

**Using e-learning to build workforce
capability: A review of activities**

**Tertiary e-Learning
Research Fund**

***Overview of work-based and work-placed
e-learning landscapes***

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Executive Summary

- i.* In the current evolving economic environment, developing and implementing effective processes, procedures and plans to improve the skills and capability of employees are seen as central to improving individual, organisational and national performance and global competitiveness. The flexibility provided by e-learning communication tools and presentation software applications is seen to be critical in providing the right skills training, to the right person, at the right time, in the right place.
- ii.* Over 85% of New Zealand businesses provided training for their employees predominantly in health and safety, trade and professional skills and computer training. Conversely, the provision of training to increase the levels of literacy and numeracy of employees is limited and in some reports not noted at all. The underlying drivers of the provision of industry training were found to be the improvement of business performance and increasing customer satisfaction.
- iii.* In New Zealand the use of the Internet for education or study was most noticeable amongst 15–19 year olds and to a lesser extent within the 20-24 year old age groups. It was also notable large firms (over 100 employees) and service industries (e.g. communication and financial) were more likely to provide staff training using the Internet than medium and small firms (below 100 employees) or those involved in manual or outdoor activities (e.g. agricultural and manufacturing sectors).
- iv.* In trade-training, the use of ICT to present content (for example videos, simulations, animations and workbooks), to facilitate assessments and encourage interaction through asynchronous and synchronous internet based communication tools (for example video conferences, white boards, forums and quizzes) are challenging the traditional training approaches, including the “apprenticeship model”, were a significant portion of learning is “classroom-based”.
- v.* When reviewing the results of e-learning initiatives it was found trade-trainees in general are learners with a preference for “visual” presentations and ongoing

personal touch. To meet these preferences the increased adoption of “video” technologies (e.g. video conferencing, practical task demonstrations embedded in HTML pages, web-casts) will impact training in a positive way.

vi. When e-learning applications are used in trade-training activities most respondents enjoy the experience. They find the use of personal devices and communication tools (the Internet, desktop and laptop computers, digital cameras and e-mail) enhance their learning environment.

vii. A number of national and international surveys on e-learning in industry have suggested, but did not prove, there would be a phenomenal growth of e-learning implementations within industry in the future. However, after an extensive review of the evidence currently available, the indications are e-learning will grow “steadily” rather than exploding at the often phenomenal rates predicted.

viii. The key business drivers for e-learning growth in industry training are focused upon;

- ◆ **Information Overload:** There is an ever increasing amount of information from an organisational, individual, trade and professional viewpoint, which employees need to be aware of to complete their tasks successfully.

- ◆ **Technological Innovation:** The rapid rate of change in production, informational and communication technologies impacts on work practices and this impact needs to be managed in a consistent and timely manner.

- ◆ **Return on Investment:** The provision of training to improve performance at both an individual and organisational level must be done economically and efficiently.

ix. The impediments to e-learning growth can be classified according to three factors (the three Cs). These are;

- **Connectivity** (ready access to appropriate technologies),
- **Capability**, (all participants (managers, trainers and learners) have the confidence and capability to perform successfully),

- **Content** (relevant engaging material is presented).

x. The critical success factors identified to sustain e-learning initiatives are;

- **Organisational:** Leaders within organisations need to support e-learning deployments and develop plans to encourage e-learning initiatives and measure their effectiveness.
- **Training:** Trainers need to believe in and promote the effectiveness of e-learning methodologies.
- **Learning:** Learners need ongoing support and motivation to continue to participate fully in e-learning activities.

xi. Increasingly “blended learning” is becoming the prevalent delivery method in workplace learning settings. The three conceptions underpinning blended learning are:

- **Blending of course delivery.** The course of study can consist of a mixture of face-to-face sessions and online activities.
- **Blending of location.** Activities can be used within a scheduled class-session or they can be carried out by students in independent locations.
- **Blending of resources.** Resources, both digital and human, from different sources in a variety of digital media can be made available to participants.

xii. The benefits of the deployment of e-learning can be seen to fit within three key concepts, these are;

- **Accessibility and Flexibility:** Employees have offered and have the ability to undertake activities that fit within their personal schedules.
- **Consistency and Scalability:** Training can be offered to unlimited numbers in a consistent and uniform way.

- **Sustainable and Cost Effective:** Cost of training will be reduced, compliance training will be monitored and impact of training will be evaluated.

xiii. The “quality” of the learning experience of participants in an e-learning environment can be directly attributed to the quality of all of the processes used in the creation of the training event. To ensure quality the following need to be monitored:

- **Firstly**, the processes used in the creation and publication of digital learning materials;
- **Secondly**, the processes used in the ongoing tutoring/mentoring/supporting of students in e-learning environments;
- **Finally**, the processes used in the administration of e-learning activities.

xiv. While some reports advocate the use of innovative models to evaluate the impact and effectiveness of e-learning implementations In general the literature argues a comprehensive measurement model based on slight modifications to the widely-applied Kirkpatrick-Philips evaluation model would be more in keeping with existing evaluation practices and would be more readily accepted. This Kirkpatrick-Philips model defines five levels of evaluation – satisfaction, learning, impact, results and return on investment.

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TABLE OF CONTENTS

Executive Summary	<i>i</i>
Acknowledgements	<i>v</i>
List of Tables	<i>vii</i>
List of Figures	<i>viii</i>
SECTION 1 Introduction	1
Context	2
Definition of key terms	3
Methodology	8
Limitations	10
Report structure	10
SECTION 2 e-Learning in industry: Current state	12
The New Zealand Training Landscape	14
ICT in Households and Businesses	17
E-Learning in Industry Training Organisations (ITOs)	21
Current state of e-learning: Stakeholder responses	22
E-Learning in Trade Training	24
E-Learning in industry: Annotated Bibliography	27
SECTION 3 e-Learning in industry: Perceived demand	35
Rhetoric	37
Reality	40
Demand for e-learning: Stakeholder responses	42
Drivers and critical success factors for e-Learning	43
Impediments to e-learning: Annotated Bibliography	47
Impediments to e-learning: Stakeholder responses	50
Impact of blended learning	51

SECTION 4 e-Learning: Effectiveness and Impact	55
Desired impact	57
Benefits of e-learning: Stakeholder responses	60
Quality Assurance in e-learning	61
Measuring effectiveness and impact	65
Effectiveness of e-learning: Stakeholder responses	69
Effectiveness and impact: Annotated bibliography	70
SECTION 5 Conclusions and Future Directions	78
Overview	78
Report Review	79
Future Activities	82
SECTION 6 References and Appendix	85
References	85
Appendix 1: Structured interview Templates	88
Appendix 2: Glossary of Key Terms	94

LIST OF TABLES

Table 1: Recent Internet use by individuals for education	18
Table 2: Business use of computers and the Internet: By size	18
Table 3: Business use of computers and the Internet: By type	19
Table 4: Provision of training via the Internet by size	19
Table 5: Provision of training via the Internet by type	20
Table 6: Skillsoft Modified Kirkpatrick-Philips Evaluation Model	68

LIST OF FIGURES

Figure 1: Kinds of training provided	15
Figure 2: Preferred training support materials	15
Figure 3: Types of Employee Training	16
Figure 4: Technologies used by participants	28
Figure 5: Percentage training using e-learning	31
Figure 6: Digital materials used in training	32
Figure 7: Perceived future use of e-Learning in ITOs	37
Figure 8: Predictions of Dominance of e-Learning	37
Figure 9: Predictions e-Learning growth by industry size	38
Figure 10: Actual e-Learning growth	41
Figure 11: Primary drivers of online learning	44
Figure 12: Critical success factors for online learning	44
Figure 13: Priorities of e-Learning activities	45
Figure 14: Cultural barriers to online learning	47
Figure 15: Projected growth of blended learning	52
Figure 16: Performance impact of blended learning	53
Figure 17: Why employers would encourage the use of e-Learning	59
Figure 18: Perceived advantages of online learning	60
Figure 19: The conceptual logic of SEEQUEL	63
Figure 20: Ratings of e-Learning Initiatives	64
Figure 21: Defining “quality” in e-Learning	65
Figure 22: Wilsons evaluation model	67
Figure 23: Kirkpatrick-Philips Evaluation Model	67
Figure 24: Students’ confidence in using ICTs	70
Figure 25: Students perceptions of using ICTs in learning	71
Figure 26: Cost benefits and impact of blended learning	77

1. Introduction

1.1 This section has been divided into five sections;

- Context, provides an overview of the research project.
- Definitions of key terms, defines four key concepts used in the project.
- Methodology, describes how this phase of the research was undertaken.
- Limitations, outlines how issues identified have been addressed.
- Structure, describes the purpose of the further sections presented in this report.

1.2 The key points noted in this section were

- ◆ In present economic environment improving the skills and capability of employees is seen as central to improving individual, organisational and national performance and global competitiveness.
- ◆ The flexibility provided by e-learning communication tools and presentation software applications is seen to have a pivotal role to play in providing the right skills training, to the right person, at the right time, in the right place.
- ◆ To reduce confusion and to clarify the landscape investigated simple definitions are provided for *on-the-job and off-the-job learning, e-learning and blended learning*. These definitions will be used in all future phases of the project.
- ◆ This exploratory phase of the research project combined two activities, (a literature review and the results from structured telephone interviews with stakeholders) to provide a framework for future phases of the research project to build upon.

Context

1.3 In the current evolving economic environment developing and implementing effective processes, procedures and plans to improve the skills and capability of employees is seen as central to improving individual, organisational and national performance and global competitiveness.

1.4 The drive to improve capability has been outlined in the *Human Capability Framework* (HCF)¹ where the emphasis has been placed on examining the skills and abilities of New Zealanders, and how these can be used successfully to generate income and promote an inclusive and thriving community and economy.

1.5 In an increasingly Information and Communication Technology (ICT) dependent world, employers, employees, training providers and government officials are recognising the critical need to access ICT infrastructures. The flexibility provided by e-learning communication tools and presentation software applications are seen to be critical in providing the right skills training, to the right person, at the right time, in the right place.

1.6 This research project, *Using e-learning to build workforce capability: A review of activities* has been funded by the Tertiary e-Learning Research Fund (TeLRF). The project aims to assess, explore, identify, describe and report on

- How and in what ways Information and Communication Technologies (ICT) and e-learning applications are currently used within industry, nationally and internationally, to build workforce capability.
- How does e-learning currently contribute to the achievement of advanced trade, technical and professional qualifications to meet regional and national industry needs?
- The potential New Zealand industry demand for training delivered through ICT and e-learning methodologies.

¹ Department of Labour (2005), Human Capability Framework, New Zealand Government: <http://www.dol.govt.nz/initiatives/strategy/hcf/>

- ◆ How enterprises, from small to large, can be informed of the most appropriate blend of e-learning strategies, processes and procedures for their specific situation.

1.7 During the project, a series of research reviews, culminating in a final research report, will be produced serving to inform all industry sectors (large, medium and small) of how ICT and e-learning in its many forms, has and could be used to ensure effective and ongoing training is provided to the right person, at the right time, in the right place in a cost effective way. The four reports to be published are listed below;

- a. Report 1: Overview of work-based and work-placed e-learning landscapes in New Zealand and internationally.
- b. Report 2: Examples of work-based and work-placed e-learning in action.
- c. Report 3: New Zealand e-learning case studies.
- d. Report 4: A final research report completed and delivered to the Ministry of Education and Industry sector.

1.8 This report presents the findings of the first phase (*overview of work-based and work-placed e-learning landscapes*) of the four-phased research project. It provides

- ◆ A review of the literature of e-learning initiatives in building workforce capability nationally and internationally.
- ◆ The results of structured telephone interviews with a limited number of key stakeholders to ascertain the level of demand from employers, providers and employees for ICT and e-learning, off-the-job and on-the-job within New Zealand.

Definitions of Key Terms

1.9 When the literature was reviewed it became clear the definitions of the key terms used within the project, *on-the-job and off-the-job learning, e-learning and blended learning* were often defined within the specific context of the report produced. Therefore, throughout the literature a complex range of definitions was provided often serving to confuse rather than clarify the landscape to be investigated. The following sections provide firstly, an overview of the meaning of the term and secondly, a simple definition to be used throughout all phases of the research project.

1.10 Off-the-job Learning

- ◆ Off-the-job learning is regarded as particularly effective as it provides trainees realistic, hands-on experience and develops generic skills that are relevant to industry needs. Based on a contextualised form of “learning by showing”, work-based learning typically involves a pre-defined set of instructional modules, courses or programs that deliberately use authentic experiences in the workplace as a focus for learning. These experiences attempt to instil work habits and change attitudes and behaviours. During this process participants are exposed to a variety of skills and the underpinning knowledge they will need to perform their jobs effectively or become skilled in a particular trade. In essence, off-the-job learning can be described as learning that takes place *for* the workplace or the *know how to do*.
- ◆ In general, off-the-job learning has a significant component of formal learning activities and would include instruction in normal workplace competencies, broad instruction in all aspects of the participants industry as well as formal assessment activities. Off-job learning is often, though not always, linked to the achievement of formally recognised or credentialed standards and qualifications. Since off-the-job learning is often delivered outside the participants’ normal place, and sometimes hours of work, it has been described as *work-based learning*.
- ◆ For the purpose of this research project, “off-the-job” learning refers to authentic, evidence-based learning activities and tasks designed and provided for workers at locations other than their normal place of work. Off-the-job learning resources are

normally designed in context with the worker's current working practices. This is also known as *work-based learning*.

Pollitt, D., (2005). Scottish Water employees get learning "on tap". *Human Resource Management International Digest*, 13(7), 25-27.

Scottish Water has a number treatment centres, pumping stations, reservoirs, offices, stores and depots across Scotland. Orkney, Skye, Shetland and the Hebrides Islands are among the organization's many remote locations where access to learning has historically been difficult.

A challenge for the company was to develop the information technology (IT) skills of many of the employees who were not office based. Many of these employees historically did not need to use a PC but, with an increasing need for IT skills for work tasks such as writing reports and performance monitoring, opening up the opportunity to IT training was becoming critical. The internal organisational development team decided to implement an organisation-wide e-learning programme based on the delivery of online learning material through a learning management system. Although the e-learning initiative predominantly used pre-packaged learning materials purchased "of the shelf" from Thomson NETg, digital content was created around customer-services for contact-centre staff.

With the implementation of e-learning, Scottish Water has reduced its need for tutor-led, classroom based IT courses by approximately 70 percent. As well as cost savings on travel expenses, room hire and course fees the initiative appears to have helped motivate employees to take responsibility for their own development.

1.11 On-the-job Learning

- ◆ On-the-job learning provides employees with the required hands-on experiences necessary to develop the specific skills that are relevant to a firm's needs. In practice on-the-job learning typically involves using the participants' normal work-related tasks as a focus for learning, and recognising the skills that they develop through these tasks. Its primary intended outcome is performance improvement. It can involve all types of learning modes from self-initiated research through to discussion,

demonstration and practise of work tasks. In essence, on-the-job learning can be described as learning that takes place *in* the workplace or the *know what to do*.

- ◆ On-the-job training includes a range of activities, from structured, assessed learning, which leads to qualifications (like that arranged by many industry training organisations) to informal and unstructured *ad hoc* learning and peer education. Using the technique of “*learning by doing*” it provides opportunities for participants to improve basic skills and meet performance targets. Since on-the-job learning occurs on-site during the participants’ normal working day it has been described as *work-place* learning.
- ◆ For the purpose of this research project “on-the-job” learning is structured learning that occurs within the learner’s normal working environment. This is also known as *work-place* learning

Little, B., (2006). British Airways flies high with online learning system: Cabin crew can top up their training from across the world. *Human Resource Management International Digest*, 14(4), 20-22.

British Airways (BA) recently introduced a new onboard software application called “Barplus”. The application is an on-board point-of-sale system recording in-flight sales and also acting as a stock-control system. The application is operated by cabin crew via personal digital assistants (PDAs) and a stylus.

To ensure that BAs cabin crews would be competent to use this system as soon as it was rolled out, the team responsible for the software training, Tata Interactive Systems, had to develop and deploy relevant and authentic learning materials. These needed to be accessible by a global workforce working variable hours at the same time, as the Barplus system was being developed and implemented. Learning materials were primarily developed for delivery via the Internet. However, where access to the Internet and the British Airways intranet was difficult, they distributed a CD-Rom.

The BA e-Learning manager, Wendy Stubbs, believes the e-learning, learning technologies used, provided consistency of training, were highly cost effective, increased participant motivation levels and developed staff competences and confidence in the use of new software.

1.12 e-Learning

- ◆ In practice, e-learning typically involves interactivity, such as student engagement with stand-alone digital content, interactive games or virtual simulations, interaction between learners and their instructors and interaction between learners and their peers. It is facilitated by the use of computers (stand-alone and networked), mobile devices (such as laptops, PDAs, mobile phones), digital communication tools, facilitated by the Internet (such as chat, e-mail, forums, instant messaging, Voice over Internet Protocols (VoIP) and video for virtual discussions) digital content creation tools (such as Wikis, Blogs and Web-folios) and digital content (such as web pages, podcasts, audio and video files, CD-ROM and DVDs).
- ◆ In some cases, such as in an instructor-facilitated video/web-conference, e-learning activities are carried out in 'real-time' and the activity undertaken is time-constrained and dependent on the attendance of all participants. This is known as synchronous e-learning.
- ◆ In other instances, such as student engagement with a CD-ROM, interactive DVDs, stand-alone games and virtual simulations, the learning will occur in 'nominal-time' and the activity undertaken is not time-constrained and is independent of other participants. This is referred to as asynchronous e-learning.
- ◆ For the purpose of this research project e-learning refers to the provision, administration and support for 'off-the-job' and 'on-the-job' training using information and communication technologies such as stand-alone and networked computers, Internet-based technologies and mobile devices.

Autero, J., (2007). Training: When popcorn is enough. *Control Engineering*, 54(11), 22.

Autero argues in today's business world of reduced personnel, 24 hour/365 day per year service calls and with the need to increase productivity, time is at a premium and it is becoming more difficult for a company to justify reserving time to train employees.

He describes how the industrial automation company Yaskawa has developed and deployed a range of eLearning Modules (eLMs), available through the

Internet and on CDs, as part of a total training package. They provide employees with a variety of training options including, podcasts, automated lessons, Webcasts and offsite and onsite training. The eLMs topics developed range from generic motor and drive basics to techniques for implementing specific Yaskawa products.

In general it appears most Yaskawa eLMs take no more than 30 minutes to review and provide employees with just in time access to specialised, to-the-point lessons to help improve their performance. It has since been found a range of topics are now covered electronically. This increases flexibility, reduces the length of time needed for “factory” classes and minimises the time an employee is away from the job.

At Yaskawa e-Learning has in effect reduced the total costs, (financial, physical and human) of employee training.

1.13 Blended Learning

- ◆ Blended learning typically involves combining aspects of traditional face-to-face activity (such as block courses in an identified room during the working week focused on theory, or scheduled weekend sessions at a learning organisation focused on practical aspects) with computer-mediated support (such as the presentation of interactive simulations on a CD completed at home, or the provision of online support through the communication tools embedded in a learning management system (LMS)).
- ◆ In essence, blended learning “*blends*” firstly, time-constrained and time-dependent, (synchronous) activities with time-independent (asynchronous) activities; secondly, dependent, identified physical spaces (classrooms) with digitally created, flexible spaces (virtual environments), and finally, instructor-facilitated, high human interactive environments (face-to-face) with computer-mediated environments (e-learning).
- ◆ However, blended learning should not be approached as a “Lego Build” where the combination of face-to-face and e-learning activities is merely “clicked” together

because the “blocks just happen to fit” with little thought of integrating the learning experiences of participants. This “click together” approach can lead to poor module design resulting in learner and tutor confusion about their various roles in scheduled training activities.

- ◆ For the purpose of this research project, blended learning has been described as a design approach thoughtfully combining traditional methods to on-the-job and off-the-job training with e-learning applications.

Wales E-Training Network, (2006). *The Foundation Degree in e-Commerce for Small Business Development*. Centre for Excellence in Learning and Teaching. Retrieved January 17, 2008 from http://celt.glam.ac.uk/Applying_Blended_Learning/foundation-degree-in-e-commerce

The Foundation Degree in e-Commerce for Small Business Development at the University of Glamorgan has been designed to demonstrate, to SMEs in particular, how conducting business through the Internet can significantly improve business performance. All the module activities and assessments are practical and work-based, allowing the skills and knowledge taught to be directly applicable to the business in which the learner is working. The modules are scheduled over four study periods during the year with three of the modules available during each period.

The Degree is structured to allow participants to select and participate in individual modules they are interested in rather than complete the whole course if that is what they desire. Learners are primarily supported by online tutors who intensively use e-learning tools to facilitate activities within the module/course. This creates opportunities for learners to negotiate assignments that are relevant to their specific circumstances and have a clear value to themselves and their employer.

Methodology

1.14 This exploratory phase of the research project combined two activities, a literature review and the reporting of results from structured telephone or face-to-face interviews with a limited number of the identified stakeholders, employers, employees and training providers.

1.15 During the literature review a broad-brush approach was used in searching for and locating material. The key terms defined above were used, individually and in various combinations, to search indices, data-bases, digital repositories, library holdings, bibliographies and web-sites. Materials were rejected or accepted based on the underlying principles of the research project outlined in section **1.6** above.

1.16 Since the structured telephone or face-to-face interviews with the three identified stakeholders were to be undertaken by different members of the research team a series of formal “interview templates” were produced to ensure

- a consistency in approach,
- all focus areas were adequately covered and;
- data collected could be collated around the key themes identified.

1.17 The templates were designed around a “base template” (see Appendix 1) to explore the participants existing use of e-learning. It contained four sections, background, current use of e-learning, the potential demand for e-learning and the perceived effectiveness of e-learning.

Limitations

1.18 The interpretation, of and reporting on material gathered during the literature review, and the data generated through the stakeholder interviews is based on the researchers ‘intuition’ formed by an extensive knowledge of the e-learning domain. It would be legitimate to argue that prior conceptions held by the researchers influenced decisions made. It is acknowledged researchers at different ends of a theoretical spectrum could interpret the data and literature in different ways and alternative conclusions would be legitimately reached.

1.19 The number of stakeholders involved in e-learning in industry is vast and forever growing and the theoretical population is potentially immense. Therefore, the reliance on a very limited number of voluntary participants (13) should be regarded as using a sample of convenience. While these samples are less complicated to create it is acknowledged the limited sample used does not accurately reflect the characteristics of the population as a whole.

1.20 However, it is argued the inclusion of the data helps firstly, to enrich the “snapshot in time” of e-learning activity in industry reported upon in the report and secondly to provide a brief insight into stakeholder perceptions of e-learning. Therefore, the inclusion of the limited data generated in stakeholder interviews is deemed appropriate in this report.

Structure of the Report

1.21 The remainder of the report is presented in four main sections:

- ◆ **Current state:** This focus of this section is to provide an overview of the current provision of training by New Zealand businesses and their current use of e-learning methodologies to support that training.
- ◆ **Perceived Demand:** This section critically reviews the perceived demand for e-learning and casts doubt upon the “hype” surrounding the future uptake of e-learning. While recognising the use of e-learning in industry will continue to grow, this will be at a steady rather than spectacular rate.
- ◆ **Effectiveness and impact:** This section is focused on the measuring success of e-learning implementations in industry. It is proposed a modified version of the Kirkpatrick-Philips evaluation model would be a suitable model to follow.
- ◆ **Conclusions:** This section outlines the major findings of this phase of the research project. It also describes activities that will occur in subsequent phases of the project.

2. e-Learning in industry: Current state

2.1 This section has been divided into six themes;

- The New Zealand training landscape provides an overview of the current provision of training by New Zealand businesses.
- ICT in households and businesses details the penetration of computers and the Internet in homes and industry.
- Stakeholder interviews reflect upon the findings of telephone interviews with employees, employers and providers on the current use of e-learning methods and technologies.
- E-Learning in ITOs reviews a recent research study on the use of e-learning methodologies in industry training organisations.
- e-Learning and Trade Training provides an annotated bibliography of recent e-learning initiatives in trade training
- e-Learning for industry provides an annotated bibliography of recent research into the use of ICT for work-based learning.

2.2 The key points identified in this section review are;

- ◆ Over 85% of New Zealand businesses provided training for their employees predominantly in health and safety, trade and professional skills and computer training. The underlying drivers of the provision of this training were found to be the improvement of business performance and increasing customer satisfaction.
- ◆ The use of the Internet for education or study was most noticeable amongst 15–19 year olds (55%) and to a lesser extent 20-24 (39%) year olds age groups. People over sixty (14%) were the least likely to use the Internet for educational purposes.
- ◆ It was notable large firms (over 100 employees) and service industries (e.g. communication and financial) were more likely to provide staff training using the Internet than medium and small firms or those involved in manual or outdoor activities.
- ◆ Currently industries' use of digital resources is primarily based on a personal computer delivery format, such as CDs, DVDs and computer based resources.
- ◆ From the extensive literature review it was noted material reviewed *suggested*, rather than proved, a significant number of organisations were using e-learning. The technical infrastructure appears to be sufficiently robust and software applications readily available for individuals to undertake, and business to offer, e-learning opportunities. It appears, however, that large service industries and individuals undertaking formal study were more likely to use ICT for education and training than small and medium enterprises.

The New Zealand Training Landscape

2.3 Overview

- ◆ Although there are a limited number of reviews available on the current state of training in New Zealand industry and business, those that have been produced contain sufficient data to provide a comprehensive understanding of the current provision of business training in New Zealand. Two significant reports are noted below. The first, undertaken for the Department of Labour by Business New Zealand and the Industry Training Federation (Report 1)² and the second, a review of data collected in 2006 by Statistics New Zealand (Report 2)³, indicated over 85% of New Zealand businesses provided training for their employees with the underlying drivers being to improve business performance and customer satisfaction. The predominant forms of training offered were in health and safety, trade and professional skills and computer training.
- ◆ The least predominant form of training offered was in literacy and numeracy. While it could be argued a number of courses may have sections devoted to numeracy and literacy skill development this has not been noted in the information available. Given the number of media releases and initiatives identifying high levels of literacy and numeracy are critically important skills for employees this lack of specific industry training in these areas is of concern.

2.4 Report 1

- ◆ In this 2003 survey, 89% of respondent organisations (n=479) in New Zealand indicated they had allocated, through their payroll, sufficient financial resources to provide formal and informal training for their staff.

² Business NZ & Industry Training Federation of NZ (2003). *Report of the Business NZ Skills and Training Survey 2003*. Department of Labour. Retrieved January 28, 2008, from: <http://www.dol.govt.nz/PDFs/Skills%20and%20Training%20Survey%20Report%20-%20June%202003.pdf>

³ Statistics New Zealand. (2007). *Business Operations Survey: 2006*. Wellington: Statistics New Zealand Retrieved January 28, 2008, from: <http://www.stats.govt.nz/NR/rdonlyres/614517BA-CB81-4603-A0A4-09DF39B675B0/0/businessoperationsurvey2006hotp.pdf>

- ◆ The most prevalent forms of training were focused on technical and trade skills, health and safety and computing/ICT with the least prevalent form of training being offered in literacy and numeracy. (see Figure 1 below)

Category	Code	Count	Percent of Responses	Percent of Cases
Specific technical & trade skills	1	355	19.2	83.5
Health & Safety	3	330	18.0	77.6
Computing / ICT	2	262	14.3	61.6
Management skills	8	228	12.4	53.6
Supervisory skills	7	214	11.7	50.4
Communication skills	5	188	10.3	44.2
Team & negotiation skills	6	170	9.3	40.0
Literacy & Numeracy	4	46	2.5	10.8
Other	9	41	2.2	9.6
Total		1834	100.0	431.5
54 missing cases, 425 valid cases				

[Source: Business NZ & Industry Training Federation of NZ (2003) (Table 52: p43)]

Figure 1: Kinds of training provided

- ◆ Significantly, training provided appeared to be organisation specific with in-house training staff, training consultants and private training providers delivering a significant portion of the firms' needs.

Category	Code	Count	Percent of Responses	Percent of Cases
Paper-based resources	1	349	32.6	82.7
Computer / CD-Rom based	2	269	25.2	63.7
Videos	3	247	23.1	58.5
Online materials	4	171	16.0	40.5
Other	5	33	3.1	7.8
Total		1069	100.0	253.3
57 missing cases, 422 valid cases				

[Source: Business NZ & Industry Training Federation of NZ (2003) (Table 54: p44)]

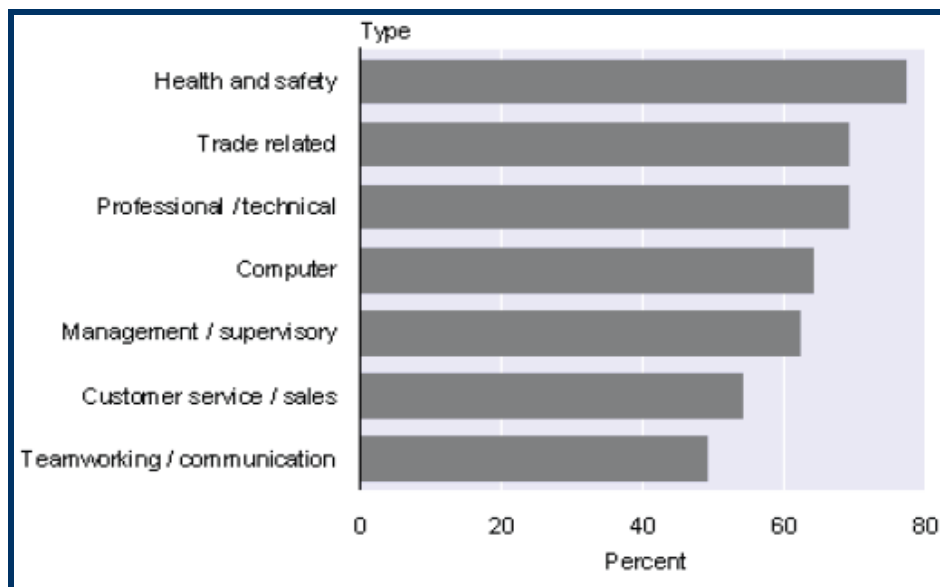
Figure 2: Preferred training support materials

- ◆ Respondents also indicated the most preferred form of training materials were paper-based resources, although there was strong support for technology delivered materials such as computer-based materials (63.7%), and videos (58.5%).

Surprisingly, over 40% of firms indicated they would be happy to use online training materials. From this data it can be assumed that a range of e-learning activities was being delivered to participants but the level of training and training areas was unknown (see Figure 2 above).

2.5 Report 2:

- ◆ In this 2006 survey, in a report by Statistics New Zealand, 86% of respondent organisations (n=6,066) indicated they provided training for their staff in the 2006 financial year.
- ◆ They found the single most important “*employment practice change*” to occur in business over the last two years was training (32%) and the most common reason for making the employment practice change was to improve business performance (55%).
- ◆ As in the report noted above, although there appears to be minor changes in ranking, the most prevalent forms of training were focused on health and safety, trade related, professional / technical computer (see Figure 3 below). It is of note literacy and numeracy learning activities were mentioned.



[Source: Statistics New Zealand. (2007) (p6)]

Figure 3: Types of Employee Training

ICT in Households and Businesses

2.6 Overview:

- ◆ In 2007 Statistics New Zealand published a report collating data collected from a range of ICT surveys conducted between 2004 and 2006⁴. The report highlighted the significant growth of the use of computers and the Internet in both households and business.
- ◆ The report indicated seven out of ten New Zealand households and nine out of ten businesses have access to computers with nearly two thirds of households and ninety percent of businesses being connected to the Internet. Skills. From this data it can be argued a significant majority of the population can access the appropriate technologies and have the necessary technological skills to participate in a range of e-learning initiatives.
- ◆ The use of the Internet for education or study was most noticeable for 15–19 year old (55%) and to a lesser extent 20-24 (39%) year old age groups. People over sixty (14%) were the least likely to use the Internet for educational purposes.
- ◆ Large firms (over 100 employees) were more likely to provide staff training using the Internet (40%) with small firms providing minimal training in this medium (14%).
- ◆ Service industries such as electricity, gas and water supply (50%), and communication services (34%) were more likely to provide staff training using the Internet than the primary sector, agriculture, forestry and fishing (7%), manual trades (8%), and the manufacturing sector (12%).

2.7 Household Use of ICT

- ◆ The growth of the use of computers and the Internet in homes has grown markedly in the last five years. In 2006, 71.6% of households had access to a home computer (a 25% increase in computer access since 2001) and 64.5% had access to the Internet (a 27.1% increase in Internet access since 2001).

⁴ Statistics New Zealand. (2007a). *Information and communication technology in New Zealand: 2006* Wellington: Statistics New Zealand Retrieved January 28, 2008, from: <http://www.stats.govt.nz/NR/rdonlyres/B45B1ECD-E10F-4948-B243-6E7EAF34E712/0/58072SNZICTWEB.pdf>

- ◆ The number of individuals who accessed the Internet in the 12 months to December 2006 was 2,207,600 or 69% of the total population aged 15 years or over (3,201,600) with 58% of the respondents accessing on a daily basis.

2.8 Household Use of Internet in Education

- ◆ Over a quarter (26.3%) of the respondents who have Internet access regularly used the Internet for learning. This was most notable in the 15–9 and 20-24 age groups and least notable in the 55-59 and 60+ age groups (see Table 1 below).

Table 1: Recent Internet use by individuals for education: August 2006

Age Group	Recent Internet users ⁵	% of total population ⁶	Education or study
15 - 19	264,400	87.2	55.1
20 - 24	237,700	83.8	39.4
25 - 29	212,000	82.4	23.3
30 - 34	225,700	82.8	20.8
35 - 39	232,800	77.0	22.1
40 - 44	242,800	77.8	21.3
45 - 49	220,100	73.3	21.9
50 - 54	179,300	68.9	19.4
55 - 59	152,000	63.8	15.9
60 +	240,600	35.8	14.0
Total	2,207,600	69.0	26.3

[Source: Statistics New Zealand. (2007a) (p83)]

2.9 Business Use of ICT

- ◆ The survey data highlights that over 90 % of all enterprises, regardless of size, are becoming increasingly dependent on computers and the Internet as business and informational and interactive tools (see Table 2 below).

Table 2: Business use of computers and the Internet: By size: August 2006

Business Size	Total	% Using computers	% Using the Internet
6-19 employees	25,974	92	89
20-49 employees	6,288	97	95
50-99 employees	1,731	99	98
100+ employees	1,440	100	99

[Source: Statistics New Zealand. (2007a) (p98)]

⁵ Individuals who have used the Internet in the last 12 months to December 2006

⁶ Total number of individuals 15 years and over is 3,201,600.

- ◆ Although, in general, all businesses are becoming increasingly dependent on computers and the Internet, it is notable the primary sector, including industries such as agriculture, forestry, fishing, mining and quarrying, is the sector with the least Internet and computer use (see Table 3 below).

Industry	Businesses	% Using computers	% Using the Internet
Agriculture, forestry and fishing	3,123	82	77
Mining and quarrying	90	83	77
Accommodation, cafes and restaurants	3,465	78	82
Retail trade	5,886	93	89
Construction	3,549	98	92
Manufacturing	5,523	97	93
Health and community services	2,085	99	93
Transport and storage	1,524	98	94
Communication services	141	96	94
Cultural and recreational services	615	95	95
Education	585	98	96
Property and business services	5,055	98	96
Wholesale trade	3,198	99	97
Finance and insurance	582	99	99
Electricity, gas and water supply	18	100	100
Total	35,436	93	91

[Source: Statistics New Zealand. (2007a) (p98)]

2.10 Business use of the Internet for Training

- ◆ Given the increasing dependence of business on ICT, it is significant the provision of employee training using the Internet is limited, with small firms providing minimal training in this medium (14%) and large enterprises providing less than half their training (40%)(see Table 4 below).

Business Size	Total Number using the Internet	% offering staff training using the Internet
6-19 employees	23,055	14
20-49 employees	5,970	23
50-99 employees	1,698	28
100+ employees	1,422	40

[Source: Statistics New Zealand. (2007a) (p102)]

- ◆ It is also significant that while service industries such as electricity, gas and water supply (50%), and communication services (34%), have relatively high use of the Internet for staff training, the primary sector, agriculture, forestry and fishing (7%), some manual trades (8%), and the manufacturing sector (12%) provide very limited Internet facilitated training opportunities for their employees (see Table 5 below).

Table 5: Provision of training via the Internet by type: August 2006		
Industry	Number using the Internet	% of staff training via the Internet
Agriculture, forestry and fishing	2,403	7
Construction	3,267	8
Accommodation, cafes and restaurants	2,835	9
Manufacturing	5,157	12
Retail trade	5,259	16
Restaurants	1,428	20
Wholesale trade	3,099	21
Health and community services	582	21
Property and business services	549	24
Mining and quarrying	69	27
Education	1,935	30
Transport and storage	132	32
Finance and insurance	4,845	33
Communication services	579	34
Electricity, gas and water supply	18	50
Total	32,157	22.9

[Source: Statistics New Zealand. (2007a) (p102)]

Silvers, A. (2002). E-Learning from around the world: Example RBC Financial Group (slides 19-21). Retrieved January 14 2008 from: <http://www.authorstream.com/>

RBC Financial Group is a large multi-national company with 58,000 employees in 30 countries. The group has a large number of geographically dispersed customers and often deals with “sensitive” financial transactions. They also are constantly meeting market demand by continually modifying and changing products and services they offer. The group implemented a competency-based learning management system facilitated learning environment. Employees using the solution rated the system highly and they believe they are better trained to do the job, have a clearer understanding of the job requirements and have better access to appropriate information.

e-Learning in New Zealand ITOs

2.11 Overview:

- ◆ In 2007 the Tertiary e-Learning Research Fund (TeLRF) funded a research project⁷ to determine the answer to the question of 'how effective e-learning has been in a vocational/workplace context both in terms of meeting learner/business needs and in increasing organisational productivity'.
- ◆ The research project team focused on a review of e-Learning activities in New Zealand Industry Training Organisations to identify the observable trends and drivers of change that were likely to have a significant impact on the future
- ◆ As part of phase two of the project an online questionnaire containing 81 items using a mix of checklists and 5-point Likert-type questions and text-box responses was completed by 23 of the 39 ITOs in New Zealand (approx 58% response rate).

2.12 Current use of e-learning in ITOs:

- ◆ The survey indicated a slim majority of the respondent ITOs (12/23) did not consider they were delivering any e-learning activities to their trainees.
- ◆ Those respondents who used e-learning tended to use traditional digital presentation resources such as CDs DVDs (8) and computer based learning resources (7). Emerging digital creation technologies such as Blogs and Wikis were rarely used (1) while digital display technologies iPods and MP3 players were not used at all.
- ◆ A substantial number of respondents (20/23) extensively used a range of information and communication technologies [e-mail (18), standard phone (17), mobile phone (15)] to inform and communicate with their trainees.
- ◆ It was significant larger organisations (those with above 5000 enrolments) were more likely to promote and utilise digital resources than small (below 1000 trainees) or medium (between 1000 and 5000 trainees) organisations.

⁷ Clayton, J & Elliott, R (2007, July) Report 2: *A survey of e-learning activity in the ITO sector*: E-Learning Activities in Aotearoa / New Zealand Industry Training Organisations. Tertiary e-Learning Research Fund, Wellington Retrieved February 1, 2008, from http://ito.elearning.ac.nz/file.php/1/Report2_TELRF.pdf

- ◆ The report concluded the majority of ITOs were still coming to grips with the concepts of e-learning and only a relative few organisations were actively engaged in e-learning activities such as promoting the creation of online resources, or evaluating the e-learning experiences of participants.

Chan, S (2006). m-Learning for work based apprentices: trials, tribulations and triumphs. eFest Wellington. Retrieved January 14 2008 from:
http://www.efest.org.nz/2006/docs/Selena_Chan_eFest2006.pdf

Chan describes how bakery apprentices and tutors have used mobile technologies to disseminate summative and formative assessments. They have also used the technologies to capture evidence of work place skills, using various file formats, e.g. audio, video, photos and text. They have then used the files to create a personal (student/trainee) e-portfolio which acted as a record of assessment of the work-place competencies and skill acquisition.

Current state of e-Learning: Stakeholder Responses

2.13 The data from the stakeholder interviews indicate the current use of e-learning methods and technologies within industry varies widely and, apart from e-providers who all indicated they used a range of technologies, there is no apparent consistency. These results complement the findings of the reports noted above. Specifically;

- The current use of e-learning applications in on-the-job / off-the-job training by employees' (5) ranges from "never" (2), below 60% (1) to over 80% (2). For those engaged in e-learning the predominant technologies used were CDs / DVDs and Internet technologies. Interestingly, two respondents indicated they had been exposed to mobile technologies in their learning experiences.
- The use of e-learning applications in on-the-job / off-the-job training by employers (4) is also varied and again ranges from "nil" (1) to nearly 80% in one instance. The predominant technologies consistently used were CDs / DVDs and Internet technologies. There was some indication (2) simulation and games were being increasingly used in on-the-job training.

- All the providers of training (4) indicated they were using e-learning methods (at least 50%) to deliver training. While using a range of technologies the favoured technology was the Internet. This may be attributed to the extensive use of learning management systems (Blackboard (2) and Moodle (2) in the provider institutions surveyed.

Tyler-Smith, K.(2005) *The workplace eLearner: Designing and delivering eLearning into the workplace*. Paper presentation to the World Association of Cooperative Education Conference, 2005. Retrieved February 8 ,2008 from, http://www.tanz.org.nz/pdf/the_workplace_learner_wace.pdf

This study describes how a consortium of New Zealand Polytechnics/Institutes of Technology designed an eLearning initiative to deliver a national management qualification (The National Certificate in First Line Management) to current and aspiring supervisory personnel in the New Zealand.

To meet client expectations, (i.e. a course delivered primarily online with a minimum of face to face teaching in order to minimise costs and work-place disruption) significant aspects of the course are delivered online using a Learning Management System (LMS).

The initial launch of the first iteration of the course for the “meat inspectors” uncovered a number of unanticipated issues including, appropriate access to internet based resources, variable ICT skills amongst the participants, learner readiness to participate in online learning activities and engage with digital materials, and variable levels of organisational support for participants. However, later iterations of the course have resolved many of the earlier issues identified.

Initial evaluations of the initiative have been generally positive and it is acknowledged the e-learning course is still in a process of continual development. Since the indications for its success were good, further courses are to be developed.

e-Learning and Trade Training: Annotated Bibliography

2.14 Overview:

- ◆ It is increasingly recognised there is a shortage of a skilled, trade qualified, population in developed countries such as New Zealand, Canada and Australia. This lack of a trade qualified personnel is making it increasingly difficult for these countries to compete successfully within a global economy.
- ◆ Traditional training approaches, the “apprenticeship model”, where a significant portion of learning is “classroom-based”, are being challenged and alternative models of skills based training are being investigated.
- ◆ The use of ICT to present content (for example videos, simulations, animations and workbooks), to facilitate assessments and encourage interaction through asynchronous and synchronous internet based communication tools (for example video conferences, white boards, forums and quizzes) are being explored as alternative methods of providing the appropriate skills training.
- ◆ Trade-trainees in general are learners with a preference for “visual” presentations and ongoing personal contact. To meet these preferences increased adoption of “video” technologies (e.g. video conferencing, practical task demonstrations embedded in HTML pages, web-casts) will impact learning in a positive way.

2.15 Thompson, L and Lamshed, R (2008) *E-learning within the building and construction and allied trades*. Canberra, Australian Department of Education, Employment and Workplace Relations

- ◆ This qualitative study, including an extensive literature review, was based on extensive telephone consultations and interviews, information provided through web searches and key informants from the Australian Flexible Learning Framework, industry, and relevant networks. It was supplemented by on-site visits and interviews with key teaching staff and managers for the case studies used in the project.
- ◆ In measuring the success or failure of e-learning initiatives the report advocated the measure of the success of e-learning used in trades training should not be the level or complexity of technology used, but rather the quality of training e-learning provides trainees. Using quality as a measure means e-learning users are able to demonstrate the benefits of using e-learning methodologies to their peers. These positive demonstrations would increase e-learning adoption.

- ◆ Given apparent trainee preference for “visual” presentations and for personal contact, the report noted a powerful technology in use by trade trainers was video, both as a communication tool with the use of video conferencing technology and as a presentation tool to demonstrate practical tasks.
- ◆ To increase the adoption of e-learning in trade areas and to enable a move from periphery to mainstream, the report identified a number of strategies. These are summarised below:
 - Involve staff in vision-sharing, planning and innovation and the re-alignment of organisational structures to support the vision created
 - Plan for and adequately resource e-learning initiatives, with a particular focus on human resource management.
 - Place an emphasis on good teaching practice and the quality of the learning experience, not e-learning.
 - Capitalise on past, present and future organisational investments through implementing effective information dissemination strategies. In addition, the deployment of robust information management structures and systems, and the creation e-learning implementation strategies.

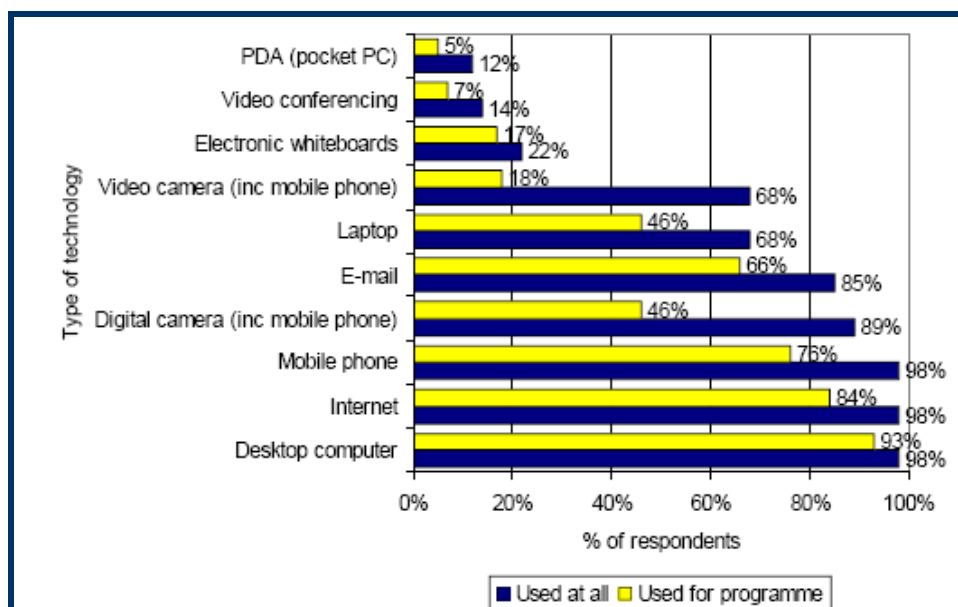
2.16 Hill, A. (2006) (Ed) *Alternative Trades Training: Best Practices from Across Canada*. Industry Training Authority, British Columbia

- ◆ This qualitative study is based on numerous “on-site” visits within British Columbia and across Canada. The findings are supplemented by a review of global trade training initiatives and case studies. The report noted each trade has its own “unique” knowledge and skill base and in reality a flexible “one size fits all” approach to the use of e-learning in trades training was unrealistic. However, it did conclude there were identified “commonalities” that constituted alternative trade training. Those which focused on e-learning and which are relevant for this study, included:
 - Self-paced learning, providing individual trainees with the ability to learn at any time, any place, anywhere.

- The use of media and technology helping to facilitate learning through the delivery of content, assessments and providing the opportunity for asynchronous and synchronous communication.
- Identifying a blended approach, combining face-to-face training and self-paced learning as the most effective approach to delivering practical skills based training.
- Acknowledging many trainees are visual learners and the inclusion of videos, graphics, animations and simulations in the development of content will impact on their learning in a positive way.

2.17 Cooper, C. (2007) Work-based learner ICT and e-learning survey: Final report Association of Learning Providers and the Learning and Skills Council. Retrieved January 28, 2008, from: http://www.elearningproviders.org/HTML/images/cms/alp_e-learner_survey_final_report.pdf

- ◆ In this survey (n=508), conducted with apprenticeship and entry to employment participants, all learners had access to a computer (99%) and the Internet (97%) and most (97%), used them to help with their apprenticeship or E2E programme. Respondents used a wide range of information and communication technology, both for coursework and personal use, since starting their learning programme: The percentage of personal (blue) and course (yellow) use are illustrated in Figure 4 below.



[Source: Cooper, C. (2007) (figure 3.5: p17)]

Figure 4 Technologies used by participants

- ◆ Over two thirds of learners found these technologies useful in their course work. Personal devices and communication tools (the Internet, desktop and laptop computers, digital cameras and e-mail) were considered the most useful.

Thompson, L and Lamshed, R (2008), CASE 2: E-learning within stonemasonry Trade and Technician Skills Institute (Brisbane North) *in E-learning within the building and construction and allied trades* Canberra, Australian Department of Education, Employment and Workplace Relations

There are few stonemasonry courses in Australia and therefore the relevant e-learning resources for teaching this topic are scarce. This study demonstrated how a tutor, initially with limited ICT skills, brought innovation to the learning experiences of stonemasonry apprentices by experimenting with a wide range of e-learning tools.

Key features:

- ◆ The teacher first worked with resources distributed on CD-ROM and then migrated this content to a learning management system.
- ◆ A range of development tools were used and included a number of freeware programs (e.g. *Hot Potatoes*, *MSN Group*, freeware HTML editors).
- ◆ During the resource development process the teacher discovered his student cohort were visual learners. He therefore began to develop visually rich presentations and found the use of Video was a very effective teaching medium in this subject.

2.18 I & J Management Services (2006) *2006 E-learning Benchmarking Project E-learning in the traditional trades* Canberra, Australian Department of Education, Employment and Workplace Relations

- ◆ This survey analysed the “trade training” responses to the 2006 E-learning Benchmarking Project. It reported on the delivery of e-learning in traditional trades by registered training organisations (RTOs) (n=155), the use of e-learning by teachers/tutors (n= 106) and student views of e-learning in trade training (n=38).
- ◆ The study found there was a significant number of RTOs (46%) delivering trade training using e-learning methods and/or technologies. This use was highest among

the larger RTOs, although there was evidence a considerable number of smaller and industry-based RTOs were using e-learning. However, how deep the level of uptake of e-learning across their trades training could not be ascertained.

- ◆ The analysis of the uptake of e-learning by trainers appeared to demonstrate around 70% of all teachers of traditional trades use e-learning in some way. The most common forms of e-learning used were multimedia interactive resources in the classroom (52%) and online access to and downloading of learning materials and resources (48%). Electronic submission of work and online assessment are also used by around 30% of traditional trades' trainers.
- ◆ Forty two percent of students indicated courses offered included some form of e-learning. Based on their e-learning experience 48% of participants indicated they would recommend e-learning to their friends or work colleagues.

e-Learning in Industry: Annotated Bibliography

2.19 Overview:

- ◆ During the extensive literature review of government reports, white papers, research reports and journal articles it was noted a common thread within the material reviewed was the number of surveys published which *suggested*, rather than proved, a significant number of organisations were using e-learning.
- ◆ These results need to be treated with caution as sample sizes in some studies were often limited, and it could be argued respondents had a high degree of technological literacy with a keen interest in computer-mediated training.
- ◆ The literature appears to indicate the technical infrastructure is sufficiently robust and software applications are readily available for individuals and for all sizes of business to offer e-learning opportunities. However, it appears large service industries, firms and individuals undertaking formal study were more likely to use ICT for education and training.

2.20 Bloom, M. (2003). e-Learning in Canada findings from 2003 e-survey : Special report. The Conference Board of Canada. Retrieved November 27, 2007 from, www.conferenceboard.ca/education/reports/pdfs/TopLine_report.pdf

- ◆ This research project (n=570) surveyed organisations across Canada about the use of e-learning within individual organisations. They found e-learning was used significantly in software training, followed by technical skills and management skill development. Not surprisingly, the main users of e-learning were professional and technical employees.
- ◆ When questioned on the effectiveness of e-learning in training, 25% believed it was effective while almost 50% of respondents needed further evidence to be convinced of e-learning's effectiveness.
- ◆ Of the 77% respondents who used e-learning it is notable this method represented a small percentage of total training within the organisations with 37% indicating it represented between 1% and 24% of total training and only 6% indicating it represented more than 50%.
- ◆ The main drivers for the future use of e-learning were ranked in order of importance as cost effectiveness, effectiveness as a training method compared to other modes of training, and ability to reach more learners in the organization.

2.21 Lain, D. & Aston, J. (2004) *Literature review of evidence on e-Learning in the workplace*: Institute for Employment Studies, Brighton

- ◆ In this extensive literature review it was noted that although there were a number of surveys published which *suggested* a large proportion of organisations in the United Kingdom were using e-learning, the results should be treated with some caution. Sample sizes were typically low and the original sample may have been derived from groups of employers with a keen interest in training — further biasing the results.
- ◆ However, from their review they concluded manual workers *seemed* to be the least likely to receive training through e-learning methods. There was also a reasonable degree of consistency across surveys, indicating that e-learning was most widely used in sectors with a high degree of computer penetration; IT and financial services for example.

- ◆ Although there was a lack of hard evidence in regards to what is taught using e-learning, the authors concluded that it is most likely 'hard' skills (for example, IT) which dominate over 'soft' skills (such as team building and leadership). The research also suggested that asynchronous activities (nominal time) were used more widely than synchronous (real time) activities.
- ◆ The study noted small and medium sized companies with limited resources appear to be increasingly using e-learning courses and material produced by 'LearnDirect' (the University for Industry brand) and specifically the 'Skills for Life' programme which produces e-learning courses to improve work-based skills and materials. The authors note that in 2002/2003, 64,000 Small and Medium Enterprises (SMEs) enrolled employees on Skills for Life courses, representing 106,336 employees.

Silvers, A. (2002). E-Learning from around the world: Example Krispy Kreme Doughnuts (slides 7-10). Retrieved January 14 2008 from: <http://www.authorstream.com/>

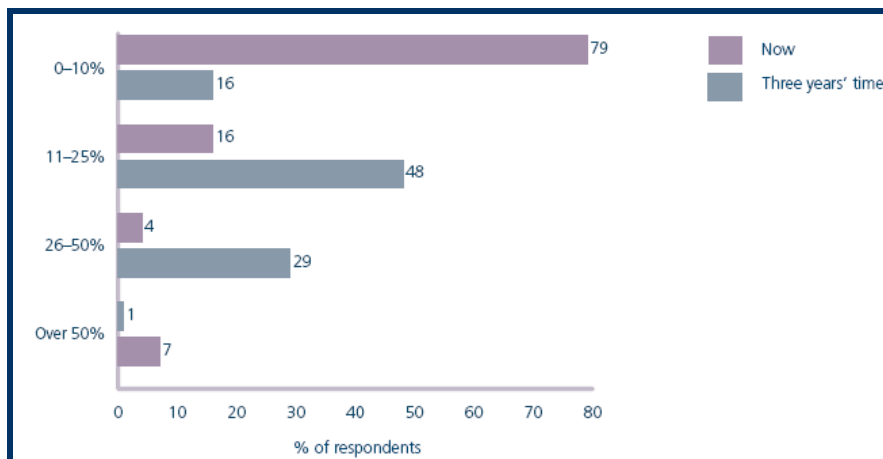
Krispy Kreme Doughnuts is a retail group with over 200 stores across North America. As well as needing to train store managers in normal operational activities they also needed to introduce them to the culture of "magic moments". They created an interactive management course using a learning content management system (LCMS).

The creation of the course meant training time for new store managers was reduced and the company was able to open further stores across the country rapidly.

2.22 CIPD (2005), *Training and development 2003 Survey Report*, London: Chartered Institute of Personnel and Development Retrieved January 28, 2008, from: <http://www.cipd.co.uk/research/rsrchplcypubs>

- ◆ This survey (n=663) conducted by the Chartered Institute for Personnel and Development (CIPD) put the proportion of respondents who currently provide e-learning to its employees at 54%, with a further 33% indicating they have plans for introducing e-learning in the future. However, e-learning accounts for less than 10% of total training time for approximately 80% of respondents (see Figure 5 below).
- ◆ The respondents indicated e-learning was mostly used for particular types of training, such as IT training (70%), technical training (45%), health and safety (34%) and

induction training (33%). E-learning is much less likely to be used for training in 'people skills' like management training (23%) and interpersonal skills training (13%). Less than 10% of respondents reported using e-learning in diversity (9%), foreign languages (7%) or teambuilding (3%) training. This may suggest that, while use of e-learning continues to grow, it is mostly aimed at training activities with a technical or knowledge component.



[Source: CIPD (2005) (figure 2: p12)]

Figure 5: Percentage training using e-learning

- ◆ The most common form of e-learning being used by respondents was CD-ROM, used by two-thirds of respondents (66%). Slightly more respondents used generic e-learning modules (59%) than custom-made modules (54%). However, it must be noted the survey had a bias to large firms with over 80% respondents employing 100+ employees.

Silvers, A. (2002). E-Learning from around the world: Example Plant America (slides 5-7). <http://www.authorstream.com/>

Etera: Plant America is a plant nursery wholesaler who provides direct access to information about and the ordering plants through a website service to independent garden centres. The company found customer access to critical information about the plants to be sold and the functions website to be used for ordering was not well understood by sales staff at independent garden centres. Therefore, they provided e-learning activities for independent garden centres on how to fully use the functions of the website. They found certified dealers who undertook the training had 170% more sales than untrained dealers.

2.23 Becta (2005) *Research into the use of ICT and e-Learning for work-based learning in the skills sector: Literature review*. British Educational Communications and Technology Agency, Coventry.

- ◆ This literature review found there was currently little balanced evidence in the academic literature to suggest a widespread adoption of e-learning in industry. A review of 2004 Labour Force Survey indicated only 12 per cent of employees who had received training in the previous four weeks had received some of it via e-learning. This suggests the growth in e-learning has not been as great as earlier literature has suggested.
- ◆ The study argues there is a reasonable degree of consistency across the literature reviewed showing
 - e-learning is used more widely in sectors of industry with a high computer penetration.
 - manual workers are the least likely to receive e-learning than professional workers
 - ‘hard skills’ such as IT are more likely to be delivered via e-learning than ‘softer’ interpersonal ones.
- ◆ The report concluded that although the extent of e-learning penetration in the workplace and its speed of growth may still not be totally known, there can be no doubt that e-learning is being used and that this will increase.

2.24 CIPD (2004), *E-learning survey results report*. Retrieved January 28, 2008, from: <http://www.cipd.co.uk/subjects/lrnanddev/elearning/elearnsurreslts04.htm>

- ◆ This survey (n=110) conducted by the Chartered Institute for Personnel and Development (CIPD) reviewed the types of e-learning respondents were exposed to at their place of work. The most popular e-learning technology used were CD-ROM while synchronous webinars were the least used technology. (see Figure 6 below).

CD-ROMs	73%
Generic modules	52%
Customised modules	57%
Asynchronous discussion sites supported by the organisation	19%
Synchronous webinars delivered by a subject expert	15%
Other	5%

[Source CIPD (2004), (figure 2: p1)]

Figure 6: Digital materials used in training

Morrison, M., (2008). Learner e-Learning. *Training*, 45(1), 16-18.

The University of Toyota (UOT) was established by Toyota Motor Sales to develop training for its own 8,500 employees and 104,000 dealership associates. By using a number of e-learning vendors in the development of e-learning modules and courses UOT found it eliminated firstly, the need to employ writers and developers and secondly the need to purchase associated hardware and software. However, the use of several vendors brought mixed results. For example independent vendors would develop independent navigation systems, instructional and visual design varied from vendor to vendor and the process used in the production of some courses meant they were difficult to update or modify. Of particular concern was the vendor development of some course materials that was incompatible with UOTs information technology (IT) and learning management systems (LMS).

The obvious solution to these issues was the development of a single set of development standards, benchmarks, specifications and best practices to ensure all material used met the high standards of UOT. The five production categories they established were;

- ◆ Usability Best Practices (how to maximize usability and usefulness)
- ◆ Technical Specifications: (technical Standards for compliance with IT and LMS)
- ◆ Development Best Practices: (how to develop courses efficiently and effectively)
- ◆ Brand Standards: (standards for logos, fonts, colours and backgrounds)
- ◆ Reusable Resources: (design templates, photos, code routines, animations)

To inform vendors of UOT requirements, a web-site, *e-Source*, was created and it became compulsory for potential vendors to visit the site before “bidding” for any content development at UOT. The success of the introduction of the five production categories is demonstrated by the fact that since *e-Source*’s launch only one course has had to be reformatted (due to video file size) compared to the 10% that needed to be reformatted previously.

3. e-Learning in industry: Perceived Demand

3.1 This section has been divided into seven themes;

- Rhetoric provides an overview of studies that claim rapid growth for e-learning in industry.
- Reality reviews a series of reports that indicate e-learning is growing steadily in industry.
- Demand for e-learning: stakeholder responses reflect upon the findings of telephone interviews with employees, employers and providers on the potential demand for e-learning methods and technologies.
- Drivers for success and critical success factors three key motivators influencing the adoption of e-learning methods in industries.
- Impediments: identifies three factors that could impede the adoption of e-learning methods in industries.
- Impediments to e-learning: stakeholder responses reflect upon the findings of telephone interviews with employees, employers and providers on the potential barriers to the adoption of e-learning methods and technologies.
- Impact of blended learning reviews why the mixture of methods, classroom and e-learning is having a significant impact on industry training.

3.2 The key themes identified during the review were

- ◆ There appears to be a growing dependence on the use of computers and the Internet in businesses world-wide. Because of this technological dependence there has been considerable “hype” around the potential of using the current built infrastructures as a vehicle for increasing the development and adoption of e-learning in the corporate sector. The “hype” is driven by data based on forward looking predictions rather than actual hard data and should be taken at face value.
- ◆ This section indicates that despite the rhetoric and excitement around e-learning in the corporate sector a review of all the evidence currently available indicates e-learning is, and will, continue to grow “steadily” rather than achieve the phenomenal rates predicted.
- ◆ It appears there is a relationship between the size of a company and the probability of its being a user or planner of e-learning and this is notable with larger companies more likely to be using or planning to use e-learning than smaller companies.
- ◆ The key drivers for e-learning implementations are clustered around three areas. Firstly, in an era of information overload, strategies must be developed to inform staff in timely and appropriate ways. Secondly, organisations need to manage the impact of changes to production and the information and communication technologies deployed. Thirdly, training must be developed and delivered economically and efficiently.
- ◆ Critical success factors for successful e-learning deployments are identifiable at three levels. Firstly, organisations must provide the operational policy framework and ongoing personal and educational support needed. Secondly, trainers need to believe in the effectiveness of e-learning methodologies and have the requisite skills to teach and evaluate effectively in these e-learning environments. Thirdly, learners need to have the requisite skills to learn effectively in these e-learning environments.
- ◆ To ensure the smooth incorporation of e-learning within organisations three factors (the three Cs), **connectivity** (ready access to appropriate technologies), **capability**, (all participants (managers, trainers and learners) have the confidence and capability to perform successfully), **content** (relevant engaging material is presented) are critical to the success of any initiative.

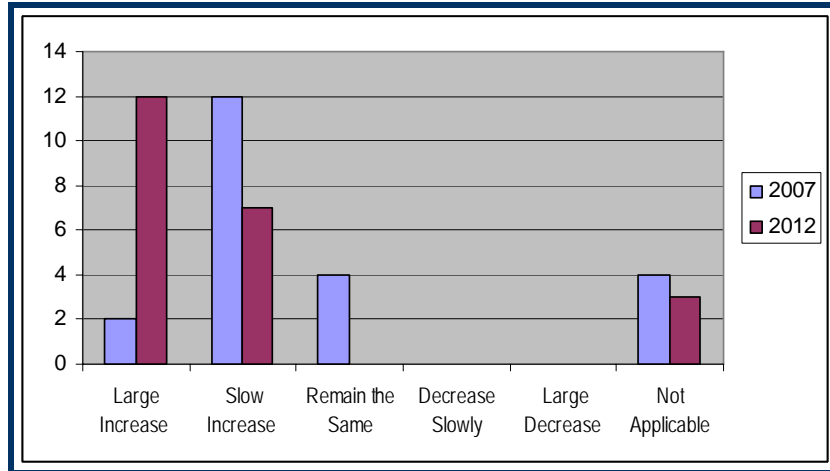
Demand for e-Learning: Rhetoric

3.3 Overview

- ◆ A number of national and international surveys on e-learning in industry have included specific items on the potential growth of e-learning activities within individual organisations. In general the data gathered from some of the reports indicate there will be a rapid increase in e-learning implementations in industry in the future.
- ◆ However, it should be noted these are “suggested” indicators of potential growth. Since most of the respondents are e-learning or training professionals or providers of e-learning materials the responses, and therefore the predictions, should be treated with caution.

3.4 Clayton, J & Elliott, R., (2007, July) Report 2: *A survey of e-learning activity in the ITO sector*. E-Learning Activities in Aotearoa / New Zealand Industry Training Organisations. Tertiary e-Learning Research Fund, Wellington Retrieved February 1, 2008, from http://ito.elearning.ac.nz/file.php/1/Report2_TELRF.pdf

- ◆ The report noted the desire of individual governments (such as Australia, Canada and Great Britain) to raise the profile and use of Information and Communication Technologies (ICT) in the Vocational Education and Training (VET) and Industry Training sectors. This is apparent in a number of commissioned reports, funded incubator projects and policy documents produced and reviewed in phase one of this project.
- ◆ In the quantitative survey (n=23) two items were included seeking respondents perceptions of “*How will the adoption of e-learning approaches by your ITO change in the next 12 months(first) and the next 3-5 years(second)*”. The survey concluded ITOs were anticipating within the next one to five years there would be a steady but significant increase of e-learning activities in their organisations. Figure 7 below has included responses from both questions in a single graph.

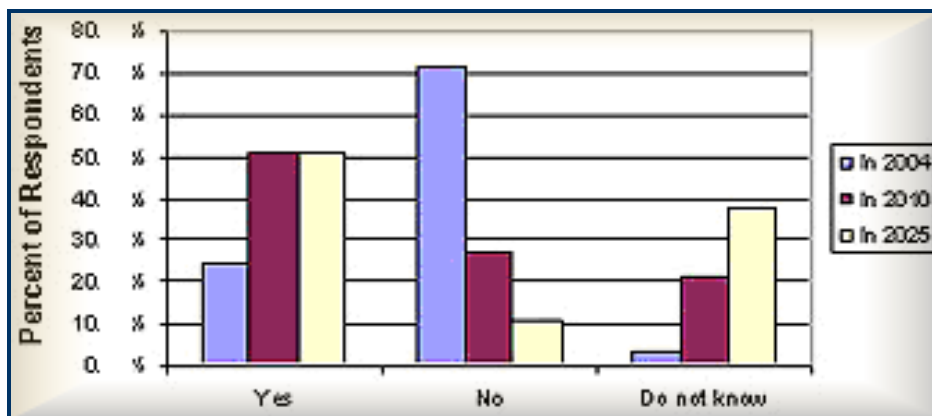


[Source: Clayton, J & Elliott, R (2007, July) (p44)]

Figure 7: Perceived future use of e-Learning in ITOs

3.5 Kim, K. J., Bonk, C. J., & Zeng, T., (2005, June). [Surveying the future of workplace e-learning: The rise of blending, interactivity, and authentic learning](http://www.elearnmag.org/subpage.cfm?section=research&article=5-1). E-Learn Magazine. Retrieved February 1, 2008, from <http://www.elearnmag.org/subpage.cfm?section=research&article=5-1>

- ◆ This survey (n= 239) indicated e-learning had become an increasingly important delivery format. The authors suggested e-learning would dominate training in the near future with 25 percent of the respondents to this survey indicating in 2004, e-learning was the dominant form of training in their organization, while 50 percent predicted that e-learning would become the dominant form of training within their organization by 2010. A modified version of the original graph is illustrated in Figure 8 below.

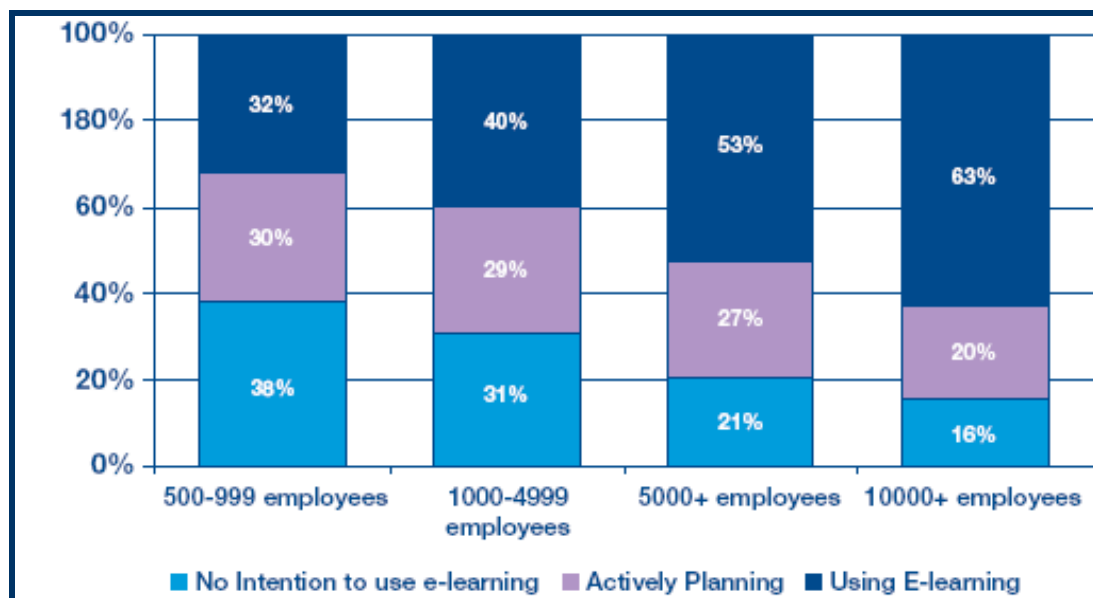


[Original Source: Kim, K. J., Bonk, C. J., & Zeng, T., (2005, June) (figure 1)]

Figure 8: Predictions of Dominance of e-Learning

3.6 Hills, H. & Kappler, S. (2004) Embedding e-learning in large organisations. Learndirect: HI Europe. Retrieved February 1, 2008, from http://www.edu-lab.de/file.php?file=/1/embedding_e-learning.pdf

- ◆ This survey (n= 503) of large companies (all with 500+ employees) indicated e-learning currently was, and would increasingly become, an important tool in the delivery of training in organisations. The report also indicated the business services sector was more likely to become an early adopter of e-learning approaches.
- ◆ There is a relationship between the size of a company and the probability of its being a user or planner of e-learning and this is notable with 83% of larger companies using or planning to use e-learning. However, even with the smaller companies a significant number (62%), were using, or planning to use, e-learning. The modified version of the original graph presented is illustrated in Figure 9 below.



[Original Source: Hills, H. & Kappler, S. (2004) (Figure 1 p5)]

Figure 9: Predictions of e-Learning growth by industry size

Demand for e-Learning: Reality

3.7 Overview

- ◆ The following review of the literature indicates a varied demand for e-learning implementations and, in many ways, refutes the phenomenal growth rate predictions illustrated above.
- ◆ In one study (see section 3.8 below) it was noted the responses from current and previous studies indicated the use of e-learning applications actually decreased (from 54% in 2005 to 48% in 2007).
- ◆ The most realistic view of the perceived demand e-learning is the documentation of the steady decline of classroom-based (from a high 78% in 1999 to a projection of 53% in 2006, a decrease of 25%) and the steady growth of technology-based training, from a low of 14% in 1999 to a projection of 40% in 2006, an increase of 26%.

3.8 CIPD (2007), *Latest trends in learning, training and development*, London: Chartered Institute of Personnel and Development Retrieved January 28, 2008, from: <http://www.cipd.co.uk/research/rsrchplcypubs>

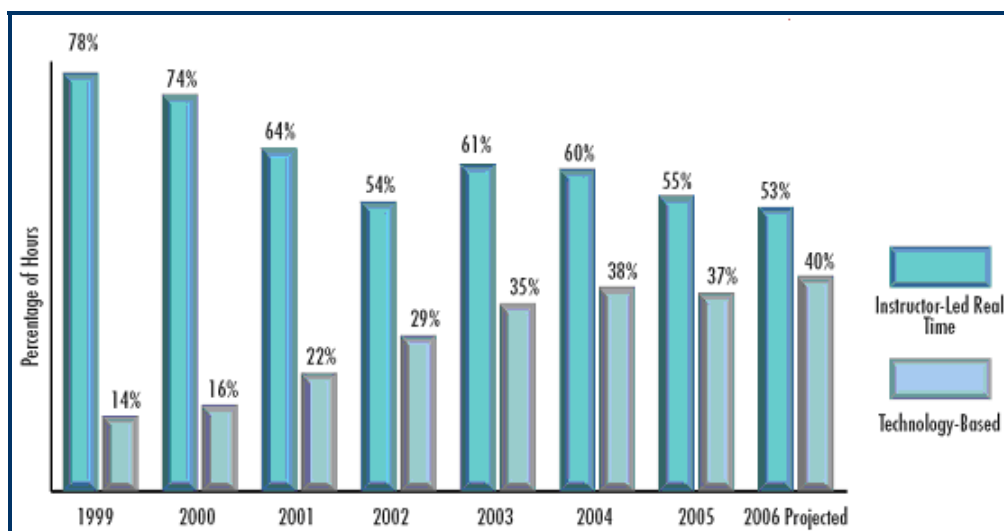
- ◆ This survey (n= 642) indicated it was anticipated e-learning would become an increasingly important method for training and development, with 67% of respondents anticipating an increase in this method of training in the next few years.
- ◆ However, the authors noted that in a similar survey conducted by the organisation in 2005 over half of respondents (54%) reported that they use e-learning. Yet the results of the current survey in 2007 indicated there was in fact a reduction in meaningful e-learning activity to 48% and 2% believed that e-learning was the most effective way to learn.
- ◆ It should also be noted a similar survey conducted by the group in 2006 was found only 26% of respondents agreed with the statement “*e-learning has significantly altered our learning and training offerings*” and only 1% believed that e-learning was the most effective way to learn (CIPD, 2006).

3.9 Danish Technological Institute & Massy, J. (2004), *Final Report: Study of the e-learning suppliers' market in Europe*: European Commission, Directorate-General for Education and Culture Retrieved January 28, 2008, from: http://www.ec.europa.eu/education/archive/elearning/doc/studies/market_study_en.pdf

- ◆ This review combining desktop research with e-learning suppliers' case studies and a summit, found it difficult to place a value on the traded products and services with any accuracy. Any values placed on activities was a matter of estimates, which they recommended should be treated with great caution because of the absence of broader education and training "market" data and more specific e-learning data.
- ◆ The report investigated e-learning activities in a number of segments including workplace and vocational education and training. They concluded that up to 2004 the private workplace-learning segment was hit by the slow economic conditions in Europe. Consequently, the demand for e-learning products and services for training, driven by the need for e-learning investment, could be measured in terms of business impact.
- ◆ In essence, the report concluded the overall picture emerging for e-learning was not one where high volume commodity trading would generally occur. Rather, traded services in technologies, e-learning content and services in education, training and workplace learning would be built around customer relationships and higher end/high value products and knowledge services.

3.10 Rivera, R. & Paradise, A. (2006), *ASTD State of the Industry Report*, American Society for Training & Development. Retrieved January 28, 2008, from: <http://www.astd.org/>

- ◆ This survey (n=37) of large corporations (average of over 60,00 employees) demonstrated the use of classroom-based learning had slowly declined from a high 78% in 1999 to a projection of 53% in 2006, a decrease of 25%. In the meantime technology-based training had increased from a low of 14% in 1999 to a projection of 40% in 2006, an increase of 26%.
- ◆ A feature of the figures presented (see Figure 10 below) is the significant increase in classroom real-time events in 2003, a 7% increase after a four-year period of decline. However, this did not impact upon the steady growth of e-learning activity.



[Original Source: Rivera, R. & Paradise, A. (2006) Figure 15, p14]

Figure 10: Actual e-Learning growth

Demand for e-Learning: Stakeholder Responses

3.12 In general, the data from stakeholders indicate the demand for e-learning methods and technologies within industry are steady with a majority indicating the use of e-learning will increase slowly. However, this is most notable in employee and provider responses. One manufacturing industry respondent actually predicted a decrease as e-learning undertaken previously had not met their expectations. These results complement the findings presented in the section above. Specifically;

- The perceived demand for e-learning in on-the-job / off-the-job training by employees' (5) ranged from "remain the same" (2), "increase slowly" (2) "increase significantly" (1). While CDs / DVDs were expected to be still available respondents indicated they expected an increase in the Internet based resources (5), mobile devices (4), and simulations and games (2).
- The perceived demand for e-learning in on-the-job / off-the-job training by employers (4) was varied and ranged from "decrease slowly" (1) "remain the same" (1), "increase slowly" (1) "increase significantly" (1). While CDs / DVDs were expected to be still available, respondents indicated they expected an

increase in the Internet based resources (3), simulations and games (2), and mobile devices (1).

- All the providers of training (4) indicated e-learning would increase in the next year. However, the rate of this increase would be varied “increase slowly” (1) “increase significantly” (3). While CDs / DVDs were expected to be still available all respondents indicated they expected an increase in the Internet based resources (3) simulations and games (3), and mobile devices (3) and some indicated a move to “Web 2.0” applications (2).

Drivers and critical success factors for e-Learning

3.13 Overview:

- ◆ In the literature reviewed below it was noted the perceived key drivers for e-learning growth in industries appeared to focus on;
 - **Information Overload:** There is an ever increasing amount of information - organisational, individual, trade and professional - employees need to be aware of to complete their tasks successfully. Since this information rapidly becomes redundant, methods of continually providing staff with up-to-date, relevant and authentic information are critical.
 - **Technological Innovation:** The rapid rate of change in production, informational and communication technologies impacts on work practices and this impact needs to be managed in a consistent and timely manner.
 - **Return on Investment:** The provision of training to improve performance at an individual and organisational level must be done economically and efficiently.
- ◆ In the literature available it was noted the perceived critical success factors for e-learning could be identified at three levels;
 - **Organisational:** Leaders within organisations, as well as actively supporting e-learning deployments, need to develop strategies and plans to encourage e-learning initiatives and measure their effectiveness.

- **Training:** Trainers need to believe in the effectiveness of e-learning methodologies, have ready access to engaging, well designed, visually appealing and authentic content and be able to measure the impact of e-learning implementations on participant performance.
- **Learning:** Learners need ongoing support and motivation to continue to participate fully in e-learning activities. They also need to acquire sufficient technological, literacy and numeracy skills and learning strategies to feel comfortable in the e-learning environments created.

Carruth, J., (2007). *Delivering Results Kirklees Metropolitan Council, 2007 e-Learning Awards: UK Sector Skills Council*. Retrieved February 1, 2008, from <http://elearning.e-skills.com/>

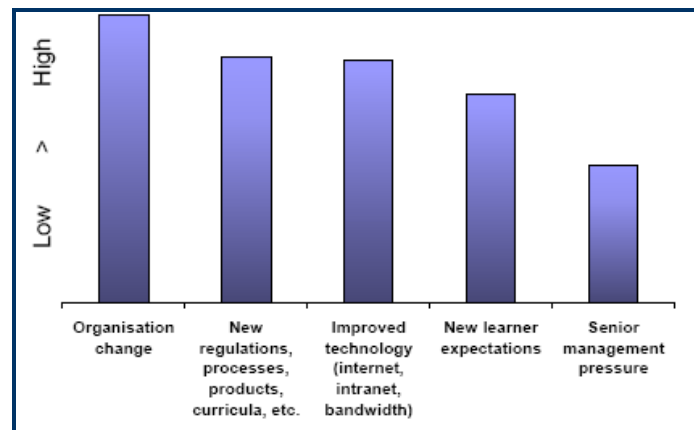
Between 1998 and 2007, the number of employees using Kirklees Council's Novell GroupWise e-mail system had grown from 2,000 to 8,000, and the only formal avenue for end user development since 1998 had been classroom sessions. In order to meet the needs of the varying range of knowledge and ability of the users, a more effective method of delivery and support had to be implemented.

Using Lectora and Macromedia Captivate, an e-learning package was put together and distributed via the Kirklees corporate Intranet. The interface of the learning package was designed to emulate the tabbed structure of the GroupWise 7 e-mail client and contained over 50 short, narrated movies that explained how to do almost anything in GroupWise 7. Although no actual figures are available for the return on investment of implementing this new system, the Council says a substantial amount has been saved. For instance, the development took just two weeks of only one person's time. Not only that, previous Kirklees Councils had been delivering approximately 10 hours of classroom training each week. So the most notable savings were in reducing or eliminating, trainer time, employee time away from work, employees travelling time to training centre, room hire, refreshments, and handouts.

Perceived benefits over classroom training were seen by the Council as available anywhere at any time; learners have greater flexibility in choice and time of learning. Refresher training could be undertaken at any time, as many times as the learner needed, and the cost per employee was massively lower than for classroom courses.

3.14 Clark, D. & Hooley, A. (2006) *Epic Survey 2003: The future of e-learning*. White Paper, Epic Group. Retrieved February 1, 2008, from http://www.epic.co.uk/content/resources/white_papers_index.htm

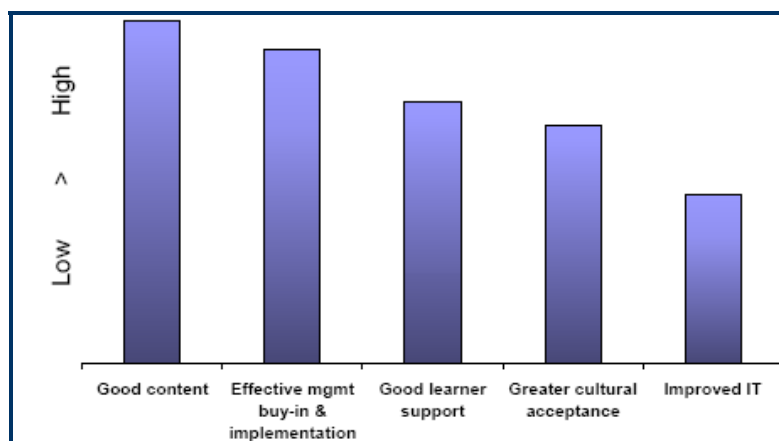
- ◆ This survey (n=203) indicated strategic organisational change was seen as the most important driver of e-learning. This was followed by more practical drivers such as the introduction of new regulations, processes, products and curricula, changes to technology, learner expectations and finally senior management pressure (see Figure 11 below).



[Original Source: Clark, D. & Hooley, A. (2006) p7]

Figure 11: Primary drivers of online learning

- ◆ This survey also asked respondents what were the factors that would ensure e-learning would be successful in their business. The critical success factors they identified were the availability of content, support from management and learner support (see Figure 12 below).

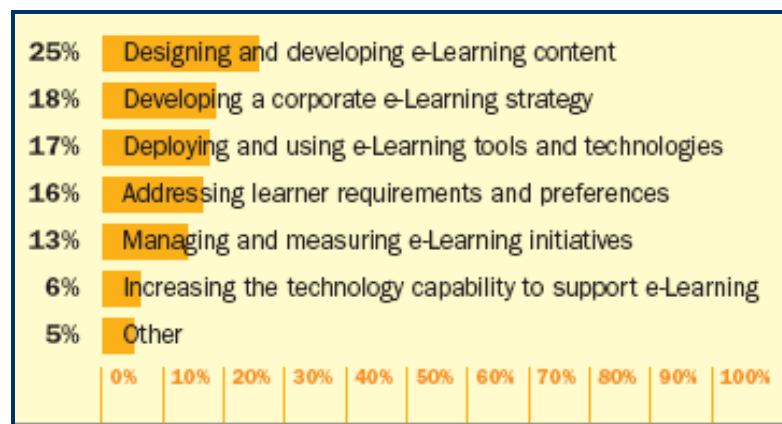


[Original Source: Clark, D. & Hooley, A. (2006) p9]

Figure 12: Critical factors for online learning

3.15 Pulichino, J. (2006) *Future Directions in e-Learning Research Report 2006*. The Learning Guild Research. Retrieved February 1, 2008, from <http://www.eLearningGuild.com>

- ◆ This survey (n=not stated) asked respondents to select the number one activity that would be the focus for their organisation in the current year. The results indicated the design and development of appropriate e-learning content was the highest priority for a significant number of respondents (25%), while increasing the technology infrastructure to facilitate e-learning was rated lowest priority (6%) (see Figure 13 below).



[Original Source: Pulichino, J. (2006) Figure 8, p6]

Figure 13: Priorities of e-Learning activities

3.16 Becta (2005) *Research into the use of ICT and e-Learning for work-based learning in the skills sector: Literature review*. British Educational Communications and Technology Agency, Coventry.

- ◆ This literature review indicates large corporate implementation of e-learning appears to cluster around several key drivers:
 - the rapid growth in information that knowledge workers need to handle;
 - the rapid rate of change in knowledge and skills; and
 - the promise of savings in training costs.
- ◆ The major sector confirmed as early adopters are the service sectors including the IT and telecommunications, banking, financial services and the consulting industry. Specifically, early adopters of e-learning include those with:
 - large dispersed field workers
 - rapid rates of new product launches and frequent updates

- substantial automation in customer services operations
- systematic management of knowledge and intellectual capital.

3.17 Eklund, J., Kay, M., & Lynch, H., (2003) *e-learning: emerging issues and key trends A discussion paper*. Flexible Learning Advisory Group, Australian National Training Authority. Retrieved February 1, 2008, from <http://www.flexiblelearning.net.au/flx/go>

- ◆ The discussion paper was written following a review of literature and interviews with key senior persons involved in flexible learning in Vocational Education and Training (VET). This paper argued although there were many identifiable drivers for ICT-enabled instruction these could be classified as
 - technical innovation,
 - organisational and business developments, and
 - the needs and demands of the individual learner.
- ◆ The report noted the successful implementation of e-learning within organisations depended on critical factors. These included:
 - the availability of appropriate, well-designed, interactive content
 - the competence, and the enthusiasm of the practitioner
 - organisational/management support and promotion of initiatives
 - a planned implementation strategy that includes training.

Impediments to e-Learning: Annotated Bibliography

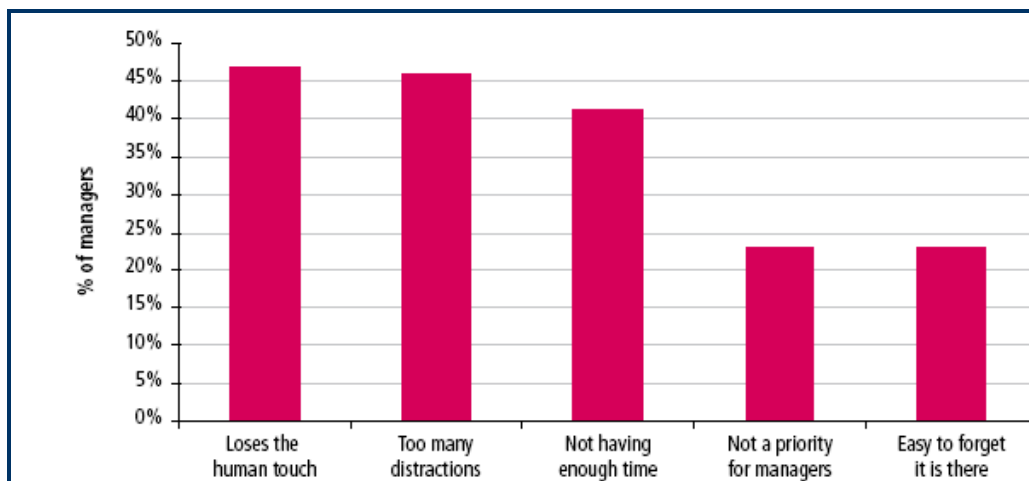
3.18 Overview:

- ◆ The impediments to e-learning growth are best articulated by The Australian Institute for Social Research (see **3.21** below). The three factors they identified as impediments for the uptake of e-learning were.
 - **Connectivity** (infrastructure and affordable access to the Internet)
 - **Capability** (skills, confidence and recognition of value in using the Internet)

- **Content** (relevant, useful and accessible information and services online)

3.19 Scott-Jackson, W., Edney, T. & Rushnet, C. (2007) *Realising Value from On-Line Learning in Management Development* Chartered Management Institute, Oxford Brookes University.

- ◆ This survey of managers from a range of industries (n=998) indicated there were a number of behavioural, attitudinal and cultural barriers to the uptake of on-line learning. These included, for example, how comfortable individuals were with using technology, motivation to complete programmes and the lack of management support. The results of the survey undertaken with managers are illustrated in Figure 14 below.



[Original Source: Scott-Jackson, W., Edney, T. & Rushnet, C. (2007) figure 7, p12]

Figure 14: Cultural barriers to online learning

3.20 Clayton, J, Elliott, R., Wood, L., & Pouwhare, D. (2007) Report 4: *Final report of e-learning activity in the ITO sector (pp146)*: E-Learning Activities in Aotearoa / New Zealand Industry Training Organisations. Tertiary e-Learning Research Fund, Wellington Retrieved 5/11/2007 from <http://ito.e-learning.ac.nz/>

- ◆ Organisations are conscious increased e-learning activities will place a strain both on the technical infrastructure the organisation has currently deployed and the support policies, procedures and mechanisms they have in place to deal with student needs in this e-environment. These factors were considered as major to moderate barriers to e-learning introduction.

- ◆ It appears organisations are conscious the costs (time, financial and human) associated with the implementation and maintenance of e-learning approaches could be a major barrier to organisational adoption.
- ◆ While respondents were confident e-learning initiatives would receive the ongoing support from staff and senior management, they recognised organisational lack of knowledge on the best practice in e-learning implementation could be a significant barrier to success.
- ◆ The potential limited technological literacy of trainees coupled with the need to implement unfamiliar ICT-based communication strategies to motivate students to complete courses could be a major barrier to trainee acceptance of e-learning environments.
- ◆ It appears small to medium-sized organisations with limited resources, capacity and capability to create organisational-specific content perceive the ability to access appropriate digital material as a significant barrier to e-learning delivery.
- ◆ Organisations, across all types, appear confident their staff either have, or can easily acquire through a range of readily available professional development opportunities, the appropriate skills to effectively monitor e-activities, e-delivery and e-content creation.
- ◆ Organisations, across all types, do not appear confident about the level of technological literacy of their trainees. There is some concern trainees may not have the skills to participate fully in e-learning activities. This concern is heightened by the perceived lack of appropriate and timely technical and learning support available to their trainees.

3.21 The Australian Institute for Social Research (2006) *The Digital Divide – Barriers to e-learning*.
Digital Bridge Unit, Science Technology and Innovation Directorate, DFEEST

- ◆ This study mentions a technologically-focused definition of the “digital divide” as the gap between those who are able to access and apply information and communication technologies (ICTs) to fully function in the “information economy” and those who are not.

- ◆ The study was designed to provide a better understanding of the digital divide. From the report three factors can be identified as impediments to the uptake of e-learning.
 - **Connectivity** (infrastructure and affordable access to the Internet)
 - **Capability** (skills, confidence and recognition of value in using the Internet)
 - **Content** (relevant, useful and accessible information and services online)

3.22 Bonk, C., (2002). *Online Training in an Online World*. Jones Knowledge Inc, and CourseShare.com. , Retrieved January 28, 2008, from http://www.publicationshare.com/docs/corp_survey.pdf .

- ◆ This survey of trainers, instructional designers, training managers, and human resource personnel (n=201) identified perceived barriers to online learning as cultural (*i.e. the working and learning “environment” of the organisation*), organisational and technical.
- ◆ In terms of **environment**/organizational issues, the main obstacles to effective use of the Web concerned perceptions of high cost (44%), time required for instructors to prepare Web-based courses (36%) and the workplace created cultural resistance to technology (33%).
- ◆ In terms of technological obstacles, the chief technological concern was bandwidth (41%), the availability of technical support (36%) and the network firewalls preventing access to appropriate activities (32%).

3.23 Sambrook, S (2003). E-learning in small organisations. *Education & Training*, 45(8/9), 506-516.

- ◆ This survey (n=154) noted nearly all Small and Medium Enterprises (SMEs) used computers. However, they speculated the firms used them for specific purposes such as software applications for accounting and the Internet for sales and access to information. However, there is limited evidence of this infrastructure being used for learning.
- ◆ Although the study was focused on SMEs’ ability to judge (and thus select) appropriate computer-based learning materials, as the project progressed the researchers found the availability of technological hardware within SMEs was a

fundamental barrier to e-learning implementation. It was also noteworthy that to complete the investigation of employer's ability to select appropriate computer-based learning materials, the original desired research sample had to be expanded to include eight large organisations that were more likely to engage in computer-based training.

- ◆ During workshop discussions, employer attitudes and use of e-learning varied. For example, 12% indicated they were using e-learning and 28% appeared eager to do so. However, the remaining 60% were non committal.
- ◆ The key identified barriers to e-learning implementation 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)

Impediments to e-Learning: Stakeholder Responses

3.24 In general the data from stakeholders indicate there are a range of “barriers” to the successful implementation of e-learning. The respondent ranking of these barriers differed widely within and across stakeholder groups. For example, the perceived lack of necessary ICT skills of employees and learners was rated as a moderate to significant barrier by employer and provider respondents. But this lack of skills was not rated as highly by employees. However, this discrepancy may be accounted for by the technological literacy levels of employee respondents. These results complement the findings of the information presented in the section above. Specifically;

- The lack of support from supervisors/managers was ranked lowest of the identified barriers where the majority ranked this as “not a barrier” (4). The lack of appropriate e-learning courses and activities was ranked highest of

the identified barriers where it was rated as a “significant barrier” (1) or “moderate barrier” (2).

- The lack of appropriate, industry-specific, interactive content and the technical competencies of employees were ranked the highest of the identified barriers where respondents ranked these as a “significant barrier” (2) or “moderate barrier” (2). The lack of support from managers was ranked lowest of the identified barriers where the majority ranked this as “not a barrier” (2) or a “moderate barrier” (2).
- The costs of implementing e-learning initiatives and the appropriate level of access of trainees were ranked the highest of the identified barriers where respondents ranked these as a “significant barrier” (1) or “moderate barrier” (3). The ability to motivate trainees to complete e-learning activities offered and the lack of appropriate content also ranked highly where all respondents ranked this as a “moderate barrier” (4).

Impact of Blended Learning

3.25 Overview:

Organisations are recognising the real benefits derived from training can be enhanced by combining (blending) the personal-touch and peer interactions created in face-to-face sessions with the self-paced on demand attributes provided by e-learning. Increasingly training managers are acknowledging the effectiveness and impact of blended learning.

Rothery, A. (2004). *The EUNIS E-Learning Workshop: Report*. EUNIS

- ◆ From this workshop involving a number European universities three conceptions of blending were discussed and these are summarised below:
 - **Blending of course delivery.** The course of study can consist of a mixture of face-to-face sessions and online activities.
 - **Blending of location.** Activities can be used within a scheduled class-session or they can be carried out by students in independent locations.

- **Blending of resources.** Resources, both digital and human, from different sources in a variety of digital media can be made available to participants.

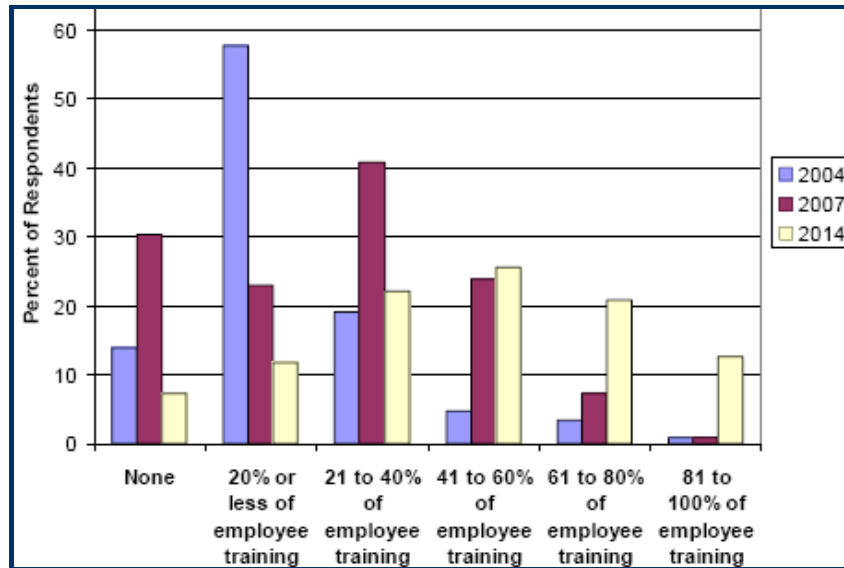
3.26 Perceived Demand

CIPD (2005), *Training and development 2005. Survey Report*. London: Chartered Institute of Personnel and Development Retrieved January 28, 2008, from: <http://www.cipd.co.uk/research/rsrchplcypubs>

- ◆ In comparing data between training and development surveys undertaken between 2002 and 2005, CIPD noted the increasing popularity of 'blended learning' with the increase in the number of respondents who believed that e-learning was more effective when combined with other forms of learning (94% 2005, compared to 63% in 2002). It was speculated, training practitioners had now realised that making e-learning available to unprepared and unsupported learners would be not be effective. It was anticipated the introduction of the human touch would enhance the learning environment.

3.27 Bonk, C., Kim, K and Zeng, T (2006). Future directions of blended learning in higher education and workplace settings in Bonk, C., J. & Graham, C. R. (Eds.). *Handbook of blended learning: Global Perspectives, local designs*. Francisco, CA: Pfeiffer Publishing.

- ◆ This chapter argues blended learning is now a prevalent delivery method in workplace learning settings. It found 86 percent of workplace respondents to the survey were currently implementing blended learning within their organisation. However, it was noted the majority of respondents (58%) were only using blended learning in 20 % or less of their courses.
- ◆ The respondents predicted an increase in their use of blended learning approaches in coming years. For example, 40% predicted that 21-40 % of the courses offered in their organisation would be blended by 2007. By 2013, 60% of respondents anticipated they would offer 40% or more of their courses in a blended format by this time (see Figure 15 below).



[Original Source: Bonk, C., Kim, K and Zeng, T (2006). Figure 2]

Figure 15: Projected growth of blended learning

3.28 Potential Impact

Snipes, J. (2005) *Blended Learning: Reinforcing Results*. Chief Learning Officer (September). Retrieved January 28, 2008, from:

http://www.clomedia.com/content/templates/clo_article.asp?articleid=1070&zoneid=24

- ◆ This study notes the Research Institute of America found that 33 minutes after completion of a course, students retained only 58 percent of the material covered in the class. By the second day, 33 percent was retained, and three weeks after the course, only 15 percent of the knowledge delivered was retained.
- ◆ To improve the effectiveness and impact of training, the study, using the work of Will Thalheimer, listed seven blended instructional principles which would improve knowledge retention and improve performance over classroom training alone by up to 110 % (see Figure 16 below).

Learning Principles	Improvement in Performance Impact
Aligning learning and performance contexts	Up to 55%
Providing retrieval practice and testing	Up to 100%
Using appropriate feedback and schedules	Up to 50%
Prompting meaningful repetition	Up to 110%
Spacing repetitions and practice over time	Up to 40%
Avoiding the addition of distracting elements	Up to 50%
Appropriately using learning objectives	Up to 45%

[Original Source: Snipes, J. (2005) Figure 2]

Figure 16: Performance impact of blended learning

QIA (2007). *Developing flexible delivery using blended learning* The Quality Improvement Agency for Lifelong Learning ('QIA') Retrieved February 1, 2008, from <http://www.qiaemployerled.org.uk/search/Resource-23552.aspx>

Riverside Training and Business Development in Hereford designed a blended learning programme where participants accessed workbooks, question papers and videoed interviews on specific topics on a dedicated website. Participants were then allocated workplace assignments which, on completion, they would e-mail to their assessor. Facilitators found this meant that the face-to-face contact time scheduled was no longer dominated by the laborious task of collecting evidence. Instead, the human contact time provides opportunities to assess the learner's work and to provide feedback.

The feedback from learners has been encouraging as some note;

- ◆ *It serves as an extra point of contact to my assessor; I don't have to wait for him to return my call.*
- ◆ *It gives me the opportunity to upload draft materials and get feedback from my assessor.*
- ◆ *It provided a good opportunity to download the knowledge questions and have them sent back before my next visit.*

4. e-Learning: Effectiveness and Impact

4.1 This section has been divided into six topics;

- Desired impact: documents the perceived benefits accrued by the use of e-learning in industry.
- Benefits of e-learning: stakeholder responses reflect upon the findings of telephone interviews with employees, employers and providers on the potential benefits accrued from e-learning.
- Quality assurance in e-learning reviews the quality assurance processes and procedures used to evaluate e-learning initiatives
- Measuring effectiveness and impact reviews the Kirkpatrick-Philips evaluation model and its potential use.
- Effectiveness of e-learning: stakeholder responses reflect upon the findings of telephone interviews with employees, employers and providers on the perceived effectiveness of e-learning.
- Effectiveness and impact an annotated bibliography uses the levels identified in the Kirkpatrick-Philips model to structure a comprehensive literature review.

4.2 The key themes identified during the review were

- ◆ The perceived benefits of the deployment of e-learning can be seen to cluster around three key concepts (see 4.3 below).
 - **Accessibility and Flexibility:** Employees have offered and have the ability to undertake activities that fit within their personal schedules.
 - **Consistency and Scalability:** Training can be offered to unlimited numbers in a consistent and uniform way.
 - **Sustainable and Cost Effective:** Cost of training will be reduced, compliance training will be monitored and impact of training will be evaluated.
- ◆ The “quality” of the learning experience of participants in an e-learning environment can be directly attributed to the quality of all of the processes used in the creation of the training event. To ensure quality the following need to be monitored.
 - **Firstly**, the processes used in the creation and publication of digital learning materials;
 - **Secondly**, the processes used in the ongoing tutoring/mentoring/supporting of students in e-learning environments;
 - **Finally**, the processes used in the administration of e-learning activities.
- ◆ The evidence from the literature and a review of current business practices indicate a comprehensive measurement model based on modifications to the widely-used Kirkpatrick-Philips evaluation model of satisfaction, learning, impact, results and return on investment as the most appropriate model to use in measuring the impact and effectiveness of e-learning implementations
- ◆ Given there is a relationship between the size of a company and the probability of it being a comprehensive implementer of e-learning, this is notable with larger companies being more likely to use or plan to use e-learning than smaller companies, it maybe appropriate to review and identify other, more simplistic models of evaluation to use for less comprehensive e-learning implementations in small to medium enterprises.

Desired Impact of e-Learning

4.3 Overview:

- ◆ In the literature a number of “benefits” derived from the deployment of e-learning in the workplace have been documented. The benefits can be seen to cluster around three concepts.
 - **Accessibility and Flexibility:** Employers have the flexibility to offer, and employees have the ability to undertake, training that fits their life-style and work schedules in a timely way.
 - **Consistency and Scalability:** Employers are assured all training events scheduled, and supporting materials developed, can be delivered to unlimited numbers of employees in a consistent and uniform way.
 - **Sustainable and Cost Effective:** As the need for physical spaces, employee travel, employee time off work-task and trainer time is refined the total cost of training will be reduced. At the same time compliance training can be monitored and the impact of training evaluated.

4.4 Clayton, J & Elliott, R (2007) *Report 1: A review of the literature: E-Learning Activities in Aotearoa / New Zealand Industry Training Organisations.* Tertiary e-Learning Research Fund, Wellington Retrieved February, 4, from <http://ito.e-learning.ac.nz/>

In this phase one report of a three-phase research project, eight benefits were identified and these are listed below.

- ◆ **Just-in-Time:** The smart use of ICT means learning and training can be delivered, on-site and off-site, to the right person at the right time in the right place. This reduces the period between undertaking the training and application of the knowledge or skills acquired. For example, sales staff could access up-to-date product information to handle customer queries and service staff could access up-to-date manuals to improve quality.
- ◆ **Consistency and Quality:** The material created and level of training delivered to employees, from session to session, from user to user, is consistent and uniform. In

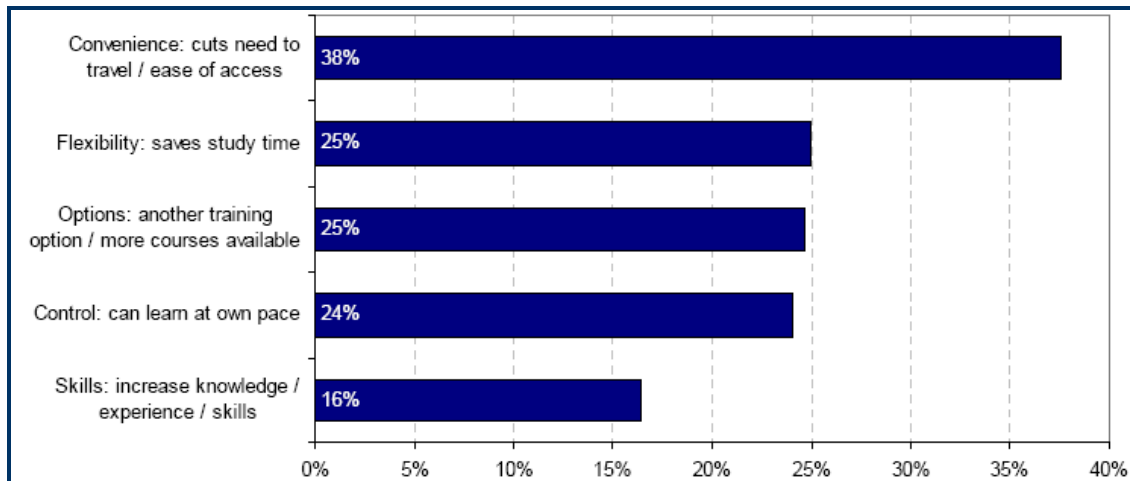
developing an e-learning course it is possible to utilise all the skills and knowledge of all trainers and subject matter experts in the development of high quality material.

- ◆ **Return on Investment:** While e-learning development costs are high, delivery and maintenance costs are relatively low. Therefore, unlike other modes, the per user costs for e-learning can decrease each time the course is used.
- ◆ **Time to Market:** Because e-learning activities can be sequenced, structured and distributed and accessed via the Internet, the training required in the servicing of new initiatives or products can rapidly be deployed, updated and kept current.
- ◆ **Health and Safety:** E-learning simulations allow trainees to safely master skills before applying them in actual, potentially-hazardous situations (such as using flight simulators to train pilots).
- ◆ **Flexible and Continued Access:** The challenge of scheduling training and the financial costs of room hire, travel and accommodation are potentially reduced. E-learning allows participants to access and review the lessons they need at times convenient to their employers.
- ◆ **Team Building:** Teams at distributed and distant locations can share company knowledge and experiences motivating each other and reinforcing the culture and values of the company and promoting the company brand.
- ◆ **Quality Assurance and Compliance Management:** E-learning can allow instant monitoring of the progress of employees in mandatory training. Such monitoring may be critical for areas where there may be legal implications, such as induction training and occupational health and safety training.

4.5 I & J Management Services (2008), *Research Paper No. 2: The role of employers in encouraging e-learning and flexible training delivery* Canberra, Australian Department of Education, Employment and Workplace Relations

- ◆ This report (n=400) is an extension of the e-Learning Benchmarking Project undertaken by the Australian Department of Education, Employment and Workplace Relations. The study investigated employers attitudes to e-learning methodologies. In response to the question, “*Why would you encourage your employees to use e-learning if it was available to them?*” 85% of respondents indicated they would encourage their employees to use e-learning. The highest ranked benefits were the convenience e-learning provided in terms of access and reduction in travel (38%).

Other factors noted were flexibility of time (25%), range of study options available (25%) available, learner control (24%) and building skills, knowledge and experience (16%), (see Figure 17 below).

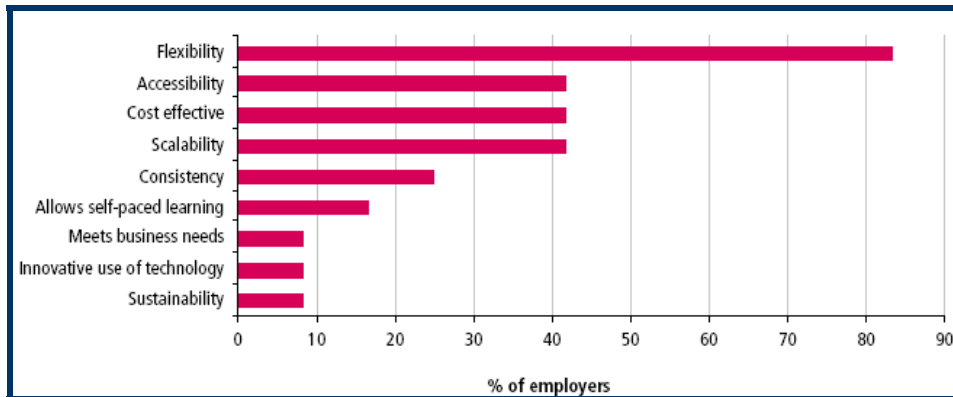


[Original Source: I & J Management Services (2008), Table 1, p3]

Figure 17: Why employers would encourage the use of e-Learning

4.6 Scott-Jackson, W., Edney, T. & Rushnet, C. (2007) *Realising Value from On-Line Learning in Management Development* Chartered Management Institute, Oxford Brookes University.

- ◆ This survey of managers from a range of industries (n=998) indicated the key advantages of on-line learning, identified by employers, reflected the demands of today's workplace. The advantages were grouped around:
 - **Flexibility and accessibility:** (i.e. allowing employees to fit their learning around their job);
 - **Scalability and consistency:** enabling the rapid dissemination of knowledge;
 - **Cost effectiveness:** reducing the cost compared with traditional training approaches.
- ◆ The key advantages identified were, flexibility (over 80%) accessibility, cost effectiveness and scalability (all over 40%). (see Figure 18 below)



[Original Source: CIPD (2005) figure 5, p9]]

Figure 18: Perceived advantages of online learning

Benefits of e-Learning: Stakeholder Responses

4.7 In general the data from stakeholders indicate there are a number of potential benefits to be gained from the use of e-learning. However, the ranking of the benefits differed among the stakeholder groups. For example, all respondents agreed the flexibility provided by e-learning to provide “just in time” training was a significant benefit. However, the reduction of time spent on training was considered more beneficial by employers than any other stake holder group, These results complement the findings of the information presented in the section above. Specifically;

- The flexibility provided by e-learning to allow respondents to undertake training when respondents needed it, at a time convenient to them and at a pace they could monitor and control, was regarded as a “significant benefit” by all respondents (5). Conversely, the reduction in associated costs of training was ranked lowest with a number of employees (4) indicating this was considered as “not beneficial” for them.
- The flexibility provided by e-learning to allow employers to offer training to employees in a timely manner, in a consistent way, at times least disruptive to production schedules were all ranked a “significant benefit” by respondents (4). While all respondents indicated the reduction in costs would be of “significant benefit” a number of respondents (2) noted cost reductions achieved by e-learning had so far not been proven to their satisfaction.

- As with employees, the providers of training (4) indicated the ability of e-learning to allow training to be undertaken when employees needed it, at a time convenient to them and at a pace they could monitor and control, was regarded as a “significant benefit”. Conversely, the reduction in associated costs of training and also the time spent on training was ranked as a “moderate benefit” (2) and “not a benefit” (2).

Quality Assurance in e-learning

4.8 Overview

- ◆ Although the concept of ‘Quality Assurance (QA)’ can be very difficult to define precisely, its critical importance to any organisation is widely accepted. Providers of e-learning modules, trainers delivering e-learning events and employees who participate in e-learning activities, need to be assured the training experiences developed and offered are effective and do what they say they will do. QA is the activity undertaken to provide the evidence needed to establish confidence among all concerned, that quality-related activities are being performed effectively.
- ◆ The quality of the experience of all participants in an e-learning environment can be directly attributed to the quality of all of the processes used in the creation of the training event. For example
 - **Firstly**, the processes used in the creation and publication of digital learning materials;
 - **Secondly**, the processes used in the ongoing tutoring/mentoring/supporting of students in e-learning environments;
 - **Finally**, the processes used in the administration of e-learning activities.

A lack of ‘quality’ during any of the identified processes above will ultimately affect the final e-learning experience of participants.

Nichols, M. (2002). Development of a quality assurance system for e-learning projects. Paper presented at ASCILITE 2002 Conference. Winds of change in the sea of learning: Charting the course of digital education, Auckland, New Zealand. Retrieved February 8, 2008, from: <http://www.ascilite.org.au/conferences/auckland02/proceedings/papers/004.pdf>

eLearning at UCOL

Like many other New Zealand tertiary institutions, UCOL uses a range of e-learning technologies, including a learning management system (LMS), to deliver a range of e-learning events. In reviewing its e-activities the eCampus team identified 5 levels of e-learning. These were:

1. Information Repository – the use of the LMS to store electronic documents.
2. One-Way Communications – the use of the LMS to post announcements/notices to students and to check learner activity.
3. Online Exercises – creation of quizzes and surveys using LMS tools.
4. Two-Way Communications – using LMS tools to enable students to communicate with their instructor and each other.
5. Learning Objects – Learning Objects can be either placed, or hyperlinked to, within the LMS site.

Creating A Quality Process

The eCampus team found the creation of quality assurance procedures were time consuming. It required the creation of procedures that were flexible, self-correcting, consistent, and enabled the realisation of the five levels of eLearning.

After reflecting on an eLearning pilot programme the team created four quality assurance procedures. These were:

1. The **training** process – quality assurance for eLearning levels one to three.
2. The **consultancy and training** process – for development at level four.
3. The **full project** process – used in the development of major learning objects (level five) and development of courses into an RBL (resource-based learning) mode.
4. The **minor / single task project** process – a 'catch-all' process that ensures quality in additional activities such as resource digitisation.

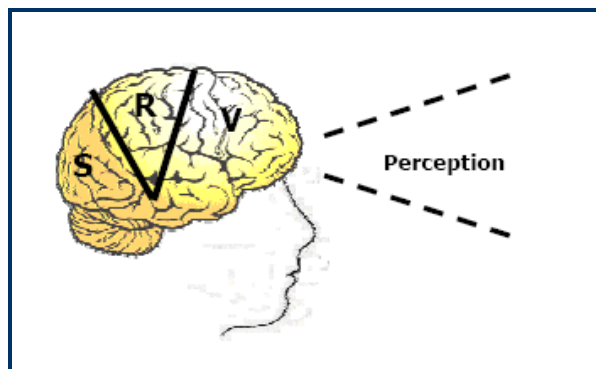
Each identified process was outlined in a detailed activity flowchart with identified steps and clearly defined roles and responsibilities. The team believe the provision of these quality assurance procedures ensures UCOL is in an excellent position to consistently develop high-quality eLearning solutions and learn from its experience.

4.9 Barker, K. (2002). *Canadian Recommended e-Learning Guidelines (CanREGs)*. FuturEd. Retrieved February 8, 2008, from: www.futured.com/pdf/CanREGs%20Eng.pdf

- ◆ The *Canadian Recommended e-Learning Guidelines (CanREGs)* have been designed to help individuals and organisations who want to design, deliver, evaluate or purchase e-learning services or products.
- ◆ The e-learning quality guidelines have been constructed around three segments;
 1. Quality outcomes from e-Learning products and services.
 2. Quality processes and practices in e-Learning products and services.
 3. Quality inputs and resources for e-Learning products and services.

4.10 Scier-MENON Network (2004) *Sustainable Environment for the Evaluation of Quality in E-Learning (SEEQUEL)*. MENON Network EEIG. Retrieved February 8, 2008, from: http://www.education-observatories.net/seequel/SEEQUEL_core_quality_Framework.pdf

- ◆ The *SEEQUEL Core Quality Framework* is a comprehensive rating matrix based on two conceptual building blocks firstly, the users (*subject*) perceptions of quality and secondly, the learning experience (*object*) the user engages in.
- ◆ In reviewing the first building block, the subjects' perception of quality, the SEEQUEL model identifies 3 dimensions, the **S**ector the subject belongs to, the subjects **R**ole in that sector and the subjects **V**ision of the world⁸. This is illustrated in Figure 19 below.



[Original Source: Scier-MENON Network (2004) figure 1, p4]

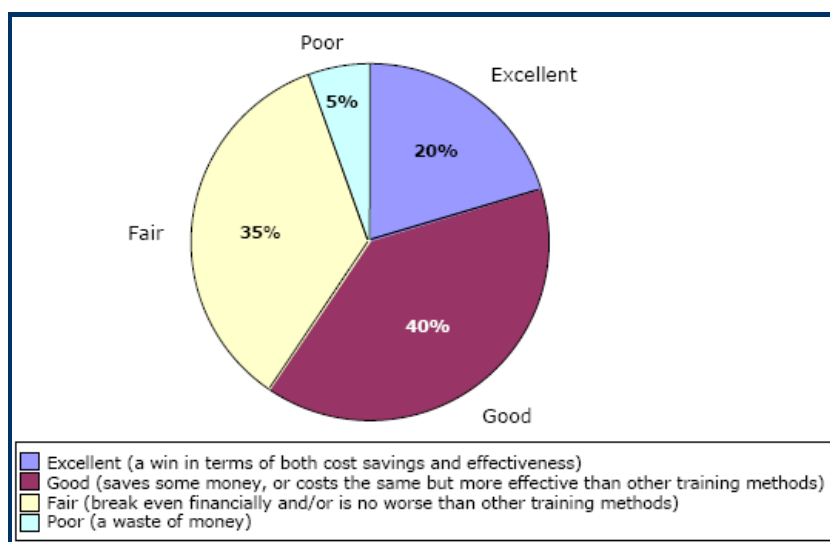
Figure 19: The conceptual logic of SEEQUEL

⁸ The model notes and describes seven *world visions* including worlds of inspiration and opinion, and domestic, civic, merchant and industrial worlds.

- ◆ In reviewing the first building block, the quality of a learning experience, the model argues the way learning can be defined and classified, is dependent on the inherent quality of 3 specific criteria:
 - The learning sources and resources committed (including trainers qualification, learners prior knowledge and content).
 - The process designed and implemented to generate learning results (including planning, delivery and evaluation).
 - The coherence and meaningfulness of the experience with the context in which the learner is working and living (including setting, value systems and legislation).

4.11 Barron, T. (2003). *LoD survey: Quality and Effectiveness of e-Learning.* Learning Circuits, Retrieved February 8, 2008, from: <http://www.learningcircuits.org/2003/may2003/qualitysurvey.htm>

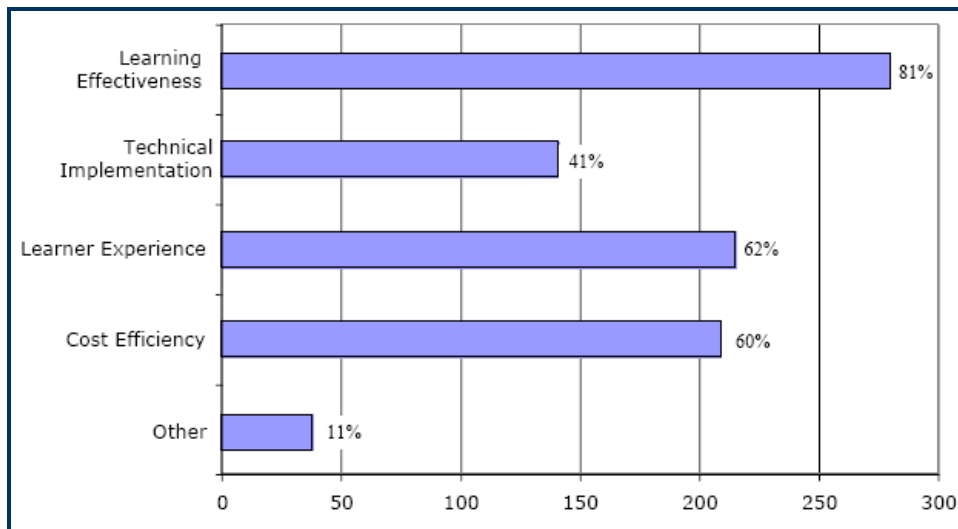
- ◆ This global study (n=350) used a graduated scale to measure respondent perceptions of the quality of their e-learning initiatives. It was found a solid majority of respondents (60%) consider their programs to be “good” or “excellent and only 6% consider it to be “poor” (see figure 20 below).



[Original Source: Barron, T. (2003) figure 7]

Figure 20: Ratings of e-Learning Initiatives

- ◆ In determining how participants defined quality, a list of options including, learning effectiveness, cost efficiency and learner experience were presented and respondents were asked to select those they believed applied. The results indicated “learning effectiveness” (81%), “learner experience” (62%) and “cost efficiency” (60%) were the highest ranked quality indicators. The full results are illustrated in Figure 21 below.



[Original Source: Barron, T. (2003) figure 9]

Figure 21: Defining "Quality" in e-Learning

Measuring Effectiveness and Impact

4.12 Overview

- ◆ Measuring and proving the value of e-learning can be a complex task and, dependent on the “model selected”, perceptions on the impact and effectiveness can vary widely. For example, feedback could be obtained from participants using a perceptual measure (feedback sheet), it could be measured by calculating the total hours of training provided for each employee and/or comparing the dollar cost of different methods of training, or complex rubrics could be developed to evaluate impact of training on the business as a whole.
- ◆ In evaluating the effectiveness and impact of e-learning the two target areas of analysis are the firstly, the individual level investigating competency and accomplishment and secondly, the organisation level investigating strategic

alignment and business impact. At an individual level it is important to ascertain if the employee has “learnt” something from the training provided. For example, have they acquired a new skill, have they modified or changed behaviour, or are they “happier” in their workplace. At an organisational level it is critical to understand how effective the learning and training opportunities presented to employees have improving the organisation. For example has quality of product improved, has the dollar value of sales increased, is there an increase in customer satisfaction, or have staff retention rates increased.

- ◆ While some reports advocate the use of innovative models to evaluate the impact and effectiveness of e-learning implementations In general the literature argues a comprehensive measurement model based on slight modifications to the widely-applied Kirkpatrick-Philips evaluation model would be more in keeping with existing evaluation practices and would be more readily accepted. This Kirkpatrick-Philips model defines five levels of evaluation – satisfaction, learning, impact, results and return on investment.

4.13 Wilson, D. (2004) *Measuring and Proving the Value of Learning*. eLearnity viewpoint paper. Cirencester, UK. Retrieved January 28, 2008, from: <http://www.elearnity.com/index.html>

- ◆ Wilson forcibly argues the Kirkpatrick model is a simple categorisation and communication tool for evaluation of learning events and, although there is universal adoption of the language and levels across the training community, the model is not effectively used, is fundamentally flawed and does not measure the diversity of e-learning that occurs.
- ◆ Wilson proposes a learning scorecard structured upon a “*Learning Portfolio*” of three core segments - core competency development, on-demand learning and project-driven learning - be used as a replacement model, which will capture all learning undertaken by employees.
- ◆ By segmenting learning into three distinct areas it is then possible to develop explicit strategies for measuring value, and align them to the portfolio segments. This is illustrated in Figure 22 below.

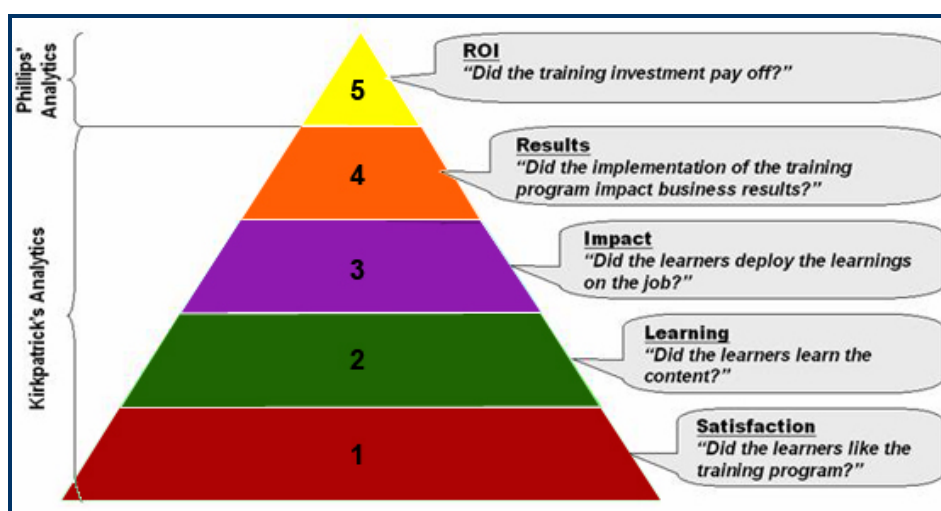
Valuing the Learning Portfolio	Core Competency	On Demand	Project-Driven
Driver	Organisation	Individual	The Business Project
Success	Performing role with requisite knowledge / skills	Addressed specific learning needs	Meeting specific project goals
Level of Assessment	Behaviour	Learning	Performance
Valuation	Organisationally (Human Capital)	Aggregated (Benchmarked)	Directly (Outcomes)

[Original Source: Wilson, D. (2004) p10]

Figure 22: Wilson evaluation model

4.14 Bebington, P. (N.D.), *Learning Analytics Demystified*, Aptech Limited: Retrieved January 28, 2008, from: <http://aptechus.com/article.aspx>

- ◆ In this web-page article Bebington describes the Kirkpatrick-Phillips model as a pyramid comprising five levels. Level one evaluates if learners liked the activities undertaken, level two measures if learners learned from the activities, level three measures how learners have used their learning on task, level four measures the impact on the businesses performance and the last level, five, measures if the investment in training paid off. This is illustrated in Figure 23 below.



[Original Source: Bebington, P. (N.D.) p2]

Figure 23: Kirkpatrick-Phillips Evaluation Model

4.15 Skillsoft. (2005) *What Return on Investment does e-Learning Provide? White Paper*. Skillsoft. Retrieved January 28, 2008, from: <http://www.e-learningcentre.co.uk/eclipse/Resources/costs.htm#d2007>

- ◆ Skillsoft accepts the underlying Kirkpatrick-Philips levels of evaluation provide a methodology for a robust measurement system. They add value to the model by refining the focus of the evaluation undertaken and suggesting actions to be undertaken in the evaluation process. The full model is illustrated in Table 6 below

Table 6: SkillSoft's Modified Kirkpatrick-Philips Evaluation Model

Level of Evaluation	Focus of the Measurements Actions Required to Evaluate the Learning Solution
Level 5: Return on Investment (ROI)	<p>Focus: Specific returns on investment from the implementation of the learning solution with a comparison of the solution's cost to the solution's benefits.</p> <p>Action: Analyze the ROI. Express the business impact including taking into account the program costs, intangible benefits and then use the calculations to make adjustments in future training programs.</p>
Level 4: Business Impact	<p>Focus: Specific business measures that will change as a result of the participants' application of the training.</p> <p>Action: Measure the business impact/benefits. Determine the monetary value of the measured change. Measure intangible benefits (e.g. increased job satisfaction among employees who participated.)</p>
Level 3: Job Application and/or Implementation	<p>Focus: Participants' behaviour that must change as the knowledge and skills are applied in the work setting following the implementation of the learning solution.</p> <p>Action: Analyze skills gained over time to see if on-the-job behaviours changed as result of learning event. Gather data on how employees are using new skills. Identify barriers and enablers, and isolate the effects of the program from other factors that can influence behaviours.</p>
Level 2: Learning	<p>Focus: Specific knowledge, skill(s), and/or attitude(s) to be developed/acquired by the participants.</p> <p>Action: Analyze learning with tests, simulations and instructor evaluations.</p>
Level 1: Reaction and/ or Satisfaction	<p>Focus: Specific level of satisfaction and reaction to the learning solution as it is delivered to the participants.</p> <p>Action: Measure employees' initial reaction, satisfaction and planned action derived from learning event (ex., postcourse survey assessing quality of course.)</p>

[Original Source Skillsoft. (2005) p4]

Effectiveness of e-Learning: Stakeholder Responses

4.16 In general, the data from stakeholders indicate e-learning approaches were perceived to be effective if they were implemented in the right place, explaining appropriate skills, for the right audience. However, the perceptions of the effectiveness and impact of e-learning differed widely within and across the identified stakeholder groups. For example, most respondents thought e-learning approaches were suitable for on-the-job training. However, the perception e-learning was most suited for employees regularly using ICTs in their normal duties was held more widely by providers than any other stakeholder group. In essence the results fit within “level one” of the Kirkpatrick-Philips evaluation model described above. The specific findings were:

- All employee respondents believed CDs / DVDs were effective e-learning technologies to use in industry training. The majority also thought Internet technologies (4) and computer simulations and games (3) could also be effective for identified tasks. In general, employee respondents accepted e-learning was “as good as traditional training methods” with only one respondent indicating this was not the case and two respondents in strong agreement.
- All employer respondents believed CDs / DVDs and Internet technologies were effective e-learning technologies to use in industry training. The majority also thought computer simulations and games (3) could also be effective for identified tasks. As with employees in general, employer respondents accepted e-learning was “as good as traditional training methods” with only one respondent indicating this was not the case.
- The providers of training (4) indicated that all e-learning technologies CDs / DVDs, Internet technologies, computer simulations and games, and mobile devices had a place in industry training. This was very dependent on the task audience and situation and was regarded as a “significant benefit”. Unlike employee and employer respondents, all providers accepted e-learning was “as good as traditional training methods”.

Effectiveness and Impact: Annotated Bibliography

4.17 Overview

- ◆ The following annotated bibliography has been structured upon the Skillssoft adaption of the Kirkpatrick-Philips evaluation model described above. At least one example from the extensive literature available has been provided for each level of the model.

4.18 Level 1: Reaction and/ or Satisfaction: *Specific level of satisfaction and reaction to the learning solution as it is delivered to the participants.*

Cooper, C. (2007) Work-based learner ICT and e-learning survey: Final report Association of Learning Providers and the Learning and Skills Council. Retrieved January 28, 2008, from: http://www.elearningproviders.org/HTML/images/cms/alp_e-learner_survey_final_report.pdf

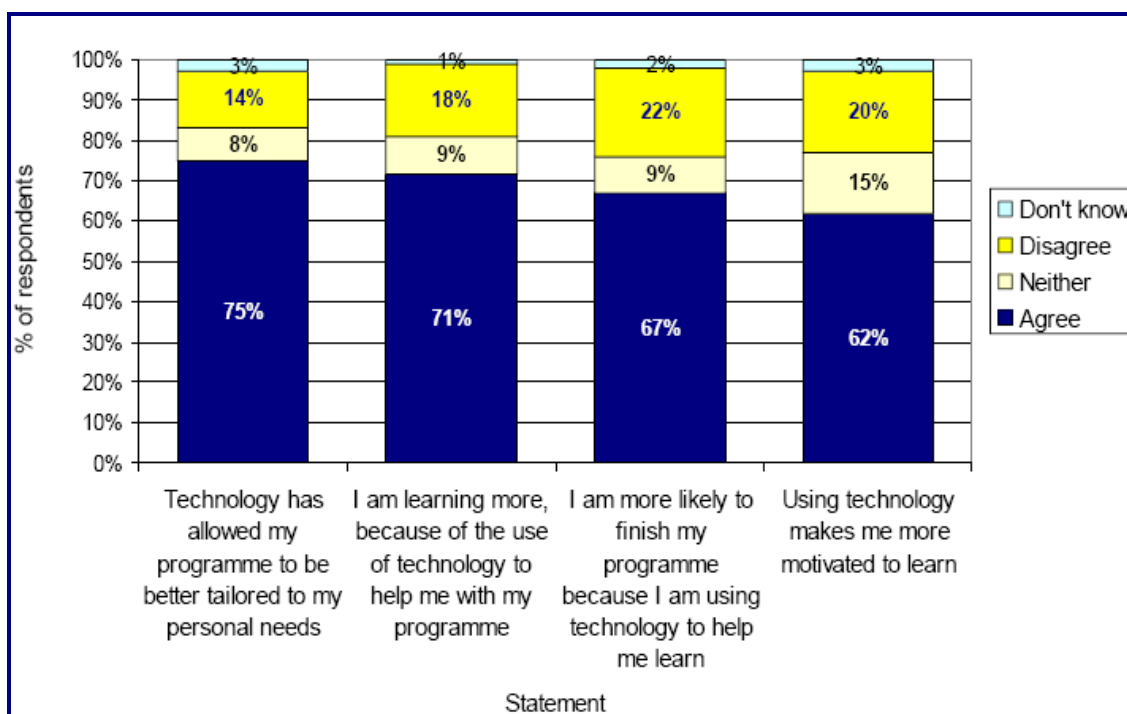
- This survey (n=508), conducted with apprenticeship and entry-to- employment participants found they had the skills and appropriate support to allow them to fully exploit ICT technologies to help with their learning.
- The majority of respondents, especially male, thought ICT had a positive impact on their learning. They were motivated to learn and many indicated the use of technologies would help them complete the courses offered (see Figure 24 below).

Statement	% Agree	% Disagree	% Neither agree nor disagree	% Don't know
I am confident I have the skills to use technology effectively for learning	96%	1%	1%	1%
I am able to get help from my training provider when I have problems using technology	87%	4%	8%	1%
Technology has allowed my Programme to be better tailored to my personal needs	75%	14%	8%	3%
I am learning more, because of the use of technology to help me with my Programme	71%	18%	9%	1%
I am more likely to finish my Programme because I am using technology to help me learn	67%	22%	9%	2%
Using technology makes me more motivated to learn	62%	20%	15%	3%
I would like to use technology more as part of my Programme	53%	24%	22%	1%

[Original Source Cooper, C. (2007) Table 2) pvii]

Figure 24: Students' confidence in using ICTs

- The majority of respondents also indicated the use of technology had a positive impact on their learning. Using technology meant they could learn at times suitable to them and increased their motivation to learn (Figure 25 below)



[Original Source Cooper, C. (2007) Table 2) p31]

Figure 25: Students perceptions of using ICTs in learning

Hoskison, J. (2005) *Valuing Ability: Demonstrating inclusivity in action*: Winner of achieving inclusivity for learners of all aptitudes and abilities e-Learning Awards 2005. e-Skills UK. Retrieved January 28, 2008, from <http://elearning.e-skills.com/index/employer-stories/>

- ◆ British Telecommunications (BT) is a large organisation with a commitment to equality and diversity issues. The company's *valuing diversity* policy aims to ensure that no individual receives unfavourable treatment on any grounds and BT actively encourages the recruitment, development and retention of disabled people.
- ◆ BT recognised equality could be further advanced and a better understanding of the issues faced by disabled colleagues developed by the provision of internal training

courses. As part of the process BT commissioned the creation of an e-learning package called "Valuing Ability".

- ◆ Since the initial pilot, over 7,000 employees have taken the course and from feedback received (n=4000) over 80% were very happy and registered positive feedback on the course, 15% were ambivalent but not critical and only 5% were very negative.

4.19 Level 2: Learning: *Specific knowledge, skill(s), and/or attitude(s) to be developed/acquired by the participants.*

Barbian, J. (2002). Blended works: here's proof! A two-year empirical study confirms that a structured curriculum of blended learning methods will significantly boost employee productivity over single-delivery options. *Online Learning*, 6, 6. p.26 (5).

- ◆ The study focused on teaching elements of Microsoft Excel to three different groups in order to measure on-the-job productivity differences stemming from chosen delivery methods. Group One was offered five Excel scenario-based exercises (SBEs) that provided a realistic business situation--outlined for the learners to attempt by using the "live" Excel application--that could be applied to real-world tasks. This group had access to supporting materials such as the NETg Excel Fundamentals Learning Objects, online mentors--during and after training--FAQs and relevant Web sites.
- ◆ Group Two completed a standard NETg E-Learning Excel Fundamentals course, with no SBEs. The learning objects assigned to the course, however, were the same as those used to create the SBES for Group One. In other words, both forms of training encompassed the same Excel objectives, learning activities and post-assessment items.
- ◆ Like Group One, Group Two had the option of consulting with an online mentor during the training and for the three months post-training. Group Two also could review FAQs, pertinent Web sites, and book links to support the learning events.
- ◆ Group Three received no training and served as a control group to benchmark on-the-job performance.

- ◆ After two years of evaluation, the study concluded that SBEs clearly gave learners an advantage over online instruction alone. Group One (the blended group) showed a 30% increase in accuracy of performance over Group Two (the e-learning only group), and demonstrated 159% more accuracy than the untrained control group, Group Three. In addition, the blended group completed real-world tasks 41% faster than the e-learning group, which, again, demonstrates how the SBEs enhanced the learners' understanding of procedural knowledge.

4.20 Level 3: Job Application and/or Implementation: *Participants' behaviour that must change as the knowledge and skills are applied in the work setting following the implementation of the learning solution.*

Becta (2005, January) Research into the use of ICT and e-Learning for work-based learning in the skills sector: Literature review. Appendix B: Case Studies British Educational Communications and Technology Agency, Coventry.

◆ **Canary Wharf Construction Workers' Learning Centre**

- The aim was to increase participation in training of groups of workers traditionally excluded from learning, especially in health and safety training in the industry.
- The learning design was "blended" with computer-based elements included in every course. The type of e-learning varied from 100 per cent online testing for the Construction Skills Certificate Scheme health and safety test to electronic diagrams for the Body Mapping exercise, Internet research and word processing support as part of completing assignments for the health and safety representative courses. Paper-based manuals with a trade union emphasis supported many of the courses. The blended nature of the learning was important in initiating and sustaining learners' confidence.
- The focus group used to evaluate the project provided a number of examples of success, where workers had progressed from being scaffolders, decorators and joiners to become UCATT site conveners and union officers and/or had taken on further responsibilities in their own union or companies. This had helped construction companies to 'home

grow' supervisors and more senior staff, as opposed to recruiting them from elsewhere. This career progression happened over a number of years.

- One concrete example provided was where one learner helped a team of scaffolders persuade their manager that a method statement (a key piece of health and safety documentation) needed to be produced before the team could resume work, and then helped the team to write one, something he would not have had the confidence or knowledge to do before.

4.21 Level 4: Business Impact: *Specific business measures that will change as a result of the participants' application of the training.*

Harris, P. (2005) Blended Learning Fuels Sales at Toshiba: Learning Circuits. Retrieved January 28, 2008, from: http://www.learningcircuits.org/2005/nov2005/0511_Toshiba_Harris.htm

- ◆ Toshiba University's "Training To Go (TTG)" programme is delivered through a method nicknamed "Training-in-a-Box". All course material and relevant equipment is delivered to dealers, the refrigerator-sized units containing up to 12 WiFi-enabled notebook computers, a wireless network, a LCD projector, and TTG participant materials (workbooks, sales rep guides and introductory CDs). In addition, a professional training team delivers a two-day, hands-on seminar. The blended approach combines synchronous and asynchronous e-learning with workbook-based and classroom learning sessions.
- ◆ The benefits for the dealers and trainers are the multiple methods have increased staff retention rates resulting from the multiple methods approach. For example, using the old methods of training, employee retention rates for new dealers with no product experience averaged 60% at nine months. After undertaking the programme retention rate was 92% after nine months.
- ◆ A follow-up study has also linked learning to increased performance. For example, two acquired companies with equal inventory loads were evaluated. The company completing the programme archived 100% transition to its product line within six

months, compared to a 10-12 month transition realized by the other company prior to the creation of the programme.

Becta (2005, January) *Research into the use of ICT and e-Learning for work-based learning in the skills sector: Literature review.* Appendix B: Case Studies British Educational Communications and Technology Agency, Coventry.

e-Skills into Business (ESiB)

- ◆ The initiative targeted SMEs (with 1 to 250 employees). It aimed to improve the competitiveness and 'bottom line' performances by engaging them in e-learning and helping them to see the benefits of ICT use in their enterprises.
- ◆ Three online tools were used in the project
 - **BAT (Business Analysis Toolkit)**. This was a set of diagnostic tools that enabled firms to work out where they stood in relation to ICT and business development, and where they wanted to be. It included an individualised company action plan detailing how to engage in ICT to benefit their business.
 - **SAT (Skills Assessment Toolkit)**. This helped firms to identify their existing skills and to identify the skills they needed, providing a recommended e-learning training programme to deliver these needs.
 - **LMS (Learning Management System)**. This is a bank of over 200 online courses (in IT, e-business and management) from which companies could choose to meet the needs identified in the SAT.
- ◆ Research in October 2002 for the SEEDA region (South East England) evaluated the impact of ESiB on businesses and found the following:
 - 78 % of businesses thought the ESiB process would add value to the way they worked.
 - 65 % of the SAT users said their organisation would adopt the training outcomes identified.
 - 58 % of the BAT users said the toolkit had had *no* impact on their business to date, and only 19% said that it had already had an impact.

However, many of the businesses believed that the impact of the ESiB process would take another year to be fully experienced.

4.22 Level 5: Return on Investment (ROI): *Specific returns on investment from the implementation of the learning solution with a comparison of the solution's cost to the solution's benefits.*

Walliker, P. (2005) *Cost Comparison: Instructor-Led Vs. E-Learning*: Learning Circuits. Retrieved January 28, 2008, from: <http://www.learningcircuits.org/2005/jun2005/walliker.htm>

- ◆ Walliker regards programme cost, which includes, the cost of development, time, material, travel, and opportunity cost, as varying widely for similar programmes depending on the delivery method. His institution, a corporate University of Caterpillar, has developed a mathematical model to compare methods of delivery. The factors included in the model are
 - development cost per hour of instruction
 - instructor cost per hour of instruction
 - instructor preparation time and post-class activity time
 - instructor travel costs
 - learner opportunity costs.

- ◆ The key finding of this study is e-learning is less expensive to deliver almost regardless of learner population. For example, with a class size of 100 and a class as short as one hour, e-learning was 40 percent less expensive than instructor-led training when learner opportunity costs were taken into account (\$9,500 vs. \$17,062). With larger classes and longer programmes the cost advantage of online learning over instructor-led training is even more pronounced, with savings as high as 78 percent.

Snipes, J. (2005) *Blended Learning: Reinforcing Results*: Chief Learning Officer (September). Retrieved January 28, 2008, from: http://www.clomedia.com/content/templates/clo_article.asp?articleid=1070&zoneid=24

- ◆ This study argues blended learning solutions, if implemented properly, can reduce total training costs by the reduction in the expense of materials and facilitation

services such as venues and trainers, as well as intangible costs (such as time off the job).

- ◆ Combining the findings of two studies, the first involving senior managers and the second based on the US Navy, a model was developed (see Figure 24 below) to demonstrate the savings generated and the performance improvement anticipated of blended over traditional classroom learning. The results indicate organisations have a potential ten fold return on their investment.

2 Days of Classroom Training			Blended
Training Component	Cost per Learner	Total Cost	Total Cost
Training, Design, Project Mgmt	\$250	\$250,000	\$50,000
Learner Materials	\$275	\$275,000	\$175,000
Facilitation Services	\$175	\$175,000	\$75,000
Travel/Accommodations/Meals	\$500	\$500,000	\$0
Sub-Total: Hard costs	\$1,200	\$1,200,000	\$300,000
Employee Time off the Job	\$800	\$800,000	\$400,000
Total Cost of Investment	\$2,000	\$2,000,000	\$700,000
Performance Improvement		2%	7%
Value of Increase in Productivity	(\$100k salary)	\$2,000,000	\$7,000,000
Return on Investment (ROI)		none	10x

[Original Source Snipes, J. (2005) Figure 4 p58]

Figure 26: Cost benefits and impact of blended learning

5. Conclusions and Future Directions

5.1 This section has been divided into three sub-topics.

- Overview places the review in context.
- Report review lists the main findings of the project.
- Future activities outline the three remaining phases of the project.

Overview

5.2 In response to the STEP (Statement of Education Priorities 2008-2010) outlined in the Tertiary Education Strategy 2007-2012 this project was commissioned in 2007. Its primary focus is on the role of e-learning in building workforce capability with a particular focus in this context on numeracy, literacy and the increased uptake and completion of advanced trade qualifications. This study is the first report of the project, *Using e-learning to build workforce capability: A review of activities* prepared by staff at the Emerging Technologies Centre at Waikato Institute of Technology

5.3 In the current evolving economic environment, developing and implementing effective processes, procedures and plans to improve the skills and capability of employees are seen as central to improving individual, organisational and national performance and global competitiveness. The flexibility provided by e-learning communication tools and presentation software applications is seen to be critical in providing the right skills training, to the right person, at the right time, in the right place.

5.4 This report, *Overview of work-based and work-placed e-learning landscapes*, presents the findings of the first phase of the three-phased research project. It provides an overview of the literature, national and international, of e-learning initiatives and implementations focused on building workforce capability nationally and internationally. Supplementing this overview is data gathered from structured telephone interviews with a limited number of key stakeholders to ascertain the level of demand from employers, providers and employees, for ICT and e-learning off-the-job and on-the-job within New Zealand.

Report Review

5.6 Although there are a limited number of reviews available on the current state of training in New Zealand industry and business, those produced contain sufficient data to provide a comprehensive understanding of the current provision of business training in New Zealand. They indicate over 85% of New Zealand businesses provided training for their employees with the underlying drivers being to improve business performance and customer satisfaction. The predominant forms of training offered are in health and safety, trade and professional skills and computer training. The least predominant form of training offered is in literacy and numeracy.

5.7 Between 2004 and 2006 there has been significant growth in the use of computers and the Internet in both households and business with seven out of ten New Zealand households and nine out of ten businesses having ready access to computers with nearly two thirds of households and ninety percent of businesses being connected to the Internet.

5.8 The use of the Internet for education or study was most noticeable amongst 15–19 year olds (55%) and to a lesser extent 20-24 (39%) year olds age groups. People over sixty (14%) were the least likely to use the Internet for educational purposes.

5.9 Large firms (over 100 employees) were more likely to provide staff training using the Internet with small firms providing minimal training in this medium. Service industries, (such as financial and communication service), were more likely to provide staff training using the Internet than the primary sector, manual trades, and the manufacturing sector.

5.10 In trade-training, the use of ICT to present content (for example videos, simulations, animations and workbooks), to facilitate assessments and encourage interaction through asynchronous and synchronous internet based communication tools (for example video conferences, white boards, forums and quizzes) are challenging the traditional training approaches, including the “apprenticeship model”, where a significant portion of learning is “classroom-based”.

5.10 When e-learning applications are used in trade-training activities most respondents enjoy the experience. They find the use of personal devices and communication tools (the Internet, desktop and laptop computers, digital cameras and e-mail) enhance their learning environment.

5.11 From the literature the most common form of e-learning presentation technologies used are CD-ROMs, off-the-shelf e-learning modules, and bespoke organisation specific e-modules. The most common form of e-learning communication technologies, used are e-mail, telephone, asynchronous discussion sites and synchronous learning events.

5.12 An extensive review of the literature indicated a varied demand for e-learning applications and implementations. In fact, one study demonstrated the responses to two separate surveys indicated the use of e-learning applications decreased, from 54% in 2005 to 48% in 2007. The most realistic view of the perceived demand e-learning is the reported documentation of the steady decline of classroom-based activities (from a high 78% in 1999 to a projection of 53% in 2006, a decrease of 25%) and the steady growth of technology-based training, (from a low of 14% in 1999 to a projection of 40% in 2006, an increase of 26%).

5.13 The key business drivers for e-learning growth in industry training are focused on:

- **Information Overload:** There is an ever increasing amount of information, (organisational individual, trade and professional), employees need to be aware of to complete their tasks successfully.
- **Technological Innovation:** The rapid rate of change in production, informational and communication technologies impacts on work practices and this impact needs to be managed in a consistent and timely manner.
- **Return on Investment:** The provision of training to improve performance at an individual and at the organisational level must be done economically and efficiently.

5.14 The perceived critical factors at three identified levels are:

- **Organisational:** Leaders within organisations, as well as actively supporting e-learning deployments, need to develop strategies and plans to encourage e-learning initiatives and measure their effectiveness.
- **Training:** Trainers need to believe in the effectiveness of e-learning methodologies, have ready access to engaging, well designed, visually appealing and authentic content and be able to measure the impact of e-learning implementations on participant performance.
- **Learning:** Learners need ongoing support and motivation to continue to participate fully in e-learning activities. They also need to acquire sufficient technological skills and learning strategies to feel comfortable in the e-learning environments created.

5.15 The three factors identified as impediments to the uptake of e-learning are.

- **Connectivity** (infrastructure and affordable access to the Internet)
- **Capability** (skills, confidence and recognition of value in using the Internet)
- **Content** (relevant, useful and accessible information and services online. Content created should be interactive and engaging)

5.16 The benefits of the deployment of e-learning can be seen to fit within three key concepts, these are;

- **Accessibility and Flexibility:** Employers have the flexibility to offer and employees have the ability to undertake training that fits their life-style and work schedules in a timely way.
- **Consistency and Scalability:** Employers are assured all training events scheduled and supporting materials developed can be delivered to unlimited numbers of employees in a consistent and uniform way.

- **Sustainable and Cost Effective:** As the need for physical spaces, employee travel, employee time of work-task and trainer time is refined the total cost of training will be reduced. At the same time compliance training can be monitored and the impact of training can be evaluated.

5.17 Increasingly “blended learning” is becoming the prevalent delivery method in workplace learning settings. The three conceptions underpinning blended learning are:

- **Blending of course delivery.** The course of study can consist of a mixture of face-to-face sessions and online activities.
- **Blending of location.** Activities can be used within a scheduled class-session or they can be carried out by students in independent locations.
- **Blending of resources.** Resources, both digital and human, from different sources in a variety of digital media can be made available to participants.

5.18 While some reports advocate the use of innovative models to evaluate the impact and effectiveness of e-learning implementations In general the literature argues a comprehensive measurement model based on slight modifications to the widely-applied Kirkpatrick-Philips evaluation model would be more in keeping with existing evaluation practices and would be more readily accepted. This Kirkpatrick-Philips model defines five levels of evaluation – satisfaction, learning, impact, results and return on investment.

Future Activities

5.19 The report was designed to inform the future activities scheduled to be undertaken as the research project matures. The immediate future reporting activities anticipated in this project are:

- ◆ **Phase Two:** *Examples of work-based and work-placed e-learning in action.* This will include
 - A selected review and publication of successful national and international examples of e-learning initiatives in building workforce capability; these to include evidence of up-skilling in numeracy and literacy and how e-learning has contributed to the achievement of advanced trade, technical

and professional qualifications to meet regional and national industry needs.

- Data will be collected through a web-based questionnaire, focus groups and/or individual interviews and with stakeholders to ascertain the perceptions of industry leaders of the efficacy of using e-learning to build workforce capability

◆ **Phase Three: Case Studies.** This will include

- Case studies will be conducted with industry partners, focusing on the use of e-learning as a training mode.
- Each case study will cover one distinct firm, and the mix of case studies will be drawn from firms with different characteristics (e.g. size (small, medium and large enterprises), industry/sector (e.g. primary, manufacturing and service)).
- The case studies will highlight either participant perceptions of the effectiveness of the e-learning delivered in building workforce capability, **or** participants, perceptions of why other learning modes were preferred / selected to deliver training.
- Particular attention will be paid to how participants believe e-learning has contributed to the provision of advanced trade, technical and professional training to meet their needs.

◆ **Phase Four: Final Report.**

- A final report will be produced describing the current use of e-learning in industry within New Zealand.
- This report will include recommendations on activities to be undertaken to promote and embed the use of ICT and e-learning applications in building workforce capability.

5.20 The project team will also create and deploy an online interactive Web-space including a searchable database of industry leaders and training managers in New

Zealand with an interest in e-learning initiatives. While this web-space will primarily be used as a research tool, it will also be used to:

- inform stakeholders of developments in, and results obtained from, the various phases of the research project;
- be a *resource warehouse* of reports and findings from studies in industry and vocational e-learning initiatives nationally and internationally; and
- be used as an area to potentially facilitate industry collaboration in e-learning activities.

5.21 The importance of effective levels of numeracy and literacy as precursors to the development of high level ICT skills has been acknowledged. The initial review of education and training in industry has not revealed courses and programmes specifically targeted at developing literacy and numeracy skills in employees. The issues associated with numeracy and literacy skills will be examined in some detail throughout the next phases of this project. The intent will be to highlight any case studies that support the development of employee numeracy and literacy and any other evidence that shows positive outcomes from numeracy and literacy education and training initiatives.

5.22 It is increasingly recognised there is a shortage of a skilled, trade qualified, population in New Zealand. This lack of a trade qualified personnel is making it increasingly difficult for New Zealand to compete successfully within a global economy. It appears traditional training methods, where large amounts of training occurs in the classroom, are being challenged and alternative models of skills based training, including e-learning alternatives, are being investigated. The review and e-learning initiatives in trade-training will be examined in more detail throughout the next phases of the project.

Summary

5.23 Finally, this study was not designed to be a full listing of all the available reports, articles, case studies, surveys and conceptual theories on e-learning in the on-the-job, off-the-job e-learning activities. Instead, it should be regarded as a resource guide for industry leaders, training personnel and learners to refer to in identifying issues to be addressed when they begin the journey of introducing e-learning as a training mode.

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6.2 Appendices

6.2. APPENDIX 1: Structured Interview Guidelines

◆ Overview

- Since the structured telephone or face-to-face interviews with the three identified stakeholders (employees, employers and providers) were to be undertaken by different members of the research team a series of formal “interview templates” were produced to ensure
 - a consistency in approach,
 - all focus areas were adequately covered and;
 - data collected could be collated around the key themes identified.
- The templates were designed around a “base template” (see employer template below) to explore the participant’s existing use of e-learning. It contained four sections - background, current use of e-learning, the potential demand for e-learning and the perceived effectiveness of e-learning.
- A small number of questions were changed to meet the specific needs of identified stakeholders. For example, “*Which industry “category” would you say best describes your organisation*” in the employer template was replaced by “*Which provider “category” would you say best describes your organisation*” in the provider template.
- Words and terms were adjusted to match the respondent stakeholder. For example, the term *your organisation* in the employer and provider interviews was replaced by *you* in the employee interview.
- However, these minor changes did not alter the inherent structure of the template designed.

Base Template

Introduction

As part of the government's Tertiary e-Learning Research Funded projects for 2008, the Ministry of Education is supporting research examining the role of e-learning in building workforce capability to meet regional and national industry needs.

The aim of the project is to produce a series of research reports culminating in a final research report, which will increase awareness in the industry of the development and delivery of effective, cost efficient and educationally sound work-based (off-the-job) and work-placed (on-the-job) e-learning. This brief interview is part of phase one of the project providing an overview of e-learning in industry in New Zealand. We anticipate this structured interview will take no more than 15 minutes of your time.

Please be aware all of the information we obtain from you during this interview will remain confidential to the research team. Information collected will only be reported to third parties in a summary or aggregate form that will ensure your confidentiality and anonymity. Two years after the completion of the project the original data will be destroyed.

Section 1: Background

1.1 Which industry / provider "category" would you say best describes your organisation? (Interviewer will circle the response).

Agriculture, Forestry, Fishing	Finance, Insurance
Mining	Property, Business Services
Manufacturing	Government Admin (including Local
Electricity, Gas & Water Supply	Government)
Construction	Education
Wholesale Trade	Health, Community Services
Retail Trade	Culture, Recreation Services
Accommodation, Hospitality, Restaurants	Personal & Other Services
Transport, Storage	ICT / Web Services
Communications Services	Multi-Media Production (Videos/Games)
Computer Industry,	Other (please
Telecommunications	specify)_____

1.2 Approximately how many people does your organisation currently employ? (Interviewer will circle the response).

0 - 5 6 - 9 10 - 49 50 - 99 100 - 1000 1000+

1.3 Does your firm currently provide skills training and / or personal development for your employees? (Interviewer will circle the response).

Yes Some No

Section 2: Existing use of “e-learning”.

Off-the-job training: for the purpose of this research project, “off –the-job’ training refers to authentic, evidence-based learning activities and tasks designed and provided for workers at locations other than their normal place of work. Off-the-job learning resources are normally designed in context with the worker’s current working practices. This is also known as “work-based” learning.

‘On-the-job’ training: For the purpose of this research project “on-the-job” is structured learning that occurs within the learner’s normal working environment. This is also known as “work-place” learning.

e-Learning: For the purpose of this research project e-learning refers to the provision, administration and support for “off-the-job” and “on-the-job” training using information and communication technologies such as, stand-alone and networked computers, Internet-based technologies and mobile devices.

Reflecting on these definitions

2.1 What proportion of your organisations employees do you estimate participated in e-learning activities in off-the-job / work-based learning in **2007**? (Interviewer will circle the response).

Nil: <10% <30% <50% <80% 100%

2.2 What proportion of your organisations employees do you estimate participated in e-learning activities in on-the-job / work-place learning in **2007**? (Interviewer will circle the response).

Nil: <10% <30% <50% <80% 100%

(If response is “Nil” proceed directly to 2.5)

2.3 What e-learning technologies did **your organisation** use in off-the-job / work-based training in **2007**? (Interviewer will circle the response(s)).

CDs / DVDs	Computer simulations and / or games
Internet-based Technologies	Mobile devices
Other Technologies (Please describe)	

2.4 What e-learning technologies did **your organisation** use in on-the-job / work-place learning in **2007**? (Interviewer will circle the response(s)).

CDs / DVDs	Computer simulations and / or games
Internet-based Technologies	Mobile devices
Other Technologies (Please describe)	

3.3 What e-learning technologies do you anticipate **your organisation** will use in off-the-job / work-based training in 2008? (Interviewer will circle the response(s)).

CDs / DVDs	Computer simulations and / or games
Internet-based Technologies	Mobile devices
Other Technologies (Please describe)	

3.4 What e-learning technologies do you anticipate **your organisation** will use in on-the-job / work-place learning in 2008? (Interviewer will circle the response(s)).

CDs / DVDs	Computer simulations and / or games
Internet-based Technologies	Mobile devices
Other Technologies (Please describe)	

3.5 What, in your opinion, could be the benefits of implementing of e-learning activities in **your organisation** in **2008 and beyond**? (Interviewer will circle the response(s)).

a. e-Learning allows "just in time" training to be offered

Significant Benefit	Moderate Benefit	Not a Benefit
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b. e-Learning assures there will be a consistency in the delivery of training

Significant Benefit	Moderate Benefit	Not a Benefit
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c. e-Learning will help reduce overall costs of training for the organisation

Significant Benefit	Moderate Benefit	Not a Benefit
----------------------------	-------------------------	----------------------

d. e-Learning will provide a degree of flexibility in scheduling training events

Significant Benefit	Moderate Benefit	Not a Benefit
----------------------------	-------------------------	----------------------

e. e-Learning will help reduce the overall time it takes to deliver training in the organisation

Significant Benefit	Moderate Benefit	Not a Benefit
----------------------------	-------------------------	----------------------

f. e-Learning allows employees to complete activities at their own pace, anywhere at anytime

Significant Benefit	Moderate Benefit	Not a Benefit
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3.6 Any further detail which the respondent wishes to add, to highlight any particular area or areas not fully addressed, will be entered in the box below.

Section 4: The perceived effectiveness of “e-learning”.

4.1 To what extent would you agree with the statement “*e-learning is as good as traditional training methods?* Please circle the response.

Strongly Disagree **Disagree** **Agree** **Strongly Agree**

4.2 To what extent would you agree with the statement “*e-learning is most suited to work-based (off-the-job) activities?* (Interviewer will circle the response).

Strongly Disagree **Disagree** **Agree** **Strongly Agree**

4.3 To what extent would you agree with the statement “*e-learning is most suited to work-placed (on-the-job) activities?* (Interviewer will circle the response).

Strongly Disagree **Disagree** **Agree** **Strongly Agree**

4.4 To what extent would you agree with the statement “*e-learning is most suited for employees regularly using ICTs in their normal duties?* (Interviewer will circle the response).

Strongly Disagree **Disagree** **Agree** **Strongly Agree**

4.5 To what extent would you agree with the statement “*e-learning is not suitable for the teaching of practical skills to employees?* (Interviewer will circle the response).

Strongly Disagree **Disagree** **Agree** **Strongly Agree**

4.6 Which of the following e-learning technologies do you think are most suitable for e-learning in your organisation? (Interviewer will circle the response(s)).

- | | |
|--------------------------------------|-------------------------------------|
| CDs / DVDs | Computer simulations and / or games |
| Internet-based Technologies | Mobile devices |
| Other Technologies (Please describe) | |

4.7 Any further detail which the respondent wishes to add, to highlight any particular area or areas not fully addressed, will be entered in the box below.

6.3 Appendix 2: Glossary of Terms

Term	Definition
Asynchronous	Asynchronous communication is interaction that occurs in nominal time.
Blended Learning	Blended learning can be described as a design approach thoughtfully combining traditional methods to on-the-job and off-the-job training with e-learning applications.
Computer-Based Training	An electronic self-paced learning activity. Media-Rich content and learning activities are generally stored on a CD-Rom, DVD or memory stick.
Competency Based Training	Competency-based training is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training.
Distance learning	Education in which the majority of the instruction occurs when student and instructor are not in the same place. Distance education may employ correspondence study and/or audio, video, or computer technologies.
Distributed learning	A student-centred approach to learning that incorporates the use of technology in the learning process.
e-learning	In this report e-learning refers to the provision, administration and support for 'off-the-job' and 'on-the-job' training using information and communication technologies such as stand-alone and networked computers, Internet-based technologies and mobile devices
Flexible learning	The provision of a range of learning modes or methods, giving learners greater choice of when, where and how they learn.
Instructional design	The systematic process of translating principles of learning and instruction into plans for instructional materials and activities.
m-learning	In essence Mobile Learning (m-learning) refers to the use of electronic devices, generally small, hand-held, portable and wearable, in formal and informal learning activities.

Off-the-job learning	For the purpose of this research project, off-the-job learning refers to authentic, evidence-based learning activities and tasks designed and provided for workers at locations other than their normal place of work. Off-the-job learning resources are normally designed in context with the worker's current working practices. This is also known as “work-based” learning.
Online learning	Learning occurring where education and training are delivered and supported by networks such as the Internet or intranets. Learners are able to learn at any time and any place.
On-the-job learning	On-the-job learning is structured learning that occurs within the learner's normal working environment. This is also known as <i>work-place</i> learning.
Stakeholder	Any organisation, group or individual with an interest in an enterprise.
Synchronous	Synchronous communication is interaction and communication that occurs in real time.
Web-Based Training (WBT)	Self-paced learning activity using the infrastructure of an intranet or the Internet. Media-Rich content and learning activities are generally accessed through a web browser.
Web-portal	Provides a 'gateway' to a range of resources and material related to a specific discipline or organisation. In addition, facilities such as synchronous and asynchronous managed forums, email and discussion groups, are provided to enable communication and interaction between authenticated users.
Web-tools	Applications that function as Web-based resources These include chat, e-mail, forums, instant messaging, VoIP (for virtual discussions), digital content creation tools such as Wikis, Blogs and Web-folios
Web-space	Provides access to a range of materials and resources on the Web that are specific to a particular discipline or organisation.