Skills Gaps and Training Needs for Information and Communications Technology in Small and Medium Sized Firms in the South East of England

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ABSTRACT
This paper shows the results of a detailed skills audit and skills gap analysis among some 380 people from 38 small or medium sized companies in the South East of England, UK. Most participants reported that their own abilities were consistent with the needs of their jobs in most areas of basic software use (word processing, database use, spreadsheet use and e-mail), but not presentation and graphics. However, peripheral ICT skills such as browser skills, an ability to select appropriate software for new tasks, a knowledge of computing networks and operating systems management skills were all commonly held to be significant skills gaps. These topics should be the focus for significant staff development and training in innovative firms. More often than not, website authorship and management skills levels were low but few people considered that this topic was necessary for them to do their job effectively. The results are discussed in the context of the widely held contention that lifelong learning and skills development is key to the competitiveness and sustainable growth of firms in the UK.

Keywords
ICT, Skill gap, Small and medium sized companies, Staff development

Introduction
Employers’ skills needs and skills shortages in the South East of England are well documented by various government agencies and other responsible bodies (SEEDA, 2002, for example). Furthermore, there is wide agreement that among other needs, developing skills in information and communications technology (ICT) is a particular priority in the South East (Op. Cit.). The ICT sector is growing rapidly but the use of ICT in all business sectors in the region is also critical for its prosperity. Thus, for example, a significant report by the Department of Trade and Industry (DTI) in 1999 showed that the South East region was at the forefront of ICT utilisation in the UK. Some 44% of all companies in the region make use of the internet to make purchases and 12% of all firms already sell their products and services on-line (DTI, 1999). Nevertheless, SEEDA (2002) conclude that the single most important finding in recent research into ICT skills in firms is that “…companies in the South East [of England] report that up to 44% of their staff have significant ICT skills gaps (the second highest level in the UK)”. This paper adds to that body of work that documents skills gaps in ICT in UK businesses, and in particular it makes a novel contribution by reporting on differences between self assessments of ability and the needs of existing job roles among individual employees.

Methods
The Skills Assessment Frameworks
Two skills assessment frameworks have been developed by the School of Educational Studies at the University of Surrey since 1998 in order to help a variety of small and medium sized enterprises assess the skills and skills development needs of their staff. Topics of interest to UK businesses were identified over a period of consultation and testing (in more than 30 firms of different sizes) that lasted more than a year. These topics were then illustrated by a series of ‘level statements’ designed to describe different competencies within each area of work. The level statements were written using a variety of academic and vocational skills descriptors (e.g.
SEEC, 1996; 2002; Management Standards Centre, 1999; NICATS, 1998). They were then tested and developed over the next two years by iterative use in another 30 firms.

Briefly, both frameworks were designed to span the variety of professional, vocational and university systems of credit and qualification. Specific competency statements were written and tested so that they were both intelligible to business users and robust enough to be measured against specific standards and qualifications (NVQ and GNVQ, Degree and Masters awards etc.). They were repeatedly tested and refined by a panel of academic volunteers and professionals until independent assessment of each statement gave a consensus measure of competency in at least 8 out of 10 tests.

One assessment framework (the Skills Analysis Tool [SAT]) was then developed for use on-line and configured to allow users to score both their own self assessment of their ability and their perceptions of the levels of skill actually required by their job. The finished SAT framework actually comprised three parts: Business Operations; E-Business and Information and Communications Technology (ICT), but only data in ICT are reported in this paper. A demonstration of the interactive SAT software can be found at http://www.esib.co.uk. Click “view SAT demo” for a demonstration or register to join the programme (The SAT is now licensed for use in businesses as part of the e-Skills into Business Programme, led by the e-Skills NTO in partnership with the South East of England Development Agency and others). Topics in the ICT SAT include; using a computer, software applications, inter and intra-networking, e-mail, website design and management, using a database, information and systems management, word processing, using a spreadsheet, and presentation and graphics.

The second framework (the Business Operations Skills Analysis [BOSA]) was designed to enable businesses to compile skills data for all their workforce and to produce profiles and graphic summaries of different departments and divisions. Like the SAT, the BOSA included a variety of skills areas that are not reported here (Project Management, Business Technology and People and Team Work Skills). The BOSA was designed to allow users to record their own skills profile, but unlike the SAT, it did not allow assessment of the needs of their jobs. A screen-shot of the BOSA framework for one topic (using a database) is shown in the Appendix and an on-line demonstration of the BOSA can be found at http://www.surrey.ac.uk/Education/emap/bosa/index.htm (Demonstration copies of the BOSA or business licences for the use of the BOSA can be obtained from the author). The various topics covered by the ICT BOSA were; using a computer, software applications, internet and intra-networking, e-mail, website authorship and management, database systems management, information systems management, security systems management, word processing, using spreadsheets, and presentations and graphics.

Data Collection

The sample includes individuals at all levels and grades of employment and reflects the composition of participating firms. The firms that took part in the BOSA were recruited by letter and were first located through the local Business Link Business Register, Surrey Training and Enterprise Council, Surrey Business Club and the Surrey branch of the Institute of Directors. The eSkills into Business Programme was also advertised through the local and national press and radio and by direct marketing to firms through local Business Links in the South East of England. The publicity drive behind the e-Skills into Business Programme was considerable and participating companies were drawn from a wide geographical location. The e-Skills into Business Programme sample population (although small) is likely to be broadly representative of the region. The BOSA sample population largely comprised those firms with a history of close association with Business Links and other such organisations. It is commonly assumed (although unproven) that companies with a track-record of interaction Business are more active in the review and development of staff skills than those that remain unknown to the Business Links network. If this is true then the BOSA sample population, in particular, is likely to overestimate the average level of skill and underestimate the existing gaps between abilities and skills needs among the business population of the South East of England. Furthermore all firms completing the BOSA were also located in or around Guildford and the regional validity of this sample is therefore limited.

All firms taking part in this study employed less than 250 staff. No company had an annual balance sheet in excess of £16.2 million or a turnover of more than £24 million.
Results

A. Skills Profiles

Figure 1 shows the self assessment scores for all participants in the Business Operations Skills Audit (BOSA). Briefly, only a few people ascribed themselves skills above level three in any topic. In all, only 128 of 2989 (4%) separate responses were at level four and there were only 32 responses at level five (1%). At levels one two and three the numbers of responses were 863 (29%), 1066 (36%) and 978 (33%) respectively.

Figure 1. The frequency of competency level scores (at levels one to five) among a total of 297 individuals among 19 different small and medium sized firms in the South East of England, UK

Basic use of the computer was the highest scoring topic (mean level score 3.14) and this was the only topic that had a mode score of level three or above (see Table 1).

Word processing (mean 2.78) e-mail (2.56), internet and intra-networking (2.55), software applications (2.49) and using spreadsheets (2.1) all achieved mean level scores of two or above. Average scores below level two were recorded for using databases (1.88), presentation and graphics (1.79), information systems management (1.71) and website authorship and management (1.33). In all, there were some 268 scores returned for website authorship and management; 200 were at level one (75%).

<table>
<thead>
<tr>
<th>Topic</th>
<th>Mean competency level score (sd)</th>
<th>Modal competency level statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using a computer</td>
<td>3.14 (0.7)</td>
<td>Level three – I am a regular computer user and I am familiar with a variety of software packages for routine tasks such as word processing, database management and e-mail in my job. I create and use directories and folders to organise files in a systematic way and I can explain to others how things are done.</td>
</tr>
<tr>
<td>Software applications</td>
<td>2.49 (0.8)</td>
<td>Level two – I make routine use of the software provided for me to do my job.</td>
</tr>
<tr>
<td>Internet and intra-networking</td>
<td>2.55 (0.8)</td>
<td>Level two – I am familiar with the basic concept of networked computing systems, local network security and the use of the world wide web.</td>
</tr>
<tr>
<td>E-mail</td>
<td>2.56 (0.7)</td>
<td>Level two – I can send and receive e-mails.</td>
</tr>
<tr>
<td>Website authorship and management</td>
<td>1.33 (0.8)</td>
<td>Level one – I know little or nothing about the</td>
</tr>
</tbody>
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management and design and management of web pages.

<table>
<thead>
<tr>
<th>Skill</th>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using a database</td>
<td>Level two</td>
<td>I understand basic database functions; I can enter and print records, create and modify tables and create queries; I am familiar with at least one commercial software package (such as Dbase or Access) and I use database software routinely.</td>
</tr>
<tr>
<td>Information systems management</td>
<td>Level two</td>
<td>I can use information management systems such as database software, file cards and stock records etc; I can use these systems carefully and I can ensure that they are kept up to date.</td>
</tr>
<tr>
<td>Security systems management</td>
<td>Level one</td>
<td>I know little or nothing about security systems management.</td>
</tr>
<tr>
<td>Word processing</td>
<td>Level two</td>
<td>I am comfortable with the basic operations of word processing software packages for my own use. I can change the formatting of text (e.g. from bold to italics) and I can use cut and paste functions.</td>
</tr>
<tr>
<td>Using a spreadsheet</td>
<td>Level two</td>
<td>I am comfortable with the basic operations of spreadsheet software packages (such as Excel or 1-2-3). I can enter data, sort it into categories and display simple data summaries and statistics.</td>
</tr>
<tr>
<td>Presentation and graphics</td>
<td>Level two</td>
<td>I am comfortable with the basic operations of presentation and graphics software packages (such as PowerPoint) for my own use. I can draw simple objects and designs, set object and background colours and control page layout and design. I can also prepare a simple slide-show presentation as well as adding pre-designed clip-art.</td>
</tr>
</tbody>
</table>

Table 1. Results of the self assessments of competency levels among 297 individuals from 19 different small and medium sized firms in the South East of England, UK

B) Skills-Gap Analysis

Overall there was good correspondence between the levels of skill that individuals thought necessary for their employment and their self-assessment of their own abilities (see Figure 2). There were four skills topics for which average levels of ability were reported consistently higher than the perceived needs of the job. These were basic computer use, word processing using spreadsheets and database use. Mean scores for ability and job need in e-mail use were exactly matched. All other skills areas (general software applications, website authorship, networking, presentation and graphics software skills, operational systems management, and browser use) showed lower levels of ability than was generally held to be needed in individuals’ jobs. These topics therefore represent significant net skills gaps. Skills in the use of presentation and graphics software and the use of a browser, in particular, were consistently reported at lower levels of ability than individuals perceived their jobs required.

The most intriguing aspect of the skills gap results is the clear division between basic software applications skills and peripheral ICT skills such as networking, browser use and software applications. With the exception of presentation and graphics skills, all basic software applications (e.g. e-mail, word processing, spreadsheets and database use) showed average levels of ability that exceeded the common needs of the job. This is likely to reflect the long-standing availability of training that supports the majority of office-based software applications (Microsoft training and the European Driving Licence (ECDL) programme are particular examples). However, it is clear that significant skills gaps arise in those areas that are rarely taught in office support training programmes. Thus many employees are ill equipped to scrutinise available software applications and to select software for particular uses. Similarly, browser skills, knowledge of operating systems management and networking skills are generally poor and this is likely to be a consequence of their general neglect in specific training. This is a clear ‘gap in the market’ among training providers and it should be addressed to improve skills
in the workforce. Innovative firms could do much to improve their efficiency and competitiveness by ensuring that their workforce is trained in these peripheral (and often neglected) areas.

Overall, the profile of abilities reported in this analysis matched those recorded using the BOSA (results section A). Basic computer use and word processing skills were generally much higher than levels of skill in website authorship and management. Interestingly, despite the fact that the average skills levels for website authorship and management were so low, the discrepancy between ability and the perceived needs of the job (0.02 points) were slight compared with other topics such as presentation and graphics (0.35) or networking (0.28).

In all, 42 people (50%) reported significant skills gaps on a case-by-case basis. There were six examples of individuals with level one abilities and level five job needs, but more generally skills gaps were located between level one and two, two and three, and three and four. Thus, for example, the single most common gap was in presentation and graphics at levels one and two (12 people [14%] reported level one skills and level two needs in this topic).

**Discussion**

This paper examines the skills profiles and the gaps between individual employees’ skills levels and the abilities that they themselves perceive necessary to do their current jobs efficiently. This approach is important; others have documented significant gaps between the types of skills employees possess and those expected of them by their employers (e.g., IFF Research Ltd Report, 1998 and the (UK) National Skills Task Force Third Report, 2000) but few have reported such gaps when an analysis is done by the workers themselves. Self-assessments of this nature are vital if individuals are to be helped to engage in lifelong learning and upskilling in the context of their employment. Furthermore, it provides a rational framework for the selection of courses and training materials from education and training providers.
Promoting individual and employer participation in learning is vital to the economy of the UK and to the economic potential and security of individuals. As Tuckett states:

“There is now a widespread consensus that it is going to be central to the economic well-being of the UK for us to create a learning society. The arguments are familiar. In an increasingly global economy there is a marked economic advantage for societies with skilled, adaptable and learning workforces.” (Tuckett, 1997, p1.)

Nevertheless there is still considerable evidence that the attitudes of individuals and employers towards learning are ambivalent. The National Skills Task Force (2000), for example, reported that when asked to identify the key obstacles to learning, 43% of respondents said that they preferred to spend their time doing other things and 26% said that they were simply not interested in learning. Furthermore, when those who had not recently participated in learning were asked why this was, 32% said they were not interested in learning at all, and almost one in five said that they did not require any additional learning for their job. Statistics such as these are worrying and also incongruous in the light for other reports that show the very real economic and social benefits of learning. For example, Tremlett et al (1995), report that among a postal code sample of adults in England aged between 16 and 54, nearly two thirds (63%) thought that recent learning activities were directly linked to significant economic and social benefits in the course of employment. These benefits included things such as securing new employment, increased job satisfaction, promotion or a pay rise.

The data presented here confirm the fact that many firms lack significant skills in ICT that are likely to impede their potential for sustainable growth and competitiveness. Furthermore, these skills gaps are readily identified by the employees themselves, and overall, more than 50% of the individual participants in the survey reported that they lacked the necessary skills for their job in at least one area. This is a significant finding: not only does it suggest that commitment to training and development is necessary for competitive advantage, it suggests that this need is very clearly recognised by a significant proportion of staff. Robust audits of individuals’ skills and development needs are likely to be an important first step in the upskilling process and should be done to provide evidence of need and detailed information about the precise training priorities of individuals.

Acknowledgements

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References


### Appendix: An example of the on-line Business Operations Skills Audit Self Assessment Framework

**Topic 6 - Using a database**

Read through all the statements. Tick a box only where **all the statements** in a level apply to you.

#### Level 1

I have little experience in the use of databases.

#### Level 2

I understand basic database functions; I can enter, change and print records, create and modify tables and create queries; I am familiar with at least one commercial software package (such as Dbase or Access).

#### Level 3

I am an experienced database user. I can create and modify reports, use filters in queries, integrate data, make charts and link information; I know my way around a variety of different software packages (such as Dbase and Access) and I am familiar with their different strengths and weaknesses. I can also help others to learn basic database operations.

#### Level 4

I am an advanced database user. I can define and validate data, create and customise forms, use macro functions and create hyperlinks. I am also able to specify unique database functions so that software engineers can customise database programmes to meet specialist needs and I am able to train others to an advanced level of database operations.

#### Level 5

I can specify and design database functionality in order to create new and innovative database software; I can help other database users to specify their unique database needs and I can configure database software to integrate with other software applications systems and data input platforms.