates across surveys since those which screen (such as ours) will inevitably post lower net response rates than those whose sample comprises a list of pre-selected named individuals.

Table A3.2 Net Response Rate Analysis

	N	%	%	%	%
Original issued addresses	13,952	100.0			
Out of scope addresses:	1,215	8.7			
- insufficient address	*8*	*0.0*			
- not traced	*103*	*0.7*			
- not built	*22*	*0.2*			
- derelict/demolished	*72*	*0.5*			
- empty dwelling	*674*	*4.8*			
- business premises	*183*	*1.3*			
- institution	*28*	*0.2*			
- holiday home	*65*	*0.5*			
- other out of scope	*60*	*0.4*			
In scope of screening	12,737	91.3	100.0		
Not screened:	1,079		8.5		
- no contact with an adult	*985*		*7.7*		
- refusal (including head office)	*94*		*0.7*		
Screened	11,658		91.5	100.0	
No-one aged 20-60	3,662			31.4	
No-one aged 20-60 in paid work	1,817			15.6	
Selected eligible respondent	6,179			53.0	
Not screened, but assumed eligible	572				
Estimated eligible addresses	6,751				100.0
Not screened, but assumed eligible	572				8.5
Refusal after screening:	1,517				22.5
- personal refusal	*1,111*				*16.5*
- proxy refusal	*189*				*2.8*
- broken appointment	*217*				*3.2*
Other unproductives:	192				2.8
- ill during survey	*15*				*0.2*
- away/in hospital	*89*				*1.3*
- senile/incapacitated	*15*				*0.2*
- inadequate English	*14*				*0.2*
- other unproductive	*48*				*0.7*
- not covered/lost on laptop	*11*				*0.2*
Productive interviews	4,470				66.2

Nevertheless, a response rate (gross or net) of around seven out of ten of those deemed eligible for interview is reasonable and is in line with other national surveys carried out by academics about people's working lives (Table A3.3). Indeed, comparisons of gross and net response rates for the 2001 Skills Survey compares favorably against the 1997 Skills Survey and suggests that the extra efforts invested in maximising response rates were worthwhile (advance letters, follow-up letters and leaflets, see A2.2 and A2.3).

Table A3.3 Comparative Gross and Net Response Rates

Survey	Gross Response Rate	Net Response Rate
1997 Skills Survey	67.1	63.1
2000 Working in Britain Survey	71.7	64.6
2001 Skills Survey	72.3	66.2

Sources: Ashton *et al*. (1999: 45-47); System Three Social Research (2001: 9).

A3.2 Survey Representativeness

Although the sample design should ensure that it is representative of workers in Britain, we first checked whether the sample is broadly representative. We classified the data against some standard socio-economic variables, and compared with figures from the Spring 2001 Quarterly Labour Force Survey (QLFS). Since the QLFS has a substantially larger sample size, and since it gleans information from every member of households, it can be argued that the QLFS sample is likely to be closely representative of the workforce.

Table A3.4, below, presents this comparison, where the figures in brackets are the figures from the QLFS (excluding the Northern Ireland sample). The base is those in employment and aged between 20 and 60 inclusive. We compare the representation in the two samples of the different age groups, ethnicity, working time status, occupation and industry.

Table A3.4 Socio-Economic Distribution of the Sample

	All	All (%)	Males (%)	Females (%)
All	4470	100	100	100
Sex				
Male	2283	51.1 (54.9)	100	0
Female	2187	48.9 (45.1)	0	100
Age groups:				
20-29	902	20.2 (21.8)	20.6 (21.8)	19.8 (21.9)
30-39	1283	28.7 (30.2)	30.2 (30.9)	27.2 (29.3)
40-49	1266	28.3 (26.0)	26.8 (25.4)	29.9 (26.7)
50-60	1018	22.8 (22.0)	22.4 (21.9)	23.2 (22.1)
Ethnicity				
White	4210	94.2 (94.3)	93.8 (94.1)	94.6 (94.6)
All non-white	260	5.8 (5.7)	6.2 (5.9)	5.4 (5.4)
Working Time				
Full-Time	3476	77.8 (78.2)	95.3 (94.6)	59.4 (58.2)
Part-time	994	22.2 (21.8)	4.7 (5.4)	40.6 (41.8)
Occupation (SOC2000)				
Managers	606	13.6 (14.6)	18.0 (18.5)	8.9 (9.7)
Professionals	570	12.7 (12.7)	13.6 (13.8)	11.9 (11.3)
Associate Professionals	692	15.5 (14.1)	14.8 (13.8)	16.2 (14.4)
Administrative & Secretarial	660	14.8 (13.6)	6.4 (5.0)	23.6 (24.0)
Skilled Trades	495	11.1 (11.8)	19.4 (19.8)	2.4 (2.2)
Personal Services	307	6.9 (7.1)	2.0 (1.9)	12.0 (13.5)
Sales	303	6.8 (6.7)	3.0 (3.5)	10.7 (10.5)
Plant & Machine Operatives	389	8.7 (8.7)	13.4 (13.1)	3.8 (3.4)
Elementary	447	10.0 (10.7)	9.5 (10.5)	10.6 (10.9)

Table A3.4 Continued

	All	All (%)	Males (%)	Females (%)
Industry (SIC92)				
Agriculture & fishing	40	0.9 (1.2)	1.3 (1.7)	0.5 (0.6)
Energy & water	49	1.1 (1.2)	1.4 (1.7)	0.8 (0.6)
Manufacturing	767	17.2 (17.0)	24.3 (23.1)	9.9 (9.7)
Construction	248	5.6 (7.2)	9.9 (11.9)	1.0 (1.5)
Distribution, hotels & restaurants	770	17.3 (17.3)	15.7 (15.2)	19.0 (19.9)
Transport & communication	279	6.3 (7.5)	8.6 (10.2)	3.8 (4.1)
Banking, finance & insurance etc	752	16.9 (16.4)	17.9 (16.6)	15.8 (16.1)
Public admin, education & health	1,330	29.9 (26.6)	16.2 (14.7)	44.1 (41.1)
Other services	205	4.6 (5.5)	4.7 (4.7)	4.5 (6.5)

Note:
All figures are weighted by a factor that takes into account the differential probability of being sampled; numbers may not add to 100% due to rounding.

We find that, broadly, the achieved sample is indeed representative of Britain. The proportions are remarkably close to those of the QLFS on all variables. The QLFS point estimate lies within a 95% confidence interval for the Skills Survey estimate for all variables, with the following exceptions.

The 2001 Skills Survey sample under-represents males compared to the LFS population by just under four percentage points. This finding is broadly to be expected on the basis of previous surveys. It is likely that the difference arises from a slightly higher non-contact rate for males. The analysis below takes account of this finding by multiplying the sampling weights by a gender-related weight. The gender-related weight takes the values 1.075 for males and 0.922 for females. The result is a new weighting variable, which ensures that the estimated proportions of males and females exactly reproduce the proportions in the QLFS sample. There is also some over-representation by roughly two percentage points, relative to the QLFS, of 40-49 year olds, and an equivalent under-representation of 30-39 year olds. Finally, there is also some over-representation, by around three percentage points, of people working in the 'Education', 'Health and Social Work' or 'Public Administration' sectors, only part of which is attributable to that sector employing more females. It is likely that this over-representation derives from the clustered sampling procedure, which does not necessarily achieve a close regional representation, and may therefore bias slightly the representation of particular sectors.

TABLES

Table 3.1 Distribution of Broad Skills by Gender and by Full-Time/Part-Time Status, 2001

Broad Skills[1]	All	Males	Females	Female Full-Time	Female Part-Time
	Sample Percentages/Scores				
(a) Highest Qualification Required[2]					
Level 4 or above	29.2	30.8	27.3*	33.1†	18.8‡
Degree	17.3	18.7	15.6*	20.4	8.7‡
Non-degree	11.9	12.1	11.7	12.7	10.1‡
Level 3	16.3	20.2	11.6*	14.7†	7.0‡
Level 2	15.9	11.8	20.9*	22.2†	19.0‡
Level 1	12.1	13.1	10.8*	8.3†	14.5‡
No qualifications	26.5	24.1	29.4*	21.7	40.7‡
Required Qualification Index	2.10	2.20	1.96*	2.29	1.49‡
(b) Training Time[3]					
> 2 years	23.6	26.2	20.4*	23.4†	16.1‡
< 3 months	61.1	60.4	61.9	6.4†	70.0‡
Training index	2.27	2.33	2.19*	2.46	1.78‡
(c) Learning Time (Employees Only)[4]					
> 2 years	25.6	32.2	18.1*	21.9†	2.4‡
< 1 month	20.2	16.1	24.9*	16.8	36.9‡
Learning Time Index	3.57	3.90	3.19*	3.53†	2.69‡

Notes:
* = a statistically significant difference between male and female workers ($p<0.10$)
† = a statistically significant difference between male and female full-time workers ($p<0.10$)

‡ = a statistically significant difference between full-time and female part-time workers ($p<0.10$)

1. The data reported here and throughout have been weighted by a factor that takes into account the slight over-representation of women in all of the samples and according to the number of eligible respondents at each address visited. All calculations exclude missing values.

2. Respondents in all four surveys were asked: 'If they were applying today, what qualifications, if any, would someone need to *get* the type of job you have now?' A range of options was given. From this the highest qualification level, ranked by NVQ equivalents, was derived. For 2001, the following qualification mapping was applied:

Level 4 or above = masters or PhD degree, university or CNAA degree, other professional (eg, law, medicine), teaching, nursing (eg SCM, RGN, SRN, SEN) NVQ level 4 (or SNVQ4) or HNC/HNC (or SHNC/SHNC); Degree = masters or PhD degree, university or CNAA degree; Non-degree = other professional (eg, law, medicine), teaching, nursing (eg SCM, RGN, SRN, SEN);

Level 3 = GCE 'A' level or GNVQ advanced, SCE higher or SLC/SUPE higher, certificate of 6th year studies, university certificate/diploma (not degree), SCOTVEC national certificate, SCOTBEC/SCOTBEC certificate/diploma, completion of trade apprenticeship, NVQ level 3 (or SNVQ 3) or ONC/OND (or SNC/SND);

Level 2 = GCSE A*-C or GNVQ intermediate or GCE 'O' level or CSE grade 1 or school certificate of matriculation, SCE standard (1-3)/ordinary (A-C) or SLC/SUPE lower, clerical/commercial (eg typing or bookkeeping), professional qualification without sitting exam, NVQ level 2 (or SNVQ 2);

Level 1 = GCSE D-G or CSE (other than grade 1) or GNVQ foundation, other, NVQ level 1 (or SNVQ 1); No qualifications = none reported.

- The Required Qualifications Index was calculated from the responses: none=0; level 1=1; level 2=2; level 3 =3; and level 4 or above=4.

3. Respondents to all four surveys were asked: 'Since completing full-time education, have you ever had, or are you currently undertaking, training for the type of work that you currently do? Respondents answering 'yes' were then asked: 'How long, in total, did (or will) that training last?' A range of options was given.

- The Training Time Index was calculated from the responses: none=0; less than 1 month=1; 1=3 months=2; 3-6 months=3; 6-12 months=4; 1-2 years=5; and over 2 years=6.

4. Respondents to all four surveys were asked: 'How long did it take for you after you first started doing this type of job to learn to do it well?' This question was asked only of employees in 1986 and so the 1992, 1997 and 2001 figures have been restricted accordingly.

- The Learning Time Index was calculated from the responses: less than 1 month=1; less than 3 months=2; 3-6 months=3; 6-12 months=4; 1-2 years=5; and over 2 years=6.

Table 3.2 Distribution of Broad Skills by Occupation, 2001

Occupation[1]	Required Qualification Index	Training Time Index	Learning Time Index
Managers	2.61	2.54	4.20
Professionals	3.69	3.60	4.87
Associate Professionals	2.91	3.17	4.24
Administrative & Secretarial	2.01	1.81	2.95
Skilled Trades	1.95	2.69	4.39
Personal Service	1.45	2.40	3.11
Sales	0.96	0.97	2.36
Plant & Machinery Operatives	0.91	1.17	2.94
Elementary Occupations	0.58	0.69	1.96

Note:
1. Occupations are classified by SOC2000 Major Groups. The indices are derived as outlined in Table 3.1.

Table 3.3 Distribution of Broad Skills by Social Class, 2001

Social Class[1]	Required Qualification Index	Training Time Index	Learning Time Index
Higher Managerial & Large Employers	3.19	2.99	4.30
Higher Professional	3.59	3.49	4.58
Lower Managerial & Professional	2.92	3.01	4.28
Intermediate	1.99	1.89	3.02
Small Employers & Own Account Workers[2]	1.51	1.73	1.91
Lower Supervisory & Technical	1.87	2.47	4.05
Semi-Routine	0.88	1.29	2.46
Routine	0.66	0.93	2.31

Notes:
1. Social class is derived according to the National Statistics Socio-Economic Classification system (NS-SEC). The indices are derived as outlined in Table 3.1.
2. Elsewhere in this Report, the Learning Time Index has been restricted to employees only. Here, this restriction has been lifted.

Table 3.4 Distribution of Broad Skills by Industry, 2001

Industry[1]	Required Qualification Index	Training Time Index	Learning Time Index
Manufacturing	2.00	1.97	3.63
Construction	2.10	2.41	4.46
Wholesale & Retail	1.32	1.38	2.97
Hotels & Restaurants	1.10	1.23	2.25
Transport & Storage	1.35	1.56	3.17
Financial	2.37	2.54	3.57
Real Estate & Business Services	2.60	2.32	3.57
Public Administration	2.42	3.03	3.83
Education	2.98	2.94	4.21
Health & Social Work	2.42	3.18	3.70
Personal Services	1.91	2.24	3.28

Note:
1. Industries are classified by SIC92: only those with sample size above 100 are shown. The indices are derived as outlined in Table 3.1.

Table 3.5 Distribution of Broad Skills by Region, 2001

Region	Required Qualification Index[1]	Training Time Index	Learning Time Index
North East	2.21	2.13	3.54
North West	2.05	2.39	3.50
Yorkshire and the Humber	2.02	2.40	3.79
East Midlands	1.90	1.87	3.67
West Midlands	2.00	2.37	3.77
East	1.93	2.25	3.50
London	2.41	2.37	3.50
South East	2.30	2.20	3.69
South West	2.03	2.57	3.76
Wales	1.95	2.04	3.56
Scotland	2.05	2.08	3.12

Note:
1. The indices are derived as outlined in Table 3.1.

Table 3.6 Qualifications Demand and Supply, 2001

	Demand	Supply
	Highest Qualification Required[1] ('000s of jobs)	Highest Qualification Held[2] ('000s of people)
Level 4 or above	7,122	7,359
Degree	4,220	4,774
Non-degree	2,903	2,585
Level 3	3,976	6,379
Level 2	3,878	5,302
Level 1	2,951	3,549
No qualifications	6,464	2,881

Notes:

1. Using the Spring 2001 Quarterly Labour Force Survey, an estimate was derived of the total number of individuals aged 20-60 years old who were in paid work in Britain. This figure was then multiplied by the percentage of respondents to the 2001 Skills Survey who reported that access to their jobs required qualifications at one of the levels shown in column 1. These percentages are reported in Tables 3.1 and 4.1. Column 2, then, comprises estimates of the number of jobs in Britain that demand qualifications at various levels in the NVQ hierarchy. The analysis here is restricted to individuals' main job; secondary jobs are not included.

2. Using the Spring 2001 Quarterly Labour Force Survey, an estimate was also made of the total number of individuals who possess qualifications at each of these levels. To capture the complete supply of individuals available for work, we selected not only those in paid work – employees and the self-employed – but also those recorded as ILO unemployed (using the INECACA derived variable). For comparability with evidence from the 2001 Skills Survey, we restricted the analysis to those aged 20-60 years old living in Britain. Similarly, despite the greater detail provided by the LFS on qualifications held (such as the ability to differentiate those with one or two A levels, hence allocating individuals precisely across the Level 2/3 divide), we decided to use the simpler qualification protocols used in deriving the qualification hierarchy for the 2001 Skills Survey (based on the HIQUAL derived variable). In this way, comparability between the columns was maximised. The figures in column 3, then, provide estimates of the numbers of individuals qualified to particular levels in the NVQ hierarchy. To maximise comparability with the 2001 Skills Survey qualifications mapping protocols (see Table 3.1), HIQUAL was categorised as follows:

Level 4 or above = higher degree, NVQ level 5, first degree, other degree, NVQ level 4, diploma in higher education, HNC/HND, BTEC higher etc, teaching – further education, teaching – secondary, teaching – primary, teaching – level not stated, nursing etc, RSA higher diploma, other higher education below degree level;
Degree = higher degree, first degree, other degree; Non-degree = NVQ level 5, NVQ level 4, diploma in higher education, HNC/HND, BTEC higher etc, teaching – further education, teaching – secondary, teaching – primary, teaching – level not stated, nursing etc, RSA higher diploma, other higher education below degree level;
Level 3 = A level or equivalent, RSA advanced diploma, OND/ONC, BTEC/SCOTVEC national, City and Guilds advanced craft, Scottish 6th year certificate (CSYS), SCE higher or equivalent, AS level or equivalent, trade apprenticeship;
Level 2 = NVQ level 2, GNVQ intermediate, RSA diploma, City and Guilds craft, BTEC/SCOTVEC first or general diploma, O level, GCSE grade A-C or equivalent;
Level 1 = NVQ level 1, GNVQ/GSVQ foundation level, CSE below grade 1, GCSE below grade C, BTEC/SCOTVEC first or general certificate, SCOTVEC modules, RSA other, City and Guilds other, YT/YTP certificate, other qualifications; No qualifications = none reported.

Table 3.7 The Distribution of Generic Skills[1] by Gender and by Full-Time/Part-Time Status, 2001

	Literacy	Physical	Number	Technical Know-How	High-level Communication	Planning	Client Communication	Horizontal Communication	Problem-Solving	Checking
Males	0.01	0.09	0.15	0.19	0.09	0.05	-0.05	-0.03	0.12	0.07
Females	-0.01	-0.12 *	-0.16 *	-0.20 *	-0.11 *	-0.06 *	0.06 *	0.03 *	-0.13 *	-0.05 *
Females Full-Time Jobs	0.23 **	-0.21 **	0.03 **	-0.06 **	0.10	0.19 **	0.18 **	0.21 **	0.09	0.14 **
Females Part-time Jobs	-0.33 †*	0.02 †*	-0.42 †*	-0.39 †*	-0.41 †*	-0.41 †*	-0.11 †*	-0.22 †*	-0.45 †*	-0.33 †*

Notes:

1. The generic skills indices are the scores derived from factor analysis of the 35-item importance scale, pooling 1997 and 2001 data. The average score for each skill is zero; hence positive (negative) scores indicate above (below) average scores.

† indicates a significant difference between full-time and female part-time workers.

* indicates a significant difference between female and male workers.

** indicates a significant difference between female full-time workers and male workers.

Table 3.8 The Distribution of Generic Skills Across Occupations, 2001

Occupation[1]	Literacy	Physical	Number	Technical Know-How	High-level Communication	Planning	Client Communication	Horizontal Communication	Problem-Solving	Checking
Managers	0.34	-0.36	0.53	0.08	0.61	0.55	0.56	0.33	0.36	0.13
Professionals	0.61	-0.51	0.45	0.07	0.86	0.58	0.27	0.40	0.41	0.12
Associate Professionals	0.38	-0.33	0.15	0.14	0.42	0.37	0.32	0.27	0.24	0.18
Administrative & Secretarial	0.20	-0.54	0.07	-0.17	-0.28	-0.07	-0.04	-0.03	-0.11	0.22
Skilled Trades	-0.25	0.75	0.02	0.64	-0.27	-0.11	-0.38	-0.20	0.28	0.23
Personal Service	-0.04	0.39	-0.54	-0.30	-0.20	-0.14	0.10	0.22	-0.20	-0.34
Sales	-0.32	-0.08	-0.07	-0.17	-0.44	-0.46	0.38	-0.21	-0.43	-0.15
Plant & Machine Operatives	-0.51	0.59	-0.31	0.06	-0.60	-0.52	-0.57	-0.36	-0.24	-0.06
Elementary	-0.85	0.59	-0.70	-0.50	-0.64	-0.75	-0.69	-0.60	-0.71	-0.61

Note:

1. Occupations are classified by SOC2000 Major Group. The generic skills indices are the scores derived from factor analysis of the 35-item importance scale, pooling 1997 and 2001 data. The average score for each skill is zero; hence positive (negative) scores indicate above (below) average scores.

Table 3.9 The Industrial Distribution of Generic Skills, 2001

Industry[1]	Literacy	Physical	Number	Technical Know-How	High-level Communication	Planning	Client Communication	Horizontal Communication	Problem-Solving	Checking
Manufacturing	-0.19	0.16	0.18	0.29	-0.12	-0.20	-0.38	-0.12	0.15	0.24
Construction	-0.14	0.54	0.20	0.42	-0.13	0.09	-0.14	-0.16	0.20	0.14
Wholesale & Retail	-0.25	0.18	0.07	0.00	-0.24	-0.21	0.23	-0.17	-0.19	-0.07
Hotels & Restaurants	-0.49	0.43	-0.14	-0.12	-0.34	-0.26	0.00	-0.14	-0.23	-0.22
Transport & Storage	-0.16	0.07	-0.21	-0.13	-0.33	-0.23	-0.07	-0.21	-0.23	-0.12
Finance	0.35	-0.86	0.50	-0.01	0.25	0.17	0.33	0.08	0.12	0.23
Real Estate & Business Services	0.21	-0.55	0.17	-0.03	0.28	0.17	0.08	-0.05	0.09	0.09
Public Administration	0.40	-0.34	-0.13	-0.12	0.16	0.20	0.08	0.25	0.05	0.08
Education	0.32	-0.13	0.06	-0.33	0.51	0.38	0.13	0.39	0.04	-0.21
Health & Social Work	0.29	0.10	-0.41	-0.13	0.01	0.13	0.18	0.32	-0.01	-0.12
Personal Services	-0.29	0.13	-0.22	0.03	0.03	-0.03	0.08	-0.09	-0.07	-0.09

Note:
1. Industries are classified by SIC92; only those with sample size above 100 are shown. The generic skills indices are the scores derived from factor analysis of the 35-item importance scale, pooling 1997 and 2001 data. The average score for each skill is zero; hence positive (negative) scores indicate above (below) average scores.

Table 3.10 The Regional Distribution of Generic Skills[1], 2001

Region	Literacy	Physical	Number	Technical Know-How	High-level Communication	Planning	Client Communication	Horizontal Communication	Problem-Solving	Checking
South East	0.07	-0.08	0.09	0.02	0.03	0.07	0.04	0.03	0.05	0.04
Eastern	-0.00	-0.06	0.04	0.00	0.03	0.03	0.01	0.00	0.05	0.02
Greater London	0.08	-0.24	-0.01	-0.08	0.16	0.11	0.09	0.01	-0.01	-0.02
South West	0.00	0.07	-0.03	0.02	-0.12	0.05	0.04	-0.01	-0.03	-0.02
West Midlands	0.00	0.08	0.03	0.10	-0.04	-0.07	-0.06	-0.02	0.00	0.04
East Midlands	-0.07	0.12	-0.00	0.01	-0.05	-0.02	-0.01	-0.05	-0.01	-0.01
Yorkshire & Humberside	-0.07	0.14	0.03	0.08	-0.04	-0.06	-0.07	-0.02	0.02	0.06
North West	0.04	-0.03	0.02	0.00	-0.05	0.02	0.03	0.00	0.01	0.00
North East	-0.09	0.09	-0.09	0.00	-0.15	-0.17	-0.09	-0.04	-0.11	-0.01
Wales	-0.01	0.11	0.03	0.03	-0.08	-0.04	-0.00	0.08	0.03	0.09
Scotland	-0.03	0.03	-0.05	-0.01	-0.04	-0.08	-0.06	-0.02	-0.02	-0.02

Note:

1. The generic skills indices are the scores derived from factor analysis of the 35-item importance scale, pooling 1997 and 2001 data. The average score for each skill is zero; hence positive (negative) scores indicate above (below) average scores.

Table 3.11 Improving Learning and Performance by Gender and by Full-Time/Part-Time Status, 2001

	Percentage whose employer expects them to take responsibility to find better ways of doing their job	Percentage who agree or strongly agree that their job requires them to keep learning new things
All	75.8	81.3
Males	78.9	83.7
Females	72.3	78.4
Females Full-Time Jobs	79.0	83.7
Females Part-time Jobs	62.1	70.6

Table 3.12 Improving Learning and Performance by Occupation, 2001

Occupation[1]	Percentage whose employer expects them to take responsibility to find better ways of doing their job	Percentage who agree or strongly agree that their job requires them to keep learning new things
Managers	93.5	90.6
Professionals	87.6	96.8
Associate Professionals	84.2	94.6
Administrative & Secretarial	67.0	78.4
Skilled Trades	79.7	81.3
Personal Service	70.0	83.8
Sales	63.8	73.8
Plant & Machine Operatives	68.1	64.8
Elementary	56.5	51.2

Note:
1. Occupations are classified by SOC2000 Major Group.

Table 3.13 Generic Management Skills, 2001

	Coaching Staff	Developing Staff Careers	Motivating Staff	Resource Control	Strategic Thinking
	Percentage for Whom Each Activity is 'Very Important' or 'Essential'				
All[1]	71.9	55.3	84.3	71.3	37.8
Male Employees					
Managers	75.4	64.5	88.3	81.6	50.5
Supervisors	64.2	49.2	78.2	63.0	24.3
Female Employees					
Managers	80.4	66.3	90.1	76.5	42.8
Supervisors	73.3	51.5	87.6	63.7	23.0
Female Full-Time Employees					
Managers	82.0	70.7	90.4	80.3	45.8
Supervisors	76.1	53.4	90.1	66.5	24.3
Female Part-time Employees					
Managers	71.2	40.7	88.1	54.2	25.4
Supervisors	65.9	46.5	81.1	56.2	19.8
Employees	71.8	56.4	85.1	70.3	33.9
Self-Employed	72.6	44.7	76.9	82.3	76.9

Note:
1. The base for whom these questions were asked comprised 1,708 employees, of whom 700 were managers and 1008 supervisors, and 160 self-employed .

Table 4.1 Trends in Broad Skills, 1986-2001

Broad Skills	1986	1992	1997	2001
	Sample Percentages/Scores			
(a) Highest Qualification Required[1]				
Level 4 or above	20.2	25.5	24.3	29.2
Degree	9.7	13.2	14.1	17.3
Non-degree	10.5	12.3	10.2	11.9
Level 3	15.2	16.6	13.8	16.3
Level 2	18.5	19.0	21.2	15.9
Level 1	7.7	5.0	9.2	12.1
No qualifications	38.4	34.0	31.5	26.5
Required qualification index[2]	1.71	1.95	1.90	2.10
(b) Training Time				
> 2 years	22.4	21.9	28.9	23.6
< 3 months	66.0	62.6	57.0	61.1
Training index	2.01	2.21	2.53	2.27
(c) Learning Time (Employees Only)				
> 2 years	24.3	21.6	24.3	25.6
< 1 month	27.1	22.3	21.4	20.2
Learning index	3.30	3.36	3.48	3.57
Sample base: all in employment, aged 20-60	4047	3855	2467	4470

Notes:
1. The qualification coding frames in each of these surveys has been subject to only minor amendment. To further enhance comparability the same

qualification mapping protocols have been applied to each data set reported here. For completeness this note details the qualification mapping used for 1986, 1992 and 1997. The 2001 map is outlined in Table 3.1.

- For 1986 and 1992, the following qualification map was applied:

Level 4 or above = university or CNAA degree, other professional (eg law, medicine), teaching, nursing (eg SRN/SEN), HNC/HND or SHNC/SHND; Degrees = university or CNAA degree; Non-degrees = other professional (eg law, medicine), teaching, nursing (eg SRN/SEN), HNC/HND or SHNC/SHND;
Level 3 = GCE 'A' level, SCE higher or SLC/SUPE higher grade, certificate of 6th year studies, ONC/OND (or SNC or SND), university certificate/diploma (not degree), SCOTVEC national certificate, SCOTBEC/SCOTEC certificate/diploma, completion of trade apprenticeship;
Level 2 = GCE 'O' level or grade 1 CSE or school certificate of matriculation, SCE 'O' level or lower grade SLC or SUPE, City and Guilds, clerical and commercial (eg typing, shorthand or bookkeeping), professional qualification without sitting exam;
Level 1 = CSE (other than grade 1), other; No qualifications = none reported.

- For 1997, the following qualification map was applied:

Level 4 or above = university or CNAA degree, other professional (eg law, medicine), teaching, nursing (eg SRN/SEN), HNC/HND or SHNC/SHND; Degrees = university or CNAA degree; Non-degrees = other professional (eg law, medicine), teaching, nursing (eg SRN/SEN), HNC/HND or SHNC/SHND or S/NVQ level 4;
Level 3 = GCE 'A' level or GNVQ advanced, SCE higher or SLC/SUPE higher grade or GNVQ advanced, certificate of 6th year studies, ONC/OND (or SNC or SND) or S/NVQ level 3, university certificate/diploma (not degree), SCOTVEC national certificate, SCOTBEC/SCOTEC certificate/diploma, completion of trade apprenticeship;
Level 2 = GCE 'O' level or grade 1 CSE or school certificate of matriculation or GNVQ intermediate, SCE 'O' level or lower grade SLC or SUPE or GNVQ intermediate, City and Guilds or S/NVQ level 2, clerical and commercial (eg typing, shorthand or bookkeeping), professional qualification without sitting exam;
Level 1 = CSE (other than grade 1), other; No qualifications = none reported.

2. The indices are derived as outlined in Table 3.1

Table 4.2 The Pattern of Change in the Distribution of Broad Skills, 1986-2001, by Gender and by Full-time/Part-Time Status

	Required Qualification Index[1]			Training Time Index			Learning Time Index		
	1986-1992	1992-1997	1997-2001	1986-1992	1992-1997	1997-2001	1986-1992	1992-1997	1997-2001
All	+0.23*	-0.04	+0.19*	+0.20*	+0.32*	-0.26*	+0.06	+0.12*	+0.09
Males	+0.16*	-0.10	+0.19*	+0.02	+0.25*	-0.41*	-0.06	+0.08	+0.06
Females	+0.37*	+0.02	+0.20*	+0.49*	+0.40*	-0.10	+0.29*	+0.16*	+0.11
Female Full-Time	+0.39*	-0.04	+0.17*	+0.50*	+0.37*	-0.25*	+0.19*	+0.20*	+0.01
Female Part-Time	+0.28*	+0.08	+0.22*	+0.39*	+0.44*	+0.09	+0.36*	+0.07	+0.21*

Notes:

1. The figures reported here refer to indices changes between 1986-1992, 1992-1997 and 1997-2001. A positive (negative) figure indicates a rise (fall) between the two sample points. Any differences between the figures in Tables 4.1 and 4.2 are due to rounding.

* = a statistically significant index change ($p<0.10$).

Table 4.3 The Pattern of Change in the Distribution of Broad Skills, 1986-2001, by Occupation

Occupation[1]	Required Qualification Index[2]			Training Time Index			Learning Time Index		
	1986-1992	1992-1997	1997-2001	1986-1992	1992-1997	1997-2001	1986-1992	1992-1997	1997-2001
Managers			+0.23					+0.48	
Professional						-0.37		+0.29	
Associate Professional				+0.33		-0.36			
Admin & Secretarial					+0.38	-0.41			
Skilled Trades					+0.55	-0.70		+0.35	
Personal Service	+0.72			+0.74	+0.74		+0.96		
Sales					+0.43	-0.33			
Operatives	+0.31	-0.19				-0.42			
Elementary	+0.15					-0.43		+0.24	-0.27

Notes:
1. Occupations are classified by SOC2000 Major Group.
2. The figures are the changes in the broad skill indices in each of the sub-periods. A positive (negative) figure indicates an increase (decrease) in skill. Only changes that are statistically significant at the 10% level are included are presented, the blank cells indicate insignificant changes.

Table 4.4 The Pattern of Change in the Distribution of Broad Skills, 1986-2001, by Industry

Industry[1]	Required Qualification Index[2]			Training Time Index			Learning Time Index		
	1986-1992	1992-1997	1997-2001	1986-1992	1992-1997	1997-2001	1986-1992	1992-1997	1997-2001
Manufacturing	+0.20				+0.33	-0.55			
Construction	+0.28				+0.64	-0.99		+0.70	
Wholesale & Retail			+0.30						+0.30
Hotels & Restaurants		+0.48						+0.50	
Transport & Storage	+0.29					-0.45	+0.37		
Financial					+0.98	-0.66		+0.49	
Real estate & Business Services	+0.24	+0.38			+0.49	-0.45	+0.28		
Public Administration	+0.48	-0.38	+0.33	+0.53					
Education		+0.33						+0.42	
Health & Social Work	+0.38	-0.60	+0.36		+0.63			-0.49	+0.35
Personal Services		+0.63			+1.15		+0.52	+0.97	

Notes:

1. Industries are classified by SIC92; only those with sample size above 100 are shown.
2. The figures are the changes in the broad skill indices in each of the sub-periods. A positive (negative) figure indicates an increase (decrease) in skill. Only changes that are statistically significant at the 10% level are presented, the blank cells indicate insignificant changes.

Table 4.5 Qualifications Demand and Supply, 1986-2001

	1986		1992		1997		2001	
	D ('000s)	S ('000s)	D ('000s)	S ('000s)	D ('000s)	S ('000s)	D ('000s)	S ('000s)
Level 4 or above	4,176	3,820	5,666	4,988	5,671	6,324	7,122	7,359
Degree	2,005	2,319	2,933	2,979	3,291	3,877	4,220	4,774
Non-degree	2,171	1,501	2,733	2,009	2,381	2,447	2,903	2,585
Level 3	3,143	4,905	3,688	4,124	3,221	6,209	3,976	6,379
Level 2	3,825	4,080	4,222	7,276	4,948	5,255	3,878	5,302
Level 1	1,592	2,198	1,111	2,269	2,147	3,754	2,951	3,549
No qualifications	7,939	7,748	7,554	5,831	7,352	3,274	6,464	2,881

Notes:
D indicates the number of jobs with highest qualifications requirements at each level; S indicates the number of people holding highest qualifications at each level. Estimates were obtained as follows:

- D: For each year, using the appropriate Labour Force Survey, an estimate was derived of the total number of individuals aged 20-60 years old who were in paid work in Britain. This figure was multiplied by the percentage of survey respondents who reported that access to their jobs required highest qualifications at one of the levels shown. These percentages are reported in Table 4.1. The demand figures are thus estimates of the number of jobs in Britain that demand qualifications at various levels. The analysis is restricted to individuals' main job; secondary jobs are not included.
- S: The supply figures, giving the total number of individuals who possess qualifications at each level, are also derived from the Labour Force Survey. They are constituted from all economically active people, including the unemployed, using the EMPLOYEE and LOOKING variables for the 1986 Labour Force Survey, and including those recorded as ILO unemployed using the INECACA derived variable for 1992 onwards). For comparability with the demand figures, we restricted the analysis to those aged 20-60 years old living in Britain. Despite the greater detail provided by the LFS on qualifications held (such as the ability to differentiate those with one or two A levels, hence allocating individuals precisely across the

Level 2/3 divide), for comparability we used the simpler qualification protocols used in deriving the qualification bands for Table 3.1.

For 1986, the QUALSM1 and APPRENT variables were used to derive the following categorisation: Level 4 or above = higher degree, first degree, other degree level, BTEC/BEC/TEC higher, teaching – secondary, teaching – primary, nursing; Degree = higher degree, first degree, other degree level; Non-degree = BTEC/BEC/TEC higher, teaching – secondary, teaching – primary, nursing; Level 3 = BTEC/BEC/TEC general, A level, completed trade apprenticeship; Level 2 = City and Guilds, O level; Level 1 = CSE, other professional qualifications; No qualifications = none reported.

For 1992, HIQUAP was categorised as follows: Level 4 or above = higher degree, first degree, other degree level, BTEC etc higher, teaching – further education, teaching – secondary, teaching – primary, teaching – level not stated, nursing; Degree = higher degree, first degree, other degree level; Non-degree = BTEC etc higher, teaching – further education, teaching – secondary, teaching – primary, teaching – level not stated, nursing; Level 3 = BTEC (etc) general, A level and equivalent, completed trade apprenticeship; Level 2 = City and Guilds, O level and equivalent, RSA; Level 1 = CSE below grade 1, YT certificate, other; No qualifications = none reported.

For 1997 and 2001, the variable HIQUAL was used. See the notes to Table 3.6.

Table 4.6 Trends in the Proportions 'Over-Qualified' and 'Under-Qualified' for their Jobs, 1986-2001

	1986	1992	1997	2001
Percentage 'Under-Qualified'[1]	20.5	16.5	19.8	17.6
Percentage 'Over-Qualified'[2]	30.0	31.2	33.0	37.0
Percentage 'Over-Qualified' Among Those Holding Qualifications at Levels:				
Level 4 or above	27.9	25.3	25.8	28.0
Degree	30.2	29.7	31.6	33.9
Non-degree	32.1	28.4	29.8	33.9
Level 3	47.7	41.5	52.0	48.1
Level 2	42.4	42.7	40.8	50.0
Level 1	54.3	48.9	42.5	43.2

Notes:
1. An 'under-qualified' individual has a highest qualification at a lower level than that currently required to get the job he/she now holds.
2. An 'over-qualified' individual has a qualification at a higher level than that currently required to get the job he/she now holds.

Table 4.7 Credentialism, 1986-2001

Highest Qualification Required	1986	1997	2001
	Percentage of Each Qualification Cohort		
(a) Qualification 'Essential/Fairly Necessary' to Do Job[1]			
Level 4 or above Degree Non-degree	80.5 77.8 82.8	76.9 75.3 77.2	77.5 77.7 77.4
Level 3	77.3	74.1	70.3
Level 2	64.7	71.7	70.2
Level 1	79.3	77.2	62.7
(b) Qualification 'Totally Unnecessary' to Do Job[2]			
Level 4 or above Degree Non-degree	4.8 4.9 4.7	6.7 5.3 8.6	9.1 8.2 10.4
Level 3	4.4	6.9	10.2
Level 2	11.0	6.8	8.8
Level 1	5.8	9.8	18.8

Notes:

1, Respondents were asked to assess whether today's entry qualifications (see note 2 in Table 3.1) were 'essential', 'fairly necessary', 'not really necessary' or 'totally unnecessary' to do the job competently. This panel reports the proportions of respondents in each required qualification category saying that their qualifications were either 'essential' or 'fairly necessary' to do the job.

2. The panel reports the proportions of respondents in each required qualification category saying that their qualifications were 'totally unnecessary' to do the job.

Table 4.8 Trends in Qualifications Used at Work, 1986-2001

Qualifications 'Used' at Work[1]	1986	1997	2001
	Sample Percentages		
Level 4 or above Degree Non-degree	16.2 7.5 8.7	18.7 10.6 8.1	22.7 13.4 9.2
Level 3	15.6	15.8	18.0
Level 2	15.3	18.8	16.0
Level 1	12.5	13.1	12.2
None	40.4	33.6	31.1

Notes:

1. This table combines qualifications required for jobs data with estimates of their usefulness once in post. At the top of the qualifications hierarchy, level 4 or above qualifications are deemed to be 'used' in jobs if they are required to get jobs *and* are regarded as 'essential' or 'fairly necessary' to carry out the job competently. The same applies elsewhere in the qualifications hierarchy except for the fact that qualification usage here also includes jobs with entry requirements one level higher but where these are neither 'essential' or 'fairly necessary' to carry out the job. In other words, the likelihood is that these jobs use qualifications one level lower than their entry requirements would suggest. The data reported in this table is constructed to take this into account.

Table 4.9 The Pattern of Change in the Distribution of Generic Skills[1], 1997-2001, by Gender and by Full-Time/Part-Time Status

	Literacy	Physical	Number	Technical Know-How	High-level Communication	Planning	Client Communication	Horizontal Communication	Problem-Solving	Checking
All	+ 0.12		+ 0.09	+ 0.11	+ 0.11	+ 0.14	+ 0.07	+ 0.11	+ 0.12	+ 0.09
Males	+ 0.12	- 0.08	+ 0.10	+ 0.08	+ 0.12	+ 0.12	+ 0.06	+ 0.10	+ 0.11	+ 0.08
Females	+ 0.13		+ 0.07	+ 0.15	+ 0.08	+ 0.15	+ 0.07	+ 0.13	+ 0.13	+ 0.09
Females Full-time Jobs	+ 0.12			+ 0.12		+ 0.14	+ 0.07	+ 0.12	+ 0.10	
Females Part-time Jobs	+ 0.11	+ 0.08		+ 0.17	+ 0.10	+ 0.15		+ 0.12	+ 0.14	

Note:

1. The figures are the changes in the generic skills indices between 1997 and 2001. A positive (negative) figure indicates an increase (decrease) in skill. Only changes that are statistically significant at the 10% level are included in the table.

Table 4.10 The Pattern of Change in the Distribution of Generic Skills, 1997-2001, by Occupation

Occupation[1]	Literacy	Physical	Number	Technical Know-How	High-level Communication	Planning	Client Communication	Horizontal Communication	Problem-Solving	Checking
Managers	+ 0.14	- 0.15								
Professionals			- 0.14				- 0.10			
Associate Professionals	+ 0.15							+ 0.17		
Adminstrataive & Secretarial				+ 0.14						
Skilled Trades										
Personal Service			+ 0.17						+ 0.19	
Sales		+ 0.29		+ 0.25	+ 0.14		+ 0.17			
Plant & Machine Operatives										
Elementary		+ 0.26	+ 0.12	+ 0.32		+ 0.21		+ 0.21	+ 0.31	+ 0.27

Note:

1. Occupational groups are classified by SOC2000 Major Group. The figures are the changes in the generic skills indices between 1997 and 2001. A positive (negative) figure indicates an increase (decrease) in skill. Only changes that are statistically significant at the 10% level are included in the table.

Table 4.11 The Pattern of Change in the Distribution of Generic Skills, 1997-2001, by Industry

Industry[1]	Literacy	Physical	Number	Technical Know-How	High-level Communication	Planning	Client Communication	Horizontal Communication	Problem-Solving	Checking
Manufacturing	+ 0.10					+ 0.10				
Construction										
Wholesale & Retail	+ 0.15	+ 0.12		+ 0.17	+ 0.16	+ 0.12		+ 0.14	+ 0.17	
Hotels & Restaurants						+ 0.28				
Transport & Storage				+ 0.17		+ 0.31			+ 0.21	+ 0.20
Finance										
Real Estate & Business Services				+ 0.14						
Public Administration		+ 0.17			+ 0.16					
Education		+ 0.13					- 0.12			
Health & Social Work	+ 0.19		+ 0.24	+ 0.33	+ 0.14	+ 0.19		+ 0.14	+ 0.28	+ 0.30
Personal Services		+ 0.18					+ 0.18	+ 0.23		

Note:

1. Industries are classified by SIC92; only those with sample size above 100 are shown. The figures are the changes in the generic skills indices between 1997 and 2001. A positive (negative) figure indicates an increase (decrease) in skill. Only changes that are statistically significant at the 10% level are included in the table.

Table 4.12 Differences between Detailed Skills in 2001 and Detailed Skills in 1997

Detailed Skills	Average for 2001 minus Average for 1997	Significant Change?
	(2)	(3)
Paying close attention to detail	-0.02	None
Dealing with people	+0.01	None
Instructing, training or teaching people	+0.12	Rise **
Making speeches or presentations	+0.13	Rise **
Persuading or influencing others	+0.07	Rise **
Selling a product or service	-0.05	None
Counselling, advising or caring for customers or clients	+0.16	Rise **
Working with a team of people	+0.07	Rise **
Listening carefully to colleagues	+0.15	Rise**
Physical strength	-0.03	None
Physical stamina	-0.01	None
Skill or accuracy in using hands or fingers	+0.19	Rise **
How to use or operate tools/equipment/machinery	+0.02	None
Knowledge of particular products or services	+0.09	Rise **
Specialist knowledge or understanding	+0.18	Rise **
Knowledge of how your organisation works	+0.22	Rise **
Using a computer, PC, or other types of computerised equipment	+0.38	Rise **
Spotting problems or faults	+0.05	Rise †
Working out the causes of problems or faults	+0.11	Rise **
Thinking of solutions of problems or faults	+0.15	Rise **
Analysing complex problems in depth	+0.08	Rise **

Checking things to ensure that there are no errors	+0.08	Rise **
Noticing when there is a mistake	+0.10	Rise **
Planning your own activities	+0.13	Rise **
Planning the activities of others	+0.08	Rise **
Organising your own time	+0.10	Rise **
Thinking ahead	+0.11	Rise **
Reading written information such as forms notices or signs	+0.07	Rise **
Reading short documents such as short reports, letters or memos	+0.12	Rise **
Reading long documents such as long reports, manuals, articles or books	+0.11	Rise **
Writing written information such as forms notices or signs	+0.14	Rise **
Writing short documents such as short reports, letters or memos	+0.18	Rise **
Writing long documents such as long reports, manuals, articles or books	+0.20	Rise **
Adding, subtracting or dividing numbers	+0.07	None
Calculations using decimals, percentages or fractions	+0.15	Rise **
Calculations using more advanced mathematical or statistical procedures	+0.15	Rise **

Note:
In each case, the statistical significance of the difference between the means of the skill level for 2001 and 1997 is assessed. The level of significance is **=5%, and †=10%. This means that, where ** is indicated, we can reject the hypothesis of no change, but risk being wrong only 5% of the time; for † we could be wrong 10% of the time.

Table 4.13 Percentage Required to Learn New Things At Work, 1992-2001

Responses to Statement 'My job Requires That I Keep Learning New Things'	1992	2001
Strongly Agree	26.1	30.2
Agree	50.1	51.1
Disagree	19.6	16.6
Strongly Disagree	4.2	2.1

Table 5.1 Percentage Using Computerised or Automated Equipment in their Job, 1986-2001

	1986	1992	2001
Employees and Self-Employed	NA	53.3	71.5
Self-Employed		28.9	53.6
All Employees	40.3	56.0	73.7
Sex (Employees)			
Men	46.0	58.8	73.1
Women	33.2	53.0	74.3
Contract Status(Women Employees)			
Full-time	44.0	61.2	83.0
Part-time	20.2	40.7	61.2
Age (Employees)			
20-24	41.9	62.6	74.8
25-34	46.3	59.8	76.0
35-44	42.0	58.2	77.0
45-54	34.3	48.4	71.9
55 +	24.3	38.3	59.8

Table 5.2 Percentage Using Computerised or Automated Equipment in their Job by Occupation, 1986-2001

Occupation[1]	1986	1992	2001
Managers	54.4	71.7	84.6
Professionals	60.5	77.3	92.2
Associate Professionals	41.6	63.7	86.9
Administrative & Secretarial	61.5	0.7	95.4
Skilled Trades	32.0	28.8	44.1
Personal Service	11.1	24.8	34.8
Sales	29.8	56.7	83.1
Plant & Machine Operatives	27.8	37.9	51.7
Elementary	21.6	22.5	35.7

Note:
1. Occupations are classified by SOC2000 Major Groups.

Table 5.3 Percentage Using Computerised or Automated Equipment in their Job by Industry, 1986-2001

Industry[1]	1986	1992	2001
Manufacturing	45.2	53.7	67.8
Construction	21.9	18.8	37.0
Wholesale & Retail	37.5	52.4	74.3
Hotels & Restaurants	16.6	25.4	47.9
Transport & Storage	44.0	57.8	71.7
Finance	76.7	89.0	95.0
Real Estate & Business Services	37.3	54.3	85.0
Public Administration	45.0	70.0	87.1
Education	36.7	56.1	78.6
Health & Social Work	29.7	53.8	66.9
Personal Services	24.9	32.2	57.4

Note:
1. Industries are classified by SIC92; only those with sample size above 100 are shown.

Table 5.4 Importance of Use of PC or Other Types of Computerised Equipment to Job, 2001

	Essential (%)	Very Important (%)	Fairly important (%)	Not very important (%)	Not at all important (%)
All					
1997	30.8	14.8	12.2	11.7	30.5
2001	39.7	14.8	13.8	10.5	21.1
Men					
1997	27.5	15.4	13.0	14.2	29.8
2001	38.5	14.7	14.5	11.2	21.1
Women					
1997	34.8	13.9	11.3	8.5	31.4
2001	41.4	15.0	13.1	9.7	21.2
Contract Status (women)					
Full-time 1997	42.9	16.6	12.2	7.8	20.6
Full-time 2001	49.5	16.4	12.9	8.1	13.0
Part-time 1997	23.9	10.4	10.2	9.5	45.9
Part-time 2001	28.8	12.8	13.3	12.0	33.1

Table 5.5 Percentage Reporting Use of PC or Other Types of Computerised Equipment 'Essential' in Their Job by Occupation, 1997-2001

Occupation[1]	1997	2001
Managers	37.8	52.6
Professionals	39.1	53.3
Associate Professionals	41.9	49.1
Administrative & Secretarial	57.0	75.1
Skilled Trades	12.5	14.3
Personal Services	7.3	10.8
Sales	43.7	39.6
Plant & Machine Operatives	14.8	15.0
Elementary	11.1	10.5

Note:
1. Occupations are classified by SOC2000 Major Groups.

Table 5.6 Percentage Reporting Use of PC or Other Types of Computerised Equipment 'Essential' in Their Job by Industry, 1997-2001

Industry[1]	1997	2001
Manufacturing	33.1	35.5
Construction	11.4	19.0
Wholesale & Retail	33.4	32.3
Hotels & Restaurants	13.8	16.6
Transport & Storage	25.6	44.5
Finance	70.1	76.3
Real Estate & Business Services	47.5	64.0
Public Administration	42.5	54.4
Education	25.0	37.4
Health & Social Work	18.1	34.4
Personal Services	22.8	31.8

Note:
1. Industries are classified by SIC92; only those with sample size above 100 are shown.

Table 5.7 Whether Change in Importance of Computing Skills in Own Job in last Five Years, 2001

	Increase (%)	Little/ No Change (%)	Decrease (%)
All	51.7	42.5	5.8
Men	49.5	44.8	5.6
Women	54.6	39.4	6.0
Employment Status			
Employed	53.4	40.8	5.8
Self-Employed	38.2	56.1	5.7
Contract Status (Women)			
Full-time	63.4	32.1	4.4
Part-time	40.9	50.6	8.5

Table 5.8 Complexity of Use[1] of Computers or Computerised Equipment, 1997-2001

	Simple (%)	Moderate (%)	Complex (%)	Advanced (%)
All				
1997	38.1	39.1	17.7	5.1
2001	30.7	45.8	17.2	6.4
Men				
1997	37.5	34.7	20.4	7.4
2001	27.3	43.3	20.1	9.3
Women				
1997	38.8	44.5	14.4	2.3
2001	34.6	48.7	13.7	2.9
Contract Status (Women)				
Full-time 1997	30.9	47.0	19.1	3.0
Full-time 2001	27.0	52.1	17.1	3.7
Part-time 1997	54.9	39.3	4.9	0.9
Part-time 2001	49.6	42.0	7.1	1.4

Note:
1. Asked of those for whom use of computerised equipment was in the response set range ‘essential’ to ‘not very important’.

Table 5.9 Complexity of Use of Computers or Computerised Equipment by Occupation, 1997-2001

Occupation[1]	1997		2001	
	Advanced/ Complex (%)	Simple (%)	Advanced/ Complex (%)	Simple (%)
Managers	29.6	30.1	31.0	19.1
Professionals	34.7	20.3	36.4	11.9
Associate Professionals	34.5	25.7	26.6	23.2
Administrative & Secretarial	17.0	29.9	20.1	21.1
Skilled Trades	19.6	58.0	20.3	50.2
Personal Service	9.1	72.4	10.5	51.0
Sales	11.4	52.1	7.8	60.2
Plant & Machine Operatives	11.6	62.5	10.3	67.7
Elementary	13.8	55.9	9.7	65.4

Note:
1. Occupations are classified by SOC2000 Major Groups.

Table 5.10 Complexity of Use of Computers or Computerised Equipment by Industry, 1997-2001

Industry[1]	1997		2001	
	Advanced/ Complex (%)	Simple (%)	Advanced/ Complex (%)	Simple (%)
Manufacturing	29.5	36.3	27.8	34.0
Construction	11.8	56.8	23.3	26.3
Wholesale & Retail	10.7	60.1	13.2	53.0
Hotels & Restaurants	9.6	44.2	12.5	55.9
Transport & Storage	22.2	44.0	25.9	37.1
Finance	34.5	17.7	30.2	14.9
Real Estate & Business Services	38.6	16.0	43.8	13.6
Public Administration	21.7	25.0	20.8	15.6
Education	16.8	30.4	18.9	24.3
Health & Social Work	12.5	50.6	11.1	40.3
Personal Services	31.3	29.5	15.2	28.2

Note:
1. Industries are classified by SIC92: only those with sample size above 100 are shown.

Table 5.11 Importance of Use of Internet in the Job, 2001

	Essential (%)	Very Important (%)	Fairly Important (%)	Not Very Important (%)	Not at All Important (%)
All	13.3	10.9	14.4	16.2	45.2
Men	14.8	12.2	13.6	15.9	43.5
Women	11.5	9.4	15.3	16.6	47.2
Employees	13.4	11.3	14.4	15.9	45.0
Self-employed	12.8	8.1	13.9	18.6	46.6
Contract Status (Women)					
Full-time	14.9	12.5	18.7	17.6	36.3
Part-time	6.5	4.9	10.3	15.2	63.1

Table 5.12 Type of Use of Internet, 2001

Internet Use	All (%)	Men (%)	Women (%)	Employed (%)	Self-Employed (%)
Internal E-Mail	65.4	67.6	62.6	67.3	49.5
External E-Mail	57.5	62.1	51.4	57.4	58.2
Information on Own Organisation	36.4	36.9	35.6	38.4	18.8
Information on Suppliers	44.3	48.3	39.0	43.4	51.3
Delivering InformationTo Clients	39.4	43.9	33.5	38.7	44.8
Delivering Products To Clients	19.8	24.0	14.4	18.9	27.1
Buy/Sell Products or Services	16.3	18.9	12.8	14.4	32.0
Update Web Pages	13.5	15.1	11.6	13.1	17.3
Design Web Pages	8.6	11.3	5.1	8.0	13.9

Table 5.13 Percentage Reporting Use of Internet 'Essential' or 'Very Important' in Their Job by Occupation, 2001

Occupation[1]	Internet 'Essential' or 'Very Important' in Job
Managers	36.5
Professionals	47.9
Associate Professionals	37.9
Administrative & Secretarial	28.4
Skilled Trades	9.7
Personal Service	5.4
Sales	16.0
Plant & Machine Operatives	3.8
Elementary	3.1

Note:
1. Occupations are classified by SOC2000 Major Groups.

Table 5.14 Percentage Reporting Use of Internet 'Essential' or 'Very Important' in Their Job by Industry, 2001

Industry[1]	Internet 'Essential' or 'Very Important' in Job
Manufacturing	20.8
Construction	10.8
Wholesale & Retail	15.1
Hotels & Restaurants	8.7
Transport & Storage	24.7
Finance	38.0
Real Estate & Business Services	44.0
Public Administration	32.1
Education	34.0
Health & Social Work	13.1
Personal Services	23.5

Note:
1. Industries are classified by SIC92: only those with sample size above 100 are shown.

Table 5.15 Method of Learning Computing Skills, 2001

Method of Learning	All (%)	Men (%)	Women (%)	Employed (%)	Self-Employed (%)
Training at Work	50.4	47.6	53.7	53.4	19.8
Watching Others at Work	32.2	33.0	31.2	33.6	17.8
Help from Colleagues	47.8	46.3	49.5	50.1	22.7
Practice at Work	46.4	48.7	43.5	47.4	36.1
Training Off The Job	19.9	18.8	21.2	19.9	19.4
Training in FT Education	15.1	15.5	14.7	15.4	12.3
Manuals/Books	24.3	28.9	18.8	23.7	30.5
Practice at Home	40.9	44.4	36.6	39.2	58.5
Help from the Family	17.0	12.1	22.9	16.6	26.8

Table 5.16 Prevalence of Home Computing, 2001

	All (%)	Men (%)	Women (%)	Employed (%)	Self-Employed (%)
Have Computer at Home	58.8	60.6	56.5	58.2	63.6
Length of Time Using PC at Home:					
Less than a year	14.2	11.8	17.4	14.7	10.7
1 –2 years	21.6	20.8	22.7	22.3	16.1
3 years +	64.2	67.4	59.9	63.0	73.2

Table 5.17 Percentage with Home Computers by Occupation, 2001

Occupation[1]	Percentage with Home Computers
Managers	71.9
Professionals	83.1
Associate Professionals	71.0
Administrative & Secretarial	61.7
Skilled Trades	46.3
Personal Service	50.5
Sales	46.4
Plant & Machine Operatives	36.4
Elementary	34.6

Note:
1. Occupations are classified by SOC2000 Major Groups.

Table 5.18 Methods of Learning of Computing Skills by Complexity of Computing Skills, 2001

Method of Learning	Simple (%)	Moderate (%)	Complex (%)	Advanced (%)
Training at Work	48.0	53.1	62.0	53.3
Watching Others at Work	31.0	34.2	38.4	35.4
Help from Colleagues	45.0	53.7	52.5	51.5
Practice at Work	29.2	55.0	64.8	64.2
Training Off The Job	8.6	21.3	35.2	42.7
Training in FT Education	7.1	16.2	21.7	42.5
Manuals/Books	7.9	25.9	42.1	67.0
Practice at Home	23.5	49.9	55.1	63.5
Help from the Family	16.9	20.8	15.5	5.3

Table 5.19 Perceived Skill Match Problems Regarding Computing Skills[1], 2001

	All (%)	Men (%)	Women (%)	Women: Full-time Jobs (%)	Women: Part-time Jobs (%)
Effect of Additional Computing Skills on Job Performance					
No Difference	32.1	31.5	32.9	31.0	37.2
A Little Better	43.6	43.0	44.4	43.9	45.5
Much Better	24.2	25.5	22.7	25.1	17.3
Computing Skills Could be Better Used in Another Job					
Strongly Agree	8.4	9.2	7.4	5.2	9.3
Agree	19.6	19.6	19.7	21.6	18.0
Disagree	36.5	35.9	37.3	44.3	31.3
Strongly Disagree	35.4	35.3	35.6	28.9	41.3

Note:
1. Effect of additional skills asked of those for whom computing skills were ‘essential’ or ‘very important’; possession of underutilised skills was asked of those for whom computing skills were not ‘essential’ or ‘very important’.

Table 5.20 Computing Skill Mismatch by Occupation, 2001

Occupation[1]	Percentage Reporting Additional Computing Skills Would Make Job Performance 'Much Better'	Percentage with Computing Skills Which Could be Better Used in Another Job
Managers	21.7	29.5
Professionals	29.3	18.2
Associate Professionals	24.1	27.6
Administrative & Secretarial	22.7	32.3
Skilled Trades	26.5	25.7
Personal Service	14.6	28.0
Sales	20.4	39.6
Plant & Machine Operatives	24.4	26.2
Elementary	34.5	31.0

Note:
1. Occupations are classified by SOC2000 Major Groups.

Table 5.21 Computing Skill Mismatch by Industry, 2001

Industry[1]	Percentage Reporting Additional Computing Skills Would Make Job Performance 'Much Better'	Percentage with Computing Skills Which Could be Better Used in Another Job
Manufacturing	22.1	25.3
Construction	21.2	21.9
Wholesale & Retail	21.7	37.3
Hotels & Restaurants	25.1	36.2
Transport & Storage	24.0	27.7
Finance	23.5	30.1
Real Estate & Business Services	23.6	38.1
Public Administration	25.1	18.7
Education	26.5	23.4
Health & Social Work	21.0	25.1
Personal Services	44.5	26.9

Note:
1. Industries are classified by SIC92: only those with sample size above 100 are shown.

Table 6.1 Employee Task Discretion, 1986-2001

	1986	1992	1997	2001
Choice Over The Way You Do Your Job				
Great Deal	51.8	NA	44.3	38.6
Some	29.4	NA	39.0	44.3
Hardly Any	9.2	NA	10.1	10.7
None	9.6	NA	6.5	6.4
Influence Over How Hard to Work				
A Great Deal	NA	70.7	64.4	50.6
A Fair Amount	NA	23.2	28.8	39.2
Not Much	NA	4.9	4.7	8.6
None At All	NA	1.2	2.0	1.6
Influence Over What Tasks Done				
A Great Deal	NA	42.4	33.1	30.5
A Fair Amount	NA	33.5	36.2	35.7
Not Much	NA	15.4	20.6	22.1
None At All	NA	8.7	10.0	11.7
Influence Over How To Do Task				
A Great Deal	NA	56.9	49.7	42.8
A Fair Amount	NA	30.9	34.5	40.4
Not Much	NA	8.4	10.2	11.0
None At All	NA	3.9	5.6	5.8
Influence Over Quality Standards				
A Great Deal	NA	69.6	51.1	51.7
A Fair Amount	NA	23.1	28.4	32.0
Not Much	NA	4.8	12.6	10.4
None At All	NA	2.6	7.9	5.9
Overall Task Discretion Index[1]				
All	NA	2.43	2.25	2.18

Note:

1. The task discretion index is computed as the summed average score of the four ‘task influence’ questions, with a highest score of 3 and a lowest score of 0.

Table 6.2 Choice and Influence over Task Characteristics by Sex, 1986-2001

	1986 (%)	1992 (%)	1997 (%)	2001 (%)
Great Deal Of Choice Over The Way You Do Your Job				
Men	56.0	NA	48.9	42.4
Women	46.5	NA	39.1	34.3
Great Deal of Influence Over How Hard to Work				
Men	NA	70.1	64.6	51.1
Women	NA	71.4	64.2	50.0
Great Deal of Influence Over What Tasks Done				
Men	NA	40.9	33.0	30.3
Women	NA	44.0	33.3	30.7
Great Deal of Influence Over How To Do Task				
Men	NA	57.2	51.2	45.0
Women	NA	56.5	48.1	40.3
Great Deal of Influence Over Quality Standards				
Men	NA	69.1	52.5	52.1
Women	NA	70.1	49.6	51.3
Overall Task Discretion Index				
Men	NA	2.43	2.26	2.19
Women	NA	2.44	2.24	2.17

Table 6.3 Choice and Influence over Task Characteristics by Full-time/Part-time Contract Status Among Women, 1986-2001

	1986 (%)	1992 (%)	1997 (%)	2001 (%)
Great Deal of Choice Over The Way You Do Your Job				
Full-Time	46.3	NA	42.7	37.3
Part-Time	46.8	NA	34.4	29.8
Great Deal of Influence Over How Hard to Work				
Full-Time	NA	73.4	66.9	53.1
Part-Time	NA	68.5	60.5	45.2
Great Deal of Influence Over What Tasks Done				
Full-Time	NA	47.1	38.2	32.9
Part-Time	NA	39.3	26.7	27.2
Great Deal of Influence Over How To Do Task				
Full-Time	NA	59.7	54.3	44.1
Part-Time	NA	51.8	39.8	34.5
Great Deal of Influence Over Quality Standards				
Full-Time	NA	71.8	53.8	54.3
Part-Time	NA	67.5	43.9	46.6
Overall Task Discretion Index				
Full-time	NA	2.49	2.33	2.25
Part-time	NA	2.37	2.13	2.07

Table 6.4 Percentage with a Great Deal of Choice Over the Way They Do the Job by Occupation, 1986-2001

Occupation[1]	1986	1997	2001	Change from 1996 to 2001
Managers	79.8	60.9	62.9	-16.9
Professionals	71.7	56.9	38.3	-33.4
Associate Professionals	51.6	43.9	37.8	-13.8
Administrative & Secretarial	47.3	41.1	35.2	-12.1
Skilled Trades	49.4	49.5	43.3	-6.1
Personal Service	49.7	34.3	30.4	-19.3
Sales	45.6	32.0	30.0	-15.6
Plant & Machine Operatives	37.0	38.9	28.7	-8.3
Elementary	44.6	37.3	29.5	-15.1

Note:

1. Occupations are classified by SOC2000 Major Groups.

Table 6.5 Task Discretion Score by Occupation, 1992-2001

Occupation[1]	1992	1997	2001	Change from 1992 to 2001
Managers	2.71	2.61	2.58	-0.13
Professionals	2.54	2.48	2.23	-0.31
Associate Professionals	2.60	2.38	2.30	-0.30
Administrative & Secretarial	2.45	2.25	2.15	-0.30
Skilled Trades	2.37	2.29	2.18	-0.19
Personal Service	2.57	2.24	2.24	-0.33
Sales	2.28	2.06	1.94	-0.34
Plant & Machine Operatives	2.16	1.90	1.86	-0.30
Elementary	2.24	2.04	1.92	-0.32

Note:

1. Occupations are classified by SOC2000 Major Groups.

Table 6.6 Percentage with a Great Deal of Choice Over the Way They Do Their Job by Industry, 1986-2001

Industry[1]	1986	1997	2001	Change from 1986 to 2001
Manufacturing	50.9	51.3	44.9	-6.0
Construction	51.9	60.4	44.3	-7.6
Wholesale & Retail	50.3	39.1	38.4	-11.9
Hotels & Restaurants	50.4	42.0	29.5	-20.9
Transport & Storage	42.3	31.6	30.4	-11.9
Finance	46.8	37.3	31.8	-15.0
Real Estate & Business Services	62.7	47.8	44.0	-18.7
Public Administration	48.2	38.5	35.2	-13.0
Education	62.9	48.6	34.4	-28.5
Health & Social Work	41.8	38.2	33.9	-7.9
Personal Services	53.0	54.1	45.1	-7.9

Note:
1. Industries are classified by SIC92: only those with sample size above 100 are shown.

Table 6.7 Task Discretion Index by Industry, 1992-2001

Industry[1]	1992	1997	2001	Change from 1992 to 2001
Manufacturing	2.35	2.19	2.14	-0.21
Construction	2.50	2.43	2.25	-0.25
Wholesale & Retail	2.41	2.18	2.18	-0.23
Hotels & Restaurants	2.26	2.24	2.13	-0.13
Transport & Storage	2.36	2.01	1.92	-0.44
Finance	2.45	2.29	2.15	-0.30
Real Estate & Business Services	2.50	2.27	2.22	-0.28
Public Administration	2.44	2.33	2.15	-0.29
Education	2.59	2.37	2.27	-0.32
Health & Social Work	2.49	2.35	2.29	-0.20
Personal Services	2.44	2.38	2.27	-0.17

Note:
1. Industries are classified by SIC92: only those with sample size above 100 are shown.

Table 6.8 Closeness of Supervisory Control, 1986-2001

Closeness of Supervisory Control Among Employees	1986 (%)	1997 (%)	2001 (%)
Very closely	10.5	6.2	9.2
Quite closely	24.9	27.0	29.8
Not very closely	34.1	44.0	43.3
Not at all closely	30.6	22.8	17.7

Table 6.9 Forms of Control Over Work Effort, 1986-2001

Forms of Control Over Work Effort	1986 (%)	1992 (%)	1997 (%)	2001 (%)
Machine	7.1	5.3	10.2	5.8
Clients	37.2	50.4	53.9	56.7
Supervisor	26.7	37.7	41.0	42.4
Fellow Workers	28.7	36.1	57.0	49.6
Pay	15.3	19.4	29.8	26.3
Reports/ Appraisals	15.3	27.3	23.6	30.4

Table 7.1 Association of Pay With Skills (% Pay Premium)

BROAD SKILLS INDICES		
Required Qualifications: Pay premium over otherwise identical jobs requiring no qualifications		
	Females	Males
Level 4, degree	57.3	33.0
Level 4, non-degree	45.9	23.2
Level 3	18.2	13.5
Level 2	6.3	(0)
Level 1	5.3	(0)
Previous Training Time: Pay premium over otherwise identical jobs requiring intermediate previous training		
> 2 years	4.1	(0)
< 3 months	(0)	(0)
Required Learning Time: Pay premium over otherwise identical jobs requiring intermediate learning times		
> 2 years	11.4	8.9
< 1 month	-5.3	-8.9
GENERIC SKILLS INDICES		
Association of Pay With a 10 Unit Rise in Skills Indices		
Literacy Skills	(0)	(0)
Physical Skills	-6.5	-9.2
Number Skills	(0)	-3.1
Technical Know-How	(0)	(0)
High-Level Communication	4.4	8.2
Planning Skills	3.8	3.8
Client Communication	(0)	-5.3
Horizontal Communication	(0)	(0)
Problem-Solving	(0)	(0)
Checking Skills	(0)	(0)

Table 7.1 Continued.

Computer Usage: Rise in pay, compared with otherwise identical jobs involving no computer usage		
	Females	Males
'Simple'	12.2	6.7
'Moderate'	21.3	12.9
'Complex'	17.7	14.3
'Advanced'	32.4	18.5
Task Discretion Rise in pay associated with a one unit increase in the Task Discretion Index	(0)	4.8
Rise in pay associated with having a great deal of choice over way job is done	(0)	(0)

Note:
(0) indicates that the association is so small that we cannot reasonably reject the hypothesis that it is non-existent. All the other estimates are significantly different from zero at the 10% level. The estimates derive from a multiple regression analysis, using a hedonic wage equation. We also control for differences in wages associated with: industrial sector, whether full time or part-time, the gender mix of the job, whether in the public sector, whether permanent job, whether manager or supervisor, shift work, establishment size and region.