Literature Review of Evidence on e-Learning in the Workplace

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1. Introduction and Methodology

1.1 Purpose of this study

Although there has been much research on e-learning in the educational context, far less has been written about e-learning in the workplace (Macpherson, 2003). There is, however, a need to draw together what research has been done on e-learning in the workplace to inform future research. This is the purpose of this literature review.

This literature review covers the following areas, in accordance with the brief provided to the Institute for Employment Studies:

- **The prevalence of e-learning in companies —** how common is it for e-learning to be used in the workplace? Are there differences in usage by occupational group, sector, and size of company? What kinds of e-learning are used? (Chapter 2).

- **The demand for e-learning —** how much demand is there for e-learning products and services amongst employers? (Chapter 3).

- **The effectiveness and impact of e-learning —** what are the expected benefits of e-learning? How effective is e-learning in relation to: (1) engendering a positive response from the trainee; (2) resulting in learning on the part of the trainee; (3) changing the behaviour of the trainee; and (4) having a positive impact on the organisation (Chapter 4).

1.2 e-learning: A definition

Before we are able to make an assessment in the above three areas, we need to know what we mean by the term 'e-learning'. 'e', in regards to e-learning, obviously stands for electronic. Electronic learning can take many forms, and consequently there has been some debate about what can legitimately be covered under such a term. A wider discussion on the use of the term e-learning can be found in Pollard and Hillage (2001), however, it is enough here to state that the term e-learning used in this report will be:

> *'The delivery and administration of learning opportunities and support via computer, networked and web-based technology to help individual performance and development.'* (Pollard and Hillage, 2001, 20)

This is a deliberately wide definition which predominantly includes the use of the Internet, intranets and CD-ROMs, but also includes video conferencing, satellite-delivered lecturing, and virtual educational networks. Other definitions insist on 'connectivity' — in other words, exclude 'stand alone' systems such as CD-ROMs (for example CIPD, 2002 and 2003). Given that the content of CD-ROMs is often similar to that contained on intranets this, some would argue, is an arbitrary distinction. In this literature review, unless otherwise specified, the research referred to takes a comparable definition.

1.3 Methodology

The brief for the literature review stated that it was to examine evidence on e-learning in the workplace. We have kept tightly to this remit. We would not have been able to sufficiently cover the evidence on e-learning in the educational field, where there is far more research, and in any case, there are considerable differences between the educational and workplace settings (Bonk and Wisher 2000, 3). These differences make redundant the simple application of principles from one field to the other. This is not to say we have not addressed research which is concerned with the workplace but draws on research from education. Instead, we have applied appropriate caveats when doing so, as most authors do.

In sum, the main criteria for the inclusion of material was that it addressed the use of e-learning in the workplace. In addition, a heavy emphasis was placed on material which provided evidence concerning the three broad areas mentioned above. In some instances, however, material has been included which is of a more polemical nature, but which is of importance in setting the context.

The approach to gathering the material was to cast the net widely, and reject on inspection. Given the relative paucity of proper research on e-learning in the workplace this was felt to be important in order obtain the available material. The process began with searches on the following indices and databases for material, using the terms 'e-learning' and 'elearning':

- Web of Science
- ABI Inform
- Assia
- Zetoc
- ERIC

- Econlit

- Psychinfo.

Abstracts — and where available for downloading articles — were read and rejected, or included according to the above criteria. Articles were ordered where appropriate. Bibliographies were investigated for possible further research for inclusion. Websites of organisations and departments having conducted research in the field were searched. These included:

- EPIC, Brandon-Hall, the Masie Centre, elearning network, LSC, TUC, LSDA, CourseShare.com, learningcircuits, ASTD, e-learningcentre.co.uk.

Keith Shaw of Keith Shaw Associates was contacted for advice, as was Dr M Kerrin, formerly of IES.

In addition, a limited amount of speculative searching was done using the Google search engine, in addition to following up leads and investigating key authors' work in the area.

The report follows the structure set out, above, in Section 1.1.

2. The Use of e-Learning in Workplaces

In this chapter, we examine the use of e-learning in the UK, and in the wider world for the purposes of context. This is executed in the following way:

- **Section 2.1** examines evidence on the prevalence of e-learning in the UK and wider world.

- **Section 2.2** is concerned with evidence on differences in the use of e-learning by occupational group.

- **Section 2.3** extends the analysis to differences in the use of e-learning by company size.

- **Section 2.4** considers corresponding differences by industrial sector.

- **Section 2.5** investigates evidence on the different kinds of e-learning provided.

- **Section 2.6** provides a conclusion to the chapter.

2.1 The prevalence of e-learning in workplaces

2.1.1 In the UK

There have been a few surveys which have sought to gauge the prevalence of e-learning in the UK. One of the earlier studies by the now defunct company Xebec McGraw Hill in 2001, presented data that 87 per cent of companies had an intranet, and 28 per cent of these companies use it to deliver training — in other words, 24 per cent of the total delivered training in this fashion (Beamish *et al.*, 2002, 105). This was projected to rise to 54 per cent of all companies with an intranet within three years. This, it should be noted, does not include other forms of e-learning other than the use of intranets (for example CD-ROMs). Furthermore, as we will discuss below, there are reasons for being sceptical of many of the forecasts of e-learning growth.

Another study (Young, 2002, 54), commissioned by the e-learning provider Skillsoft, took the form of a telephone survey of 204 'senior level executives', aimed at creating a 'major benchmarking study of e-learning in UK organisations'. This study found that 46

per cent of surveyed companies had implemented e-learning in the year of the survey; 2001. This was a dramatic rise compared with an identical survey conducted in 2000, reporting 12 per cent of companies having some form of e-learning. Furthermore, it was predicted that by 2003, 78 per cent of respondents would be using e-learning.

Leaving aside the question of the reliability of the prediction, this survey would *seem* to suggest a very high penetration rate of e-learning in employing organisations in the UK. It would also seem to indicate that there had been a dramatic rise in e-learning in only the space of a year. Whilst there may be *some* truth to this there is reason for being a little sceptical of the results of this survey. First, the sample is small at 204 interviewees, and it is not possible to make strong inferences about the findings beyond the survey. Second, there is no indication that the sample is random. Finally, it *could* be argued that the company has a vested interest in locating a high degree of e-learning (and future e-learning), given that it provides products for this market.

A more recent survey conducted by the Chartered Institute for Personnel and Development (CIPD, 2003a) put the proportion of surveyed employers who gave e-learning to at least one group at 48 per cent. Once again, this was a dramatic rise since the previous survey (CIPD, 2002), when 30.5 per cent of companies delivered such training. The definition of e-learning used by the CIPD (2002 and 2003) was actually less wide than that used in this report, as it excludes the use of CD-ROMs — so we can expect the figures to have been marginally higher had such technology been included[1].

However, CIPD (2002) suggests that the *amount* of e-learning used in comparison with other forms of training is likely to be low. Sixty-nine per cent of respondent-organisations using e-learning said e-learning only accounted for 'a little' of the training time used (p6). The sample is larger at 585 interviewees, and the findings are likely to have more weight than the previous study mentioned.

Nevertheless, we cannot simply infer that these proportions are exactly reflected in the outside employer population. The sample was taken from members of the CIPD, an organisation with a keen interest in training. Respondents, therefore, arguably have a greater interest in training than the employer population at large. Also, as the report itself acknowledges (2002, 33), because CIPD members constituted the sample, it is overly representative of large companies — small and medium sized organisations, which make up the vast majority of businesses in the UK (Sambrook,

[1]   CIPD (2002), defines e-learning as, 'learning that is delivered, enabled or mediated by electronic technology for the explicit purpose of training in organisations. It does not include stand-alone technology such as the use of CD ROMs.'

2003,) would, therefore, not be adequately represented. Put simply, it is very difficult to draw precise conclusions about the prevalence of e-learning across employer organisations in the UK from the survey data available — although the CIPD survey arguably gives a closer approximation.

In the above studies, we have considered mainly whether companies have introduced e-learning. Another way of considering the prevalence of e-learning is in terms of *individuals* who receive training in this manner. There is a lack of published research from this perspective, however, our own analysis of the Labour Force Survey has yielded some interesting results which will be presented alongside the literature in this chapter.

The Labour Force Survey asks individuals (not doing an NVQ) who have received education or training related to their job in the last four weeks, how this training was delivered. One possible response was via the *'Use [of] information from the Internet and CD-ROMs'*, a measure encompassing much of that covered by e-learning (intranets are, for example, excluded). Individuals were able to specify more than one way in which they had received training — for example, a respondent could answer that they have received training via seminars or workshops *and* via e-learning, as defined here. Furthermore, the Labour Force Survey is a statistically reliable source of data, in the sense of sampling *etc.*

Table 2.1 gives the numbers and proportions of individuals who have received training in the last four weeks, broken down by whether they received on-the-job training only, training that included e-learning, or 'off-the-job' training, excluding e-learning.

As we see from Table 2.1, 12 per cent received some form of e-learning, defined as above, as part of their training. The proportions receiving 'on-the-job training only' or 'off-the-job but no e-learning' are roughly equal (with 43 and 45 per cent respectively). It is to be expected that measuring the prevalence of e-learning in this way would yield lower proportions than surveys which look at employers offering *at least some* e-learning. However, the figures do strongly suggest that the use of e-learning as a training tool may be lower than envisaged by the

Table 2.1: Whether training in the last four weeks included e-learning

	N	%
On the Job Training only	1,033,323	42.7
Training included e-learning	294,423	12.2
Training did not include e-learning	1,092,375	45.1
Total	2,420,121	100

Note: Includes only those who had some form of training in the four weeks preceding the survey, excluding those working towards an NVQ. e-learning defined here as the use of information from the Internet and/or CD-ROM

Source: Labour Force Survey, Spring to Summer 2003

CIPD (2002 and 2003) even accounting for differences in the definition of e-learning.

2.1.2 In an international context

There is more published on the prevalence of e-learning outside the UK, particularly in the USA, but also in the rest of Europe. Such reports also indicate a rapid expansion of e-learning and a relatively high proportion of companies utilising these training and learning methods. From an international perspective, the UK would seem to lead in Europe in relation to e-learning. According to research by Enterprise Island, the Irish Government's trade and technology body, the UK represents 50 per cent of the £224m spent on e-learning projects by European companies. IDC has published similar figures for the UK (Clark, 2003a, 32). By way of further comparison, the literature asserts that Europe is less advanced in terms of the prevalence of e-learning than the USA (Martin *et al.*, 2003).

As with research relating to the UK, we have acquired survey data on the prevalence of e-learning in the USA. One of the more recent surveys (IOMA, 2003b, December 2003) found that 43 per cent of respondent-employers have adopted e-learning. Unfortunately, the sample size was only 131 'training professionals', which seriously weakens its reliability. Other surveys, as a consequence of their research design, dramatically over-represent companies with e-learning (Schafter, 2001; Bonk, 2002).

There is more literature on the size of the e-learning market, an indicator of prevalence, and this is covered in Chapter 3.

2.2 Differences by occupation

What differences, if any, are there by occupational group in terms of who gets e-learning? Furthermore, which groups are likely to spend a substantial amount of their training time e-learning? The first question regarding who actually gets *any* e-learning as part of training is investigated in our analysis of the Labour Force Survey presented in Table 2.2. Once again, the definition of e-learning is narrower than that adopted in the rest of the report, as it does not include the Internet and CD-ROMs. The table shows the proportions of respondents who, having obtained work-training in four weeks prior to the survey, received at least some of this via e-learning.

Nisar (2002), predicted that highly skilled workers would be more likely than their less skilled counterparts to receive e-learning because they would be less likely to benefit. This view is partially confirmed by the data in Table 2.2 — professionals and managers, and senior officials were the most likely to obtain e-learning as part of their training during the four week period (17 and 16 per cent respectively, did so). The groups least likely to have had

Table 2.2: Whether training in the last four weeks included e-learning, by occupation

	On the job training only		Training included e-learning		Training did not include e-learning		Total	
	N	%	N	%	N	%	N	%
Managers and senior professionals	127,426	33.4	59,530	15.6	194,888	51.0	381,844	100.0
Professionals	185,335	32.8	96,009	17.0	283,865	50.2	565,209	100.0
Associate professionals and technical	226,547	43.0	59,841	11.3	241,035	45.7	527,423	100.0
Administrative and secretarial	123,314	41.1	41,873	13.9	134,978	45.0	300,165	100.0
Skilled trades and machine operatives	124,451	55.9	12,348	5.5	85,818	38.5	222,617	100.0
Personal service occupations	99,500	50.7	13,874	7.1	82,991	42.3	196,365	100.0
Sales, customer service and elementary	146,281	64.8	10,791	4.8	68,800	30.5	225,872	100.0
Total	10,322,854	42.7	293,906	12.1	1,092,375	45.2	11,709,135	100.0

Note: Includes only those who had some form of training in the four weeks preceding the survey, excluding those working towards an NVQ. e-learning defined here as the use of information from the Internet and/or CD-ROM

Source: Labour Force Survey, Spring to Summer 2003

some form of e-learning as part of their training are comprised of the bottom three categories on the table, most of whom probably have less access to a computer[1]. Between five and seven per cent of these groups had e-learning.

The second question — which groups are likely to get a substantial amount of their training delivered by e-learning — was addressed by the CIPD surveys (2002 and 2003). Those respondents who stated that they offered at least some employees e-learning were asked which occupational groups had at least ten per cent of their training time taken up via e-learning. (Note that the definition of e-learning employed by CIPD is slightly different from that used in Table 2.2, as it excludes CD-ROMs.) The results for the years 2002 and 2003 are presented in Table 2.3.

Unsurprisingly the group who were most likely to spend at least a tenth of their training time on e-learning were IT staff, with 62 per cent stating that this was the case for them. Interestingly, for the remaining workers, e-learning was not concentrated predominately around highly skilled occupations. Indeed, only a quarter (26 per cent) of respondents said those at the 'top' of the career hierarchy, senior managers, spent more than ten per cent of their training time on e-learning. This is surprising given the data in Table 2.2, which suggested the opposite. However, the trend here may be partially the result of slightly different definitions of

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[1] The exception to this rule is probably customer service jobs, but the categories had to be grouped to ensure sufficiently high numbers to be statistically reliable.

Table 2.3: Occupational groups who get at least ten per cent of their training time via e-learning

	2002	2003
Clerical and Administrative Staff	42.5	44.1
IT Staff	56.2	61.9
Manual Staff	7.2	20.0
Middle and Junior managers	34	41.2
Professionals	43.1	43.5
Senior managers	24.2	25.7
Technical staff	39.2	39.9

Source: CIPD, 2002

e-learning used, and the fact that employers rather than employees were answering[1]. For these reasons, it is difficult to draw the implied conclusion that managers and senior officials are more likely to use e-learning, but for a shorter duration.

At the other extreme of the hierarchy, only a fifth of respondents said that manual workers spent at least a tenth of their time in e-learning in their company.

The 'middle' occupations between these two extremes each had between 40 and 44 per cent of respondents using e-learning for the necessary duration. Interestingly, there is a fair degree of stability between 2002 and 2003, in the proportions of each occupation spending at least ten per cent of the training time e-learning. The one exception to this is the manual staff category, which has almost tripled over this time period, from seven to 20 per cent. Once again, however, we should be slightly cautious about making strong inferences for the way such trends might apply outside the sample.

2.3 Differences by size of company

Nisar (2002), points out that empirical studies show that small employers are less likely to provide training than larger ones and, by inference, he assumes that the same applies in the case of e-learning. But the extent to which this is true, in relation to small employers and e-learning must be questioned, especially given the potential cost savings of using an off-the-shelf e-learning tool, instead of sending a member of staff on a course (see Sambrook, 2003).

CIPD (2003), broke down their results by organisation size, 'but found that this is generally not a factor influencing the use of e-learning, though there is a small tendency for very small

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[1]   It might be the case that those in higher level jobs were more likely to recall that they used e-learning materials as part of a seminar.

organisations (with 25 to 49 employees) to use less e-learning than larger organisations' (p16). However, it should be borne in mind that the small companies in the sample would have been unusual, in the sense that they had chosen to join an organisation, the CIPD, with an interest in training.

Other research based on EU (CEDEFOP, 2003) area notes that:

> '[t]he survey shows smaller organisations supplying training have adopted e-learning more than larger ones. Taking all the respondents together, almost 38 per cent of the training provided by those with under 50 employees involved the use of e-learning, whereas, for larger organisations, the figure was only twenty-eight per cent.'

When this was broken down by country, this finding was shown to be true for the UK, although this was not the case for all countries. It could be argued that this pattern was reflected in the wider employer-population — after all, the results exclude those employers who offer no training whatsoever, many of whom are smaller employers.

However, it is very difficult to draw firm conclusions from the survey. Firstly, because it was administered over the Internet, therefore excluding businesses without access to the web — who are, therefore, less likely to have e-learning. Second, the sample was not randomly generated, but taken from various databases of employers who are known to do training. Thirdly, the response rate was very low (800 respondents, or below seven per cent). Clearly, this will bias the results in favour of those organisations with a key interest in returning the questionnaire which, by inference, suggests an interest in e-learning.

Our own analysis of the Labour Force Survey identifies little difference by company size as to whether respondents who received training in the last four weeks did so at least partially via e-learning (see Table 2.4 — e-learning defined here in relation to

Table 2.4: Whether training in the last four weeks includes e-learning, by company size

No. of people	On the job training only		Training included e-learning		Training did not include e-learning		Total	
	N	%	N	%	N	%	N	%
1 to 24	235,565	41.5	74,315	13.1	258,396	45.5	568,276	100.0
25 to 149	400,043	44.5	94,055	10.5	403,885	45.0	897,983	100.0
250 to 499	98,541	45.1	25,321	11.6	94,594	43.3	218,456	100.0
500+	220,356	44.1	62,219	12.5	216,783	43.4	499,358	100.0
Don't know, but between 50 and 499	36,266	54.5	4,392	6.6	25,914	38.9	66,572	100.0
Total	990,771	44.0	260,302	11.6	999,572	44.4	2,250,645	100.0

Note: Includes only those who had some form of training in the four weeks preceding the survey, excluding those working towards an NVQ. e-learning defined here as the use of information from the Internet and/or CD-ROM

Source: Labour Force Survey, Spring to Summer 2003

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the Internet and CD-ROMs). However, this should not necessarily be interpreted as meaning smaller companies provide more e-learning than their larger counterparts. Small companies are less likely to provide any training whatsoever (Nisar, 2002), so if a larger proportion offer e-learning compared with traditional teaching methods, this could still represent a relatively small proportion of organisations. Clearly, more research needs to be conducted in this area.

2.4 Differences by sector

According to Nisar (2002, 260), *'sectors such as agriculture, metal goods (including engineering), construction, mineral products and transport are likely to suffer from a shortage of skilled employees, and thus, the need for e-learning is observed in these particular areas.'* The author gives no evidence for this assertion, however, and most information, however limited, suggests that these are not the core sectors for the development of e-learning.

Young (2002), for example, suggests that IT/Telecomms and financial services, followed by education, were where the highest sectors with the highest usage of e-learning. Manufacturing, industrial and retail and government sectors lagged behind. (However, limitations in regard to the sample need to be remembered — see above[1]).

Table 2.5 gives our analysis of the Labour Force Survey in regard to e-learning across different sectors of industry. Once again, respondents who had received training in the four weeks prior to the survey specified how they received that training — including via e-learning (in this case via the Internet and CD-ROMs). These results were cross-tabulated by industrial sector.

As the table shows, Banking and finance stand out as a key sector in which e-learning is used — for 17 per cent of those receiving training this entailed at least some e-learning. This is reflected in the many articles in trade journals detailing the introduction of e-learning in banking and finance in the UK and abroad (for example Dodds and Verest, 2002; Anon, 2002b; Lawton, 2003; Allen, 2003).

Interestingly, according to this data, and counter to Young (2002), Public Administration workers are the group second most likely to receive e-learning as part of their training. This apparent contradiction with Young (2002) may, however, partly be down to a later adoption of e-learning in the public sector. Indeed, more recent literature charts the widespread use of e-learning government departments such as the Inland revenue and DWP

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[1]   Bonk (2002), reports the same findings for the USA.

Table 2.5: Whether training in the last four weeks includes e-learning, by sector

	On the job training only		Training included e-learning		Training did not include e-learning		Total	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Agriculture & non-manufacturing	58,116	42.7	11,865	8.7	66,144	48.6	136,125	100.0
Manufacturing	118,946	49.4	26,602	11.1	95,163	39.5	240,711	100.0
Distribution, hotels & restaurants	145,933	52.5	20,859	7.5	111,056	40.0	277,848	100.0
Transport & communication	67,774	49.3	9,418	6.9	60,271	43.8	137,463	100.0
Banking, finances, insurance *etc.*	165,205	40.1	70,736	17.2	175,716	42.7	411,657	100.0
Public administration, health & education	427,631	38.4	143,137	12.8	543,220	48.8	1,113,988	100.0
Other	49,214	48.5	11,806	11.6	40,357	39.8	101,377	100.0
Total	1,032,819	42.7	294,423	12.2	1,091,927	45.1	2,419,169	100.0

Note: Includes only those who had some form of training in the four weeks preceding the survey, excluding those working towards an NVQ. e-learning defined here as the use of information from the Internet and/or CD-ROM

Source: Labour Force Survey, Spring to Summer 2003

and local government (Clark, 2003a), and in particular, in the health sector (Henry, 2002; Clark, 2003a; Young 2003).

2.5 The kinds of e-learning provided

2.5.1 What is taught

The question of what is actually taught via e-learning is addressed in some of the literature, especially the question whether it is used for hard skills (for example, IT training) or soft skills (for example, interpersonal skills). Despite the fact that surveys show differences between the proportion of employers teaching each type of skill — 'soft' or 'hard' — via e-learning, the studies all indicate that the latter is more common than the former (CIPD, 2002; Young, 2002; Beamish *et al.*, 2002; CEDEFOP, 2003). The differences *between* surveys can be partially explained by methodological differences (for example, source and size of sample).

CIPD is probably the most reliable and recent estimate of the types of e-learning used in companies, defined as the use of learning through electronic technology such as intranets and the Internet, excluding 'stand alone' technology such as CD-ROMs. Table 2.6 gives the types of training delivered by e-learning in respondent companies for which this was applicable. As the table shows, 'hard skills', such as IT and technical training are the most commonly used, and are used in the majority of cases (covering 84 and 61 per cent of the companies respectively).

Table 2.6: Occupational groups receiving at least ten per cent of their training time via e-learning

	2002	2003
Clerical and Administrative Staff	42.5	44.1
IT Staff	56.2	61.9
Manual Staff	7.2	20.0
Middle and Junior managers	34	41.2
Professionals	43.1	43.5
Senior managers	24.2	25.7
Technical staff	39.2	39.9

Source: CIPD, 2003

However, a considerable proportion of companies, over one-third, did use e-learning to 'teach' interpersonal skills, suggesting that e-learning will not be confined solely to hard skills, and as other studies have suggested, may increasingly develop into these areas (Young, 2002; Beamish *et al.,* 2002). However, it should be born in mind that the sample for the CIPD survey was subscribers to their pro-training organisation, so it is possible that these figures overestimate the proportions using e-learning for softer skills.

Furthermore, even in larger companies with progressive views toward e-learning, the amount of time spent teaching softer skills via e-learning may be dwarfed by that devoted to hard skills such as IT. Beamish *et al.,* (2002), in a study of selected, mainly global but UK-based companies, discovered that:

> *'Only 20 per cent of the organisations' online teaching time is used for soft skills, and the majority of the study managers are enthusiastic about the role of e-learning of the teaching of hard skills, such as IT. This stance partially reflects the managers' perception of the limitations of e-learning for soft skill training, and also their strategy for the early deployment of e-learning, preferring to start with online content that is proven to be effective.'* (p108)

2.5.2 How it is taught

The use of technology: Synchronous vs. A-Synchronous

Whilst it is not the purpose of this literature review to discuss the technological issues related to e-learning, it is important to make a distinction about how it is taught to, or rather used by, learners. This distinction is between Synchronous and A-Synchronous learning. As Welsh *et al.,* (2003, p246) points out, *'A-Synchronous e-learning refers to e-learning that is 'pre-recorded' or available any time of day, potentially from any location.'* Applications of A-Synchronous learning vary from, at a basic level, PowerPoint slides posted on a website, to more sophisticated variants enabling greater learning and involvement with, perhaps, graphics and animation. It is important to note that this may involve the ability to leave

requests for assistance to a trainer *etc.*, but crucially the learner would not be interacting with trainer in 'real time' — they would not be having an uninterrupted conversational dialogue.

In contrast, Synchronous e-learning is, *'e-learning that is 'live' and that requires all learners to be in front of their computers at the same time,'* (ibid., 247). A Synchronous session could involve a chat session, where all learners and a trainer log on at the same time. Alternatively, it could be more 'structured' with a trainer-led session and the use of a 'white board' on which the trainer writes notes which can be viewed by the learner.

To further complicate matters is the notion of blended learning, which uses some combination of classroom and e-learning. This is seen to have distinct benefits over 'desk' e-learning as it utilises the benefits and possibilities of e-learning tools (good programmes, self paced *etc.*), whilst allowing for the benefits of class room learning (the use of a facilitator, social interaction, discussion and questioning) (Zenger and Uehlein, 2001; see also Voci and Young, 2001).

It is important to note that we have come across no hard data as the prevalence of these different variances of e-learning — an area, therefore, in need of research. The literature suggests that A-Synchronous learning is more popular than Synchronous learning (see, for example, Welsh *et al.*, 2003; Clark, 2003a). Clark (2003a, 7), an assessment of the e-learning market, for example, states:

> *'A preference has emerged for 'scheduled non real-time' collaborative learning over real-time collaborative events. The cost, technical issues and perception that the virtual class room is no better than the real classroom, indeed may be worse, has lead to an explosion in a-synchronous, as opposed to synchronous collaborative learning.'*

In other words, according to this assessment, is a growing tendency for blended (*ie* 'scheduled non real-time') learning — *ie* the use of A-Synchronous technologies and packages in a class-room setting. Hard evidence to back-up such an assertion has, however, not been found.

2.5.3 How it is produced

Off the shelf, bespoke, or tailored

Broadly speaking, e-learning computer packages can be produced in a number of ways: it can be bought as an off-the-shelf package for some generic (perhaps sectoral) non-organisational skill; it can be custom produced to apply to an organisational specific requirement; finally, it can be converted from existing learning material into 'technology based training' (see Russell, 2003, 38).

To slightly complicate matters, the package can be produced 'in-house', produced solely by an e-learning company (in the case of

off-the-shelf material), or produced by an e-learning company but in collaboration with the client (ibid.). There is a distinct lack of reliable information on this. The literature seems to suggest that companies are increasingly using e-learning material that is custom produced (Barron, 2003; Russell, 2003). A survey of 350 organisations across the world, but predominately in the USA, found that 50 per cent of respondents used off-the-shelf learning content, whilst 72 per cent used custom or internally developed content. This, therefore, suggests that companies used a mix of the two. However, the survey has a very small sample at 250, and we were unable to ascertain how the sample was arrived at, so these results should be treated with caution.

The use of 'universities'

The terminology of universities is increasingly being used in relation to training. First, there is a growing trend amongst large companies to create 'universities' — for example, Barclays university, or Shell Open University (see CIPD, 2003b). There is little information on how common this is in the UK, but in the USA it is estimated that there are 1,600 corporate universities (Clarke and Hermens, 2001, 264). Clarke and Hermens, (2001, 264), however, argues that, *most corporate universities are, in fact, re-badged human resources/information/training departments of organisations, with little change beyond the name.'*

It is important to remember, however, that some education relating to current work is conducted by 'real' universities. Consortiums of universities are increasingly offering MBAs via e-learning to multinational companies (see Clarke and Hermens, 2001, pp260–261, for examples). It has not been made clear from this literature review how prevalent take-up of these courses is in the UK.

At the other end of the company spectrum, small and medium sized companies are increasingly using e-learning courses and material produced by the University for Industry, or rather 'learndirect' as it has become known. learndirect has a 'Skills for Life' programme which aims to improve peoples work-based skills, and produces e-learning courses and materials to this end. In 2002/2003, 64,000 SMEs enrolled employees on Skills for Life courses, representing 106,336 employees. This is targeted to increase to 200,000 employees and 70,000 employers this financial year (learndirect, 2003).

2.6 Conclusions

In conclusion, surveys seem to suggest that a large proportion of employers are using e-learning; however, we should treat these surveys with some caution due to their low response rates and, in some cases, biased samples. This also makes it difficult to draw firm conclusions about e-learning usage. However, consistent

messages are that manual workers are less likely to get e-learning, and sectors where computer usage is high (IT, financial services) correspondingly have higher levels of e-learning usage.

Despite a lack of hard evidence, it is also fair to conclude that 'hard' skills (for example IT) dominate over 'soft' skills. The research also suggests that A-Synchronous technologies are used more widely than those which are Synchronous, although, once again, we have found no strong evidence to back this assertion. Finally, we noted the rise in the use of learndirect for SMEs and 'Corporate Universities' for larger employers.

3. Employer Demand for e-Learning

In Chapter 2, we considered the current prevalence of e-learning in employing organisations in the UK and in the wider world. Given the difficulties faced in arriving at a picture of the current usage of e-learning, it is no surprise that making assessments of future intentions to use e-learning materials, *ie* demand, are even more problematic.

All the surveys we have looked at *suggest* that a very rapid rise in the use of e-learning materials in organisations has occurred, and is occurring. For example, as already noted in Chapter 2, Young (2002), a survey of 204 senior executives in the UK in 2001, found that 46 per cent of respondent-companies were using e-learning (from 12 per cent in 2000), and 78 per cent expected to be using some form of e-learning by 2003. This suggests a massive demand for e-learning. There are, however, difficulties in making inferences outside the sample, given its small size.

These predictions of high demand for e-learning were reflected in forecasts for the growth of the e-learning market. For example, Clark (2003a, 32) notes, *'IDC estimate that the [UK] corporate e-learning market is growing at 93 per cent compound annual growth, from £148 million in 2001, to £286 million in 2002, to £550 million in 2003, and £1 billion in 2004.'* However, this estimate was produced in October 2000 — has the market and, therefore, level of demand for e-learning grown in this fashion?

The answer is that despite a lack of hard evidence, we can say with confidence that e-learning has not, and is not, growing in this manner. Martin *et al.,* (p229) summarises the position nicely:

> *'[e-learning] is in its infancy in Europe. Having reached nothing like the penetration or degree of sophistication that it has achieved in the US… Industry reports were estimating that the e-learning market in Europe would have grown from 2001 figures of $0.8 billion by more than 120 per cent in 2001 to reach $6-8 billion by 2005…. Despite the rhetoric and excitement generated by the new form of learning… the growth and penetration of e-learning has not fulfilled its predictions, even in the USA.'*

It is noticeable that there is less data available on the size and growth of the e-learning market now that it appears this growth is less phenomenal than predicted. This is, perhaps, because such

forecasts and surveys were often commissioned or produced by e-learning companies with a vested interest in finding high demand for their products and services. After a comprehensive literature review on e-learning, all Welsh *et al.,* (2003) can say about growth is that, *'although precise estimates for growth in e-learning vary, published estimates indicate that organisations have increased and will continue to increase the use of technology to deliver training'* (Welsh *et al.,* 2003, pp245-246).

So, the market for e-learning, although growing, is proving smaller across the globe than originally expected, and this message is reflected widely in the literature. *'It has been a pretty bad year. Wall Street has fallen out of love with corporate e-learning,'* says Salopek, (2003, 32). The literature also documents e-learning companies being wound up or going bankrupt, the most notable of which in the UK was Xebec McGraw Hill (see Oakes, 2003). There is, however, literature which states that the market for e-learning products is merely undergoing a process of rationalisation, as the least effective companies get pushed out of the market (Tailor, 2002; Oakes, 2003; Galagan, 2001b). Ultimately, it is envisaged that the e-learning market will continue to grow, and that part of the reason for the slower than expected growth, in the USA in any case, is the economic downturn.

Now, however, the language is of the e-learning market across Europe growing 'steadily' (Anon, 2003d). We know, as already stated, that the UK is the country with the most developed e-learning market in Europe (Clark, 2003a). Making more precise estimates of the rate of demand and growth for e-learning is, however, difficult.

3.1.1 Why slower growth?

Why has e-learning not grown to the extent predicted a few years ago? One suggestion has already been mentioned — the economic down-turn, with the expectation that it will 'pick up' when the economic conditions improve. Yet, *'even industry experts have recognised that the expectations of e-learning have been 'unrealistic' and 'over-hyped'* (Martin *et al.,* p229).

From another perspective, one study of small companies in North Wales (Sambrook, 2003), found that attitudes toward the implementation of e-learning in individuals' organisations were more varied than is sometimes appreciated in the literature. At a workshop, employers expressed positive attitudes to training in general, but were less positive about e-learning. A survey of small employers in the area (167 in total) suggested that 12 per cent were using e-learning, 28 per cent were eager to do so, the remaining 60 did not express a preference for introducing e-learning. Barriers to the implementation identified, included:

- lack of hardware

- lack of e-learning expertise

- lack of time

- lack of resources

- lack of trust (that the trainee will complete the training on their own volition)

- difficulty in determining full cost of e-learning (unlike a classroom based course) (ibid. p513).

This research was very small scale, and performed in a relatively small geographic area, which makes direct inference outside of the sample impossible. However, it uncovers opinions that are rarely voiced in research on e-learning in the workplace, and offers potential avenues for future research.

Another piece of research, Beamish *et al.*, (2002), which explores the use of e-learning in ten large companies in the UK, found that even in these pro e-learning companies, there existed barriers to the expansion of e-learning. This included a culture of suspicion about e-learning from local and senior managers who had often progressed through the company via traditional routes. This is interesting, as some of the literature concerns 'selling' e-learning to senior management. If it is not as easy to identify fast and clear cost savings (see Section 4.5), perhaps it is difficult to convince senior managers of the merits of e-learning. This, it should be reiterated, is merely speculation, however, a possible area for future research.

4. The Effectiveness and Impact of e-Learning

'Let me lay my cards on the table, face-up,' says Peter Drucker, venerable author, consultant, and professor of management, when asked if e-learning is changing the training profession. *'I am the author of several online learning tools,'* (Galagan and Drucker, 2000).

Much of the literature on e-learning is concerned with the potential, and sometimes realised benefits, of e-learning (Macpherson, 2003). However, as the above quote suggests, a particular problem with a great deal of the literature is that it is written by e-learning providers with a vested interest in e-learning, or it examines the 'success stories' of e-learning.

This second point is not surprising — few companies will be willing to publicly admit large problems with their e-learning programmes. The literature which does address problems that companies have come across tends to explain how they have overcome problems — often in relation to implementation (see, for example, Gold, 2003b). This means that evidence presented is often anecdotal, with difficulties making generalisations beyond the examples.

As a general rule, the literature suggests that there are potential benefits to the use of e-learning, but there is a lack of systematic research to prove this. Attewell (2002), which reviewed literature on e-learning (including in adult education) concluded:

> *'Most of the research identified by the review is qualitative, providing data about the experiences of, often quite small, particular groups of learners. Taken individually, it is difficult to categorise those studies as reliable evidence; taken as a whole, it represents evidence can provide significant benefits to individuals and society.'*

This conclusion, that e-learning *can*, but does not automatically confer benefits, has been reached by others who have done systematic reviews of the literature (see, for example, Sambrook, 2003).

So, what are the potential benefits of e-learning — why do employers implement such training and learning methods? This is addressed in the next section (Section 4.1). Having identified the potential benefits, we go on to consider evidence of the effectiveness of e-learning in relation to trainees' responses

(Section 4.2); learning outcomes (Section 4.3); changes in trainees working behaviour (Section 4.4), and changes at the organisational level (Section 4.5). Finally, we draw some conclusions (Section 4.6).

4.1 The desired impact of e-learning

A great deal of the literature on the advantages of e-learning focus on two themes: cost advantages and flexibility of delivery (Macpherson, 2003, p5). Macpherson (2003, 5) explains the cost advantages:

> *'Centre on the reduced training time, the costs saved in travel and time away from the job and the ability of e-learning to serve large numbers at one time, or over time, with very little additional cost.'*

In relation to flexibility Macpherson (2003, 5) explains:

> *'Discussions on flexibility tend to focus on two main issues: flexibility in delivery, and flexibility in the pace and distribution of learning. The flexibility of delivery offers organisations the ability to deliver consistent learning experiences independent of time and place. This offers great advantages to a geographically-dispersed workforce, those working non-standard hours and those employees who work from a home base.'*

Sambrook (2003), a literature review on e-learning, arrives at a similar list of potential benefits. E-Learning is said to:

1. **Provide consistent, world-wide training**.

2. **Reduce delivery cycle time**.

3. **Increase learner convenience**.

4. **Reduce learner information overload** (*ie* learner can work at their own pace).

5. **Improve tracking** (e-learning tools can automatically keep records of who has done training, what test scores were obtained *etc.*)

6. **Lower expenses**.

There have been few surveys which have addressed the reasons behind the implementation of e-learning. However, Young (2002, 58) is such a survey, and it reflects the above list of reasons: 45 per cent mentioned its cost effectiveness; 36 per cent because it could be used across multiple sites; 20 per cent because it was an effective way to develop staff skills; and 20 per cent because it is self paced and empowers the employee. Also mentioned, but by fewer respondents, were the need to keep up with latest developments (eight per cent), and the fact that e-learning materials can be constantly updated (seven per cent), amongst other things.

The survey then asked whether respondents had seen the benefits of their e-learning implementation. One-third of respondents were in their 'evaluation stage', but, *'[f]rom the rest of the responses it is evident that, without exception, almost all the benefits anticipated have been achieved,'* (p58). Of the two-thirds who were able to answer:

● 27 per cent had seen a cost efficiency benefit (45 per cent sited this as a reason for implementation)

● 24 per cent were able to deploy their training across a wide geographic area and multiple sites (compared with 36 per cent citing this as a reason)

● 19 per cent had 'reaped the benefits of e-learning empowering the individual and being self paced' (compared with 20 per cent)

● 16 per cent cited e-learning as a more effective approach to training (compared with 20 per cent).

In addition, respondents were asked if any positive impacts were observed. Responses included:

● 51 per cent stating there had been a positive impact on the efficiency of their staff, with 23 per cent expecting such an outcome

● 20 per cent citing an improvement in employee retention

● in terms of their critical business processes, 46 per cent had seen a generally positive impact, 35 per cent an improvement in the quality of such processes, and 21 per cent a positive impact on the cost of these processes

● 20 per cent said they had seen a positive effect on revenues and sales as a result of e-learning introduction

● over half said they had seen a significant reduction in their training costs.

These points all sound very positive, but there is reason for treating them with some caution. First, there was a small sample (204 senior level executives), with the strong possibility that it is biased toward companies with positive attitudes to e-learning.

Second, even if what has been said is reflective of what senior level executives would say from the wider employer-population, it would be wise to not automatically accept all their remarks as 'facts'. Research form the USA suggests that relatively few employers — 30 to 40 per cent — do an evaluation on the impact of their training beyond discovering if respondents liked it (Bonk, 2002; Strother, 2002). Perhaps, lacking much firm evidence, a respondent might be inclined to answer in the positive to questions on the impact of e-learning. This point would apply equally to surveys such as Barron, (2003), in the USA, which asked respondents to rate their e-learning from excellent to poor.

In order to get a better understanding of the effectiveness of e-learning, we need to look at the literature in regard to four areas. These four areas are those famously identified by Kirkpatrick for evaluating training (see Burgess and Russell, 2003):

1. Trainees reactions (how did they respond to training — did they like it?).

2. Learning of trainees.

3. Behaviour of training (has the working behaviour of trainees changed as a result of the training — are they applying what they have learnt to the job?).

4. Organisational impact (including, in the case of e-learning, cost savings *etc.*).

These four evaluation areas are dealt with in the next four sections (Sections 4.2 to 4.5).

4.2 Level 1: Trainees reactions to e-learning

We might consider trainees' reactions to e-learning in relation to three aspects: the initial appeal of e-learning, their satisfaction with the e-learning process, and attrition levels. Ironically, given that trainees reactions to e-learning are probably the most common measure of assessment (Strother, 2002), there is little available research on this area in relation to workplace learning. This is, perhaps, because surveys tend to be directed to training managers not staff, partly for logistical reasons, and companies might be understandably anxious about releasing data on staff responses to learning.

4.2.1 Initial appeal of e-learning

Taking the initial appeal of e-learning first, one of the few relevant statistics comes from a survey of 700 e-learners, conducted by the ASTD and Masie centre. Thirty-eight per cent of the survey respondents said that they generally preferred e-learning to class-room learning. This might be a slightly simplistic figure, as some e-learning may be conducted in a classroom setting (*ie* 'blended learning — see Section 2.5.2). Nevertheless, the literature seems to support the fact that the majority of workers who have not experienced e-learning would rather have a 'traditional' class-room learning experience. However, summing up the literature in this area, Welsh *et al.*, (2003, 254), states:

> '*Findings from the research indicate that as long as technical difficulties are not overwhelming, after participating in a technology-mediated class, participants have more positive attitudes about technology mediated classes, are satisfied with their learning experience and willing to do it again.*'

Following on from this, other research cited by Welsh *et al.*, (2003), (North *et al.,* 2000), on teachers using a CD-ROM course indicates that if the technology does not work well the first time it is used, it has the potential to be a negative experience. This results in the individual being resistant to more training via this method in the future.

4.2.2 Satisfaction with e-learning

With regards to satisfaction with e-learning in the workplace, very little has been written. There has, however, been literature on workplace e-learning which has used evidence from higher education students' satisfaction with e-learning — typically, distance learning (see, for example, Bonk and Wisher, 2000). Whilst higher education and employment situations vary considerably, research relating to the former *may* give us some clues about trainee reactions in the workplace. In a review of the educational literature, Bonk and Wisher (2000), noted:

● Some research points to anxiety, frustration, confusion, and lack of support in an online distance course; others point to high drop-out rates due to a lack of social cues, interaction, and clear expectations (p36).

● One psychology course had lower satisfaction levels amongst e-students, although they actually did better in terms of grades (p37).

● Students were more satisfied with learning if it had real human feedback, rather than an automated response — human contact and reaction was felt to be important (p40).

These studies may suggest the need for human support, if the learning experience is to be satisfying. Interestingly, on a more positive note, the overview of HE e-learning identified studies that showed that students were positive about what was seen as greater access to professors *etc.*, who had to be available to answer their queries outside of a classroom setting.

On the whole, the research on satisfaction with e-learning has mixed results. There are examples of studies which show that perceptions of courses do not differ by mode of delivery (see Burgess and Russell, 2003, 295). On the other hand, one review of the literature conducted in 2000, *'reported that most of the evidence indicates that trainees prefer traditional classroom instruction to e-learning methods,'* (ibid.).

Furthermore, it is important that the quality of the e-learning materials and support may play an important part, *'Inman et al., (1999), found that [distance learning] trainees' ratings were most heavily influenced by the quality of the materials, the presence of an on-campus orientation session, and the perceived availability of an instructor,'* (Welsh *et al.,* 2003, 296).

4.2.3 Attrition

One of the ways in which a trainee may react to a learning experience is through non-completion of the course. In this regard, the literature asserts that completion rates of e-learning courses are not as good as more traditionally administered training (see Welsh *et al.,* 2003). Pointing to the case of US army reserve officers, Welsh *et al.,* (2003), reports that when there was no powerful personal rationale for completing a course, completion rates would be 64 per cent via e-learning, compared with 95 per cent in a 'traditional' classroom setting. When the course was directly related to career advancement, however, the completion rate by e-learning was much closer to the classroom level, at 90 per cent.

The importance of ensuring that individuals feel that the course is directly relevant to their needs was further underlined by a small case study of engineers in Scotland (Brink *et al.,* 2002). Completion rates of the course were low (29 per cent), and the reasons given for this were the fact that it was a course on finance, that they thought the company wanted them to take, but which was of little relevance to their jobs.

Another case study of IT training to IT professionals (Laine, 2003) — updating their knowledge of new programmes *etc.* — was unsuccessful because of a high drop-out rate (only 29 per cent completion). This was said to be because it was conducted in a non-classroom setting at the individual's initiative, and distractions led to non-completion. Having scheduled classroom sessions was considered important in order to get trainees to focus on the learning required to complete the course.

In this discussion of e-learning attrition it is important to note that non-completion of courses may not *always* indicate the failure of e-learning. In some cases, the individual may not need to complete the course in order to gain what information he or she needs.

4.3 Level 2: Learning of trainees

According to Kirkpatrick, learning is defined as:

> *'Principles, facts, and techniques that are understood and absorbed by trainees. When trainers measure learning, they try to find out how much the skills, knowledge and attitudes of their trainees have changed. Ideally, both pre-tests and post-tests are given to trainees to determine how much they learned as a direct result of the training program.'*
> (Strother, 2002, 5).

In reality, it is commonly recognised that such a level of evaluation is not carried out by companies in the majority of cases. Consequently, *'while there is no doubt that we see an increasing number of case studies showing success with e-learning, it is still difficult to find solid research measures of learner achievement in the*

specialised setting of a corporate training program,' (Strother, 2002, 2). However, case studies and examples from the world of education may give us *some* indication of the impact on learning of e-learning, and they are examined under the following headings:

- Is e-learning as good as classroom learning?

- Is it equally effective for all trainees?

- Is it equally effective for all types of courses?

4.3.1 Is e-learning as good as classroom learning?

According to Welsh *et al.,* (2003 ,p251):

> *'the literature available generally leads the reader to the conclusion that technology delivered instruction is, on average, slightly better than class room training.'*

Research cited by Welsh *et al.,* (2003, pp. 251-252), a meta-analysis of literature on learning effectiveness, found that 'e-learners' scored on average one-quarter of a standard deviation more than those on 'instructor led' courses.

The cases cited by Welsh *et al.,* (2003), a lot of which were from the US army, indicated that learning outcomes were either better or equal for those from e-learning courses, compared with their 'classroom' counterparts. Studies from the field of education also seem to suggest that distance 'e-learners' tend to do slightly better than 'traditional' learners (see Bonk and Wisher, 2000, p36-38).

Of potential interest to the question of e-learning effectiveness compared with classroom learning, is research conducted by Russell (1997). Russell (1997), compiled 250 research reports on the effectiveness of distance learning *for students* over a 30 year period (see Burgess and Russell, 2003; and Welsh *et al.,* 2003). His discovery was that there was no significant difference in learning outcomes between those that learned at a distance, and those learning in the traditional classroom manner. This would seem to lend support to the position that e-learning can be at least as good as classroom learning.

On the whole, however, Welsh *et al.,* (2003), argues that it is difficult to compare e-learning outcomes with that of classroom learning, because you may not be comparing like with like. *'It is difficult, if not impossible, to design training that is identical in all ways except delivery… difference[s]… might have been due, at least in part to course design rather than the use of technology.'* In other words, the content of the course may have been improved when it was converted to an e-learning version.

In addition, others have argued that work such as Russell (1997), which looks at outcomes at an aggregate level, fail to take account of other factors which may intervene to affect outcomes (see

Strother, 2002). For example, in the field of education, it might be the case that older learners use the distance method, and these learners are more committed and harder working than their younger counterparts.

Given the complications of these factors, Welsh *et al.*, (2003), opt for the following conclusion, which we endorse, rather than the one given in the opening to Section 4.3.1:

> '[B]ecause some studies have not found any difference and because of methodological difficulties contrasting different training sessions, we draw the conclusion that technology-delivered training can be more effective than classroom training.'

4.3.2 Is it equally effective for all trainees?

One of the concerns of the literature is whether e-learning is as effective for those with lower levels of computer efficacy (Welsh *et al.*, 2003, 25; see also Bonk and Wisher 2000, 40). Perhaps unsurprisingly, the studies reviewed in Welsh *et al.*, (2003), found that lower levels of computer efficacy were related to lower learning outcomes. This was further indicated by evidence from the education field, that those with a higher computer efficacy felt more in control of their learning, and were more willing to take 'risks' from which they learnt (see Bonk and Wisher, 2000, p40).

Welsh *et al.*, (2003, 251), speculates from interviews with SMEs whether greater experience of computers may make the young efficacious with computers 'and therefore more suited to e-learning'. Furthermore, it is speculated that industries in which computers are more widely used may also be more suited to effective e-learning. This would seem to be supported by the wider use of e-learning in sectors with the greatest use of computers (see Section 2.4).

This question of whether computer efficacy impacts on e-learning outcomes in a work context was addressed, alongside other possible determinants, by Brown (2001). The study followed 78 employees in the US doing an intranet-delivered training course. Pre- and post-tests were delivered to discover what had be learned. The model moved from the degree to which individual differences (age, education *etc.*), impacted on the 'choices' individuals made in regard to the time spent 'on task' (*ie* time spent on the course), or 'practising' as part of the learning, or the degree to which they were prone to lose concentration on the course. These 'choices', it was hypothesised, were related to learning outcomes. The findings of the study included the following:

- Computer experience was positively associated with pre- and post-test scores, suggesting that those with more computer experience did tend to do better in e-learning environments.

- Practise level and time on task were good predictors for knowledge gains.

- However, choices made by individuals — practise level, time on task, and off-task attention did not differ substantially by age, education or computer experience. The research *suggests* that older workers took longer to complete the training and learned less; however, the relevant coefficients were not big enough to be statistically significant.

So, what are the implications of this research, given the lack of big differences in choices made by age, education, or computer experience? Computer experience is positively associated with pre- and post-tests, seemingly confirming the fact that such training is more effective for such individuals. Furthermore, time spent on task and practice levels are positively associated with knowledge outcomes. Whether or not e-learning is better than traditional learning is unclear — this is not addressed by the research as there is no control group. However, e-learning does give more control to the individual to decide how much time and effort to spend on training, and as the author points out, this means that in order to be effective for all, there needs to be a great deal of support for learners to encourage them to 'stay on track'.

4.3.3 Is it equally effective for all types of courses?

Research seems to indicate that employers feel that e-learning is more effective for harder technical skills, such as IT, than softer interpersonal skills (see, for example, Beamish *et al.*, 2002). However, we have come across no hard evidence to back this assertion. Welsh *et al.*, (2003, p. 251), refers to research which seems to suggest a very different possibility — that e-learning works most effectively for short courses with less technical content (social sciences, for example). However, the research is now dated (1991), and applies to higher education students — a context arguably very different from the world of work.

The question of shorter courses working better is supported by examples of lower course completion rates for e-learning. Laine (2003), for example, showed how IT professionals dropped out of longer courses but persisted to the end with shorter versions. However, this was hardly scientific research, and it is difficult to make inferences from this to the wider employer and employee population.

4.4 Level 3: Behaviour of trainees

In general, employers do very little to evaluate whether training changes the behaviour of their staff; in other words, whether they apply what they have learned to their jobs (Burgess and Russell, 2003, 297). This is true for e-learning as well.

The few studies which have been conducted indicate that there has been a positive impact in terms of trainees' behaviour, usually in the field of sales, where tangible measures can be made of performance. For example, GTE Learning systems tracked the performance of salespeople who had learned using an 'integrated learning system' (CD-ROM, web-based training, instructor based training, online facilitator/mentor) with those who had not. The average time to first sale decreased by 25 per cent for those who had undergone the training, compared with those that had not, and the value of the sale was 100 per cent higher (Sambrook 2003, 289). Similarly, Century 21 found that sales by agents trained solely on the web were 33 per cent higher than the traditionally trained agents (ibid.). Likewise, Etera nursery supplies claim that sales staff that have undergone online training have 170 per cent more sales than an untrained dealer (Strother, 2002).

However, it is important to reiterate that we can't make wider inferences outside of these examples. Companies which have not been so successful with e-learning are less likely to admit their problems. Clearly this is an area for independent research.

4.5 Level 4: Organisational results

In terms of the impact on the organisation, assessments of e-learning in the literature focus on its cost effectiveness (Macpherson, 2003). This is most often expressed in relation to cost savings.

4.5.1 Cost savings

Welsh *et al.*, (2003, 253), summarises nicely the savings that can potentially be made from adopting an e-learning course as a replacement for, or alternative to, a classroom course. e-learning courses are likely to have considerably higher development costs than traditional classroom courses, given the technical considerations. However, calculations show that e-learning has the potential to be considerably cheaper once the course has been developed. Whilst e-learning has some expensive recurring costs, *'such as technical support, it eliminates various variable costs associated with the classroom, such as travel, lodging, meals, materials, and for some courses, the instructors salary,'* (ibid.).

There may be additional savings, as research suggests that people can be trained more quickly via e-learning than by traditional classroom methods. The literature states that people can be trained 30 to 50 per cent faster via e-learning (see, for example, Clark 2003c; Burgess and Russell 2003), although it is not clear how these figures are arrived at.

Given the high set-up costs associated with e-learning, a branch of the literature is concerned with calculating return on investment

(see Clark, 2003c; Young, 2002; Swanson, 2001; Harris, 2003). Clark (2003c) is a white paper explaining how to calculate ROI for an e-learning programme. Basically, *'return on investment compares the investment in training deliverable with the eventual cost benefits over a specified period,'* (p13). This translates into benefits minus costs over a specified period, multiplied by 100.

Burgess and Russell (2003), gives known examples of successful returns on investment amongst companies implementing e-learning:

- Budget Rent-A-Car were formerly spending $2,000 per trainee on a two week training course. By implementing a distance e-learning programme they reduced these costs to $156 per person.

- A workshop for managers run over the web saved Boeing an estimated $9 million on air travel alone, compared with an event held in one destination.

- Bell Atlantic Network Services examined its computer-based training programme and discovered a return on investment of 366 per cent.

Other examples include:

- *'IBM saved $200 million in 1999, providing five times the learning at one-third of the cost of their previous methods.'* (Strother 2002, 1)

- *'Using a blend of web-based (80 per cent) and classroom (20 per cent) instruction, Ernst and Young reduced training costs by 35 per cent.'* (ibid.)

- *'Braxton consultants trained and certified 15,000 consultants in three dozen countries by e-learning, cutting training costs per employee from $7,500 to $3,000.'* (ibid.)

- *'Cisco Systems saved $1m per quarter and had an 80 per cent increase to speed to competence.'* (Pantanzis, 2002; see also Galagan 2001a).

There are, as well, many other similar examples in the literature. However, we should be cautious of inferring that these kinds of results can be produced in any setting. It is worth noting that some of the largest savings relate to courses that would otherwise involve a lot of travel. Welsh *et al.*, (2003, p253), concludes:

> *'e-learning has the potential to be less expensive than classroom training if there are a large number of learners, if the learners are geographically dispersed, and if the course will be repeated several times.'*

It is interesting to note that whilst a large amount of, often earlier, literature is concerned explicitly with making clear cost savings (see Schriver and Giles, 1999; Deeny, 2003; Ingram, 2002), some of

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the literature is more circumspect in this regard. TD42 states, *'e-learning has many advantages: scalability, broad geographic reach, and unmatched delivery speed — just to name a few. But these advantages don't make e-learning less expensive than other training delivery methods.'* Similarly, Chapnick (2001), argues that if there are to be any savings these will be in the very long-term due to the high set-up and IT costs associated with e-learning.

It is also worth remembering that it can be hard to calculate ROI in many cases, as many variables come into play which may impact on the effectiveness of training (Burgess and Russell 2003, 299).

4.6 Conclusions

To start our assessment of the effectiveness and impact of e-learning, we considered the expected benefits. These related to questions of flexibility and cost savings, although they were expressed in regard to many issues. Survey research from the UK seemed to suggest that the benefits expected from e-learning implementation had, in many cases, already been met.

However, we questioned whether this result could be taken at face value, given the lack of training evaluation that occurs in many organisations, and problems with the sample.

In order to get a better understanding of the impact of e-learning we then looked at evidence in relation to four outcomes commonly associated with training evaluation: (1) trainees' reactions; (2) learning outcomes; (3) changes in learner behaviour; and (4) organisational results.

In relation to **trainees' reactions**, the research pointed to the importance of the following for a positive result:

- a positive first experience with e-learning (without great technical difficulties)
- quality materials and support
- a personal rationale for doing the course.

In relation to **learning outcomes**, we concluded that e-learning *can* have better outcomes than ordinary classroom instruction. It is, however, interesting to note that those individuals with higher computer self-efficacy seem better suited to e-learning.

There was limited evidence of **behavioural change** as a result of e-learning, *ie* the application of what has been learnt. However, what was provided was positive in relation to e-learning.

Finally, we examined the **organisational results** of e-learning in the form of cost savings. The anecdotal evidence *seems to* suggest considerable savings are possible; however, along with Welsh *et*

al., (2003), we conclude that savings could be made if there were a lot of dispersed employees to train, and if the training were to be re-used.

5. Conclusions

5.1 Findings

5.1.1 The use of e-learning in the workplace

In relation to the overall prevalence of e-learning, we noted that there were a number of surveys which *suggest* a large proportion of organisations are using e-learning. However, the surveys reviewed should be treated with some caution. Sample sizes are typically low and, in some cases, where a response rate is recorded, it is also low. In addition, the original sample may have been derived from groups of employers with a keen interest in training — further biasing the results.

This makes it difficult to draw firm conclusions in relation to e-learning usage by occupational group, size of company, or sector of industry. In relation to the occupational groups using e-learning, the results presented also seem to be slightly at odds — partly due to different methodological approaches — but manual workers *seem* to be the least likely to receive training in this way. There is a reasonable degree of consistency across surveys to the result that e-learning is most widely used in sectors with a high degree of computer penetration — IT and financial services — although it is strongly possible that they over-estimate usage given their sampling methods.

Similarly, there is a lack of hard evidence in regards to what is taught using e-learning, although it is fair to conclude from the research that it is most likely 'hard' skills (for example, IT) which dominate over 'soft' skills. The research also suggests that A-Synchronous technologies are used more widely than Synchronous, although, once again, we have found no strong evidence to back this assertion. Finally, we noted the rise in the use of **learndirect** for SMEs, and 'Corporate Universities' for larger employers.

5.1.2 Employer demand for e-learning

Given the difficulties associated with identifying the current use of e-learning, we found it hard to draw conclusions about the demand amongst employers for e-learning. However, we did note

that the market for e-learning products and services had not grown at the rate envisaged a few years ago.

5.1.3 The effectiveness and impact of e-learning

We began our assessment of the impact and effectiveness of e-learning by identifying the expected benefits of e-learning. These included the ability to:

● provide consistent, world-wide training

● reduce delivery cycle time

● increase learner convenience

● reduce learner information overload

● improve tracking

● lower expenses.

We then examined UK survey results which seemed to suggest that benefits such as those listed above had been realised. However, we questioned the degree to which these results could be taken at face value. It is known that most organisations do not systematically evaluate training, and we suggested that in the absence of hard information, many employers may respond positively to questions of impact. In addition, the sample was small.

In order to get a better understanding of the impact of e-learning we then looked at evidence in relation to four outcomes commonly associated with training evaluation: (1) trainees' reactions; (2) learning outcomes; (3) changes in learner behaviour; and (4) organisational results.

In relation to **trainees' reactions**, the research suggests:

● Trainees may be initially less positive about e-learning than 'normal' classroom instruction, although this can be overcome to a large degree if the first experience is positive and not fraught with technical difficulties.

● Satisfaction with e-learning is related to the quality of materials and support.

● e-learning courses are widely considered to have higher attrition levels, but if there is a strong personal rationale for doing the course (for example, career progression), the differences compared with traditional classroom instruction are much smaller.

In relation to **learning outcomes**, we concluded that e-learning *can* have better outcomes than ordinary classroom instruction. It is, however, interesting to note that those individuals with higher computer self-efficacy seem better suited to e-learning.

There was limited evidence of **behavioural change** as a result of e-learning — in other words applying what has been learned in the job. However, what evidence there was came from the field of sales, and suggested a positive impact.

Finally, we examined the **organisational results** of e-learning in the form of cost savings. All the anecdotal evidence *suggests* that considerable savings could be made, although a number of the examples were of distance e-learning, which substantially reduced costs associated with travel *etc.* compared with classroom learning. We concluded in line with Welsh *et al.*, (2003) that cost savings could be made if there were a lot of dispersed employees to train, and if the training were to be re-used.

5.2 Future research

Clearly, there is a need for independent, statistically reliable research on the use of e-learning in organisations. Rectifying this gap in the data could be done by including a question, or even better questions, about training delivery in the Employers Skills Survey.

At a micro-level, case study research could greatly increase our understanding of how e-learning impacts on behaviour, and what methods are effective for generating positive outcomes.

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