December 2005

E-education - Keys to Success for Organisations

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Abstract

Fundamental to success of organisations in the knowledge economy is how such organisations cultivate learning and retain knowledge. E-learning can aid an organisation in developing its knowledge base (Harun, 2002; Wild et al. 2002). E-learning is instructional content or learning experience delivered or enabled by electronic technologies. For e-learning to become a core part of the training strategy of organisations they need to be clear of the business benefits it delivers (Acton and Golden, 2001; Little, 2001; Mann and Robertson, 1996; Young, 2002). However, research indicates that instructor-led training is still the most popular and most used training method within organisations (Acton and Golden, 2001; O'Donnell and Garavan, 2003).

This paper presents a study that identifies key areas where organisational knowledge transfer through electronic modes of education can out-perform and surpass more traditional methods. In particular the study compares e-learning with traditional instructor-led classroom training with respect to learner goals, as well as identifying conditions under which 'e' methods benefit the organisation. Findings indicate that when organisational strategic goals are aligned with a managed approach to knowledge transfer, and when employee requirements are identified and central to training procedures, 'e' delivery of training can increase the knowledge base and improve employee satisfaction and competencies.

Keywords: Training, E-Education, E-Learning

1. Introduction

In the knowledge economy, to maintain competitive advantage organisations must continuously innovate and utilise knowledge to create new and better-quality goods and services. Learning is regarded as a vital component in the knowledge building process. Stemming from the influence of new technologies, competitive global markets and the new labour force there is a continuing and growing demand for learning in the organisation (Strand and Thune, 2003). Further, with the potential to enhance an organisation's performance through the alignment of learning with business strategy, a formal system must exist in organisations to manage the learning process (Cheong, 2001; Beamish et al., 2002; Hughey and Mussnug, 1997). Should such systems fail, or be sub-optimal, business strategies may be detrimentally impacted, and competitive advantage lost.

2.   Theory

2.1   Knowledge and Learning

The most formal system of acquisition of new knowledge and skills utilised by organisations is 'training': the activity of "learning the skills, knowledge, and attitudes required initially to perform a job or task or to improve upon the performance of current job or task" (Nadler and Wiggs, 1986, p4).   The drive to stay one step ahead of the competition obliges organisations to invest in employee training. Training can aid organisations maintain competitiveness, increase employee satisfaction, facilitate the updating of skills and strengthen employee commitment to the organisation (Bushardt et al., 1994; Hughey and Mussnug, 1997).   Employees undertake training to increase their skill level, improve their career prospects, and acquire knowledge (Acton and Golden, 2001).   Training becomes one managed form of organisational operationalisation of the delivery of learning and a vehicle for knowledge transfer (Changchit, 2003).   When effective, it increases organisational levels of explicit (and to a lesser extent, tacit) knowledge.

There are many types of training; one of the oldest and most accepted methods is classroom-based instructor-led training (Wehr, 1988).   Such training involves a 'unidirectional flow of information-transmission from instructors to learners' (Callahan et al., 2003, p665), and can be an effective method of knowledge transfer.   Operationally, a guiding instructor is present to answer questions or address problems that may arise (Wehr, 1988). Indeed such classroom-based instruction-led training involves a deductive approach to learning, where the learner has little control over the process (Simon et al., 1996): in such environments learners lack sequence and pace control available in some implementations of e-learning, whereas in the latter learners may lack control in terms of seeking clarification on material (from remote or non-existent instructors).

E-learning is a more recent approach to the delivery of knowledge, offering the learner more control over the learning process.   In its broadest definition e-learning can be defined as "instruction delivered via all electronic media including the internet, intranets, extranets, satellite broadcasts, audio/video tape, interactive TV, and CD-ROM" (Govindasamy, 2001). At perhaps the opposite end of a training delivery spectrum e-learning may involve a unidirectional dissemination of material such as pre-recorded instructor-delivered lessons with little or no learner interactivity.   Alternatively the term 'e-learning' may also describe synchronous instructor-delivered lessons where the instructor is located at a different physical location to the audience. Fundamentally, e-learning has existed before internet technologies began to be employed.   It was previously known as computer-based training where content was stored in floppy disks and later in CD-ROMs.   Web-based e-learning is an evolved version, taking advantage of the benefits of global accessibility and internet technologies such as markup languages, web-based tools and browser ubiquity (Cheong, 2001).

As an enabler of innovation, knowledge creation and organisational learning, e-learning offers an important potential to organisations given the ability for a wider application of the training function (Beamish et al., 2002).   Some organisations have moved away from the traditional focus on training to focus on e-learning within the perspective of knowledge management (Ismail, 2002).   Corporations are realising that e-learning has many of the same elements as knowledge management processes, that is, knowledge generation (including acquisition, creation, capture, and adoption), as well as knowledge storage, distribution and application.   As such, e-learning can be used as a tool for knowledge management.

Key to the success of knowledge management is efficient knowledge transfer: the process by which one unit (a group, department or division) is influenced by experiences (Karlsen and Cottschalk, 2003, p112). Knowledge transfer arises at various levels in an organisation: between individuals; from individuals to explicit sources; between groups; and from the group to the organisation (Karlsen and Cottschalk, 2003). Increasing the effectiveness and efficiency of the transfer of knowledge from one source to another is an important matter for organisations (Changchit, 2003; Karlsen and Cottschalk, 2003). Knowledge transfer channels can be informal or formal, personal or impersonal. Information Technology, and in particular e-learning, can play an important role in supporting all these channels, as well as providing a mechanism for increased explicit knowledge in the organisation (Changchit, 2003).

2.2   E-Education and Traditional Approaches

One difference with e-learning compared with traditional methods of knowledge transfer is the medium over which instruction is transmitted and knowledge delivered. E-learning is delivered over electronic media while traditional methods are presented to learners via a physically-present instructor (Hamid, 2001). An advantage of traditional classroom-based instructor-led training is that the instructor has complete control over the learning environment, adapting and changing components as needed. Particularly in asynchronous e-learning environments this ability to adapt or change is no longer available. In e-learning however, although an instructor may be divorced from the learner, e-learning offers learners more control over their instruction (Cheong, 2001; Hamid, 2001; Hughey and Mussnug, 1997; Zhang and Zhou, 2003).

Traditionally, instructors dictate learning times. In comparison, e-learning can allow learners to determine their own learning schedule (Cheong, 2001; Zhang and Zhou, 2003). In learner-controlled environments, responsibility shifts from the instructor to the learner, they now control important features of instruction, for example, practice time and time spent on tasks (Brown, 2001). This shift of control can have positive or negative consequences depending on how learners utilise the opportunity. The possibility that e-learners might make choices that limit their learning is an important consideration for training designers and managers (Brown, 2001; Rossett and Schafer, 2003) The effort exerted by the learner, practice level and time spent on a task may explain variances in knowledge gain: at its simplest the more time learners practise and spend on a task the more knowledge they gain (Brown, 2001). As a result, to prevent e-learners from quitting their e-learning sessions, programs must guide them in making the right choices. E-learners often make poor choices when they have control over their training; the challenge is to find a balance between choice and direction (Rossett and Schafer, 2003).

An important quality of instructor-led training is the opportunity it provides for learners to interact with each other socially through classroom discussions and break-time conversations. Even though some emerging technologies (for example online chat) can support interaction the actual human contact and relationship building gained from traditional learning is not easily replicated in a digital environment (Heathman and Kleiner, 1991). Indeed e-learning may result in isolation of workers from each other with the social aspect of learning lost (Heathman and Kleiner, 1991; Young, 2002).

Another key difference between e-learning and traditional formal learning methods is the reduced need for staff to run courses or sessions based on the former, with e-learning programs independent of the number of learners, and incremental running costs negligible to the provider. In contrast, for traditional instructor-led training methods to be cost-effective a minimum number of employees is required (Cheong, 2001), with the costs of re-running such training sessions at least on a par with initial investment. For the organisation, e-learning requires a more significant initial investment than traditional

training (Beamish et al., 2002; Boisvert, 2000; Driscoll, 1998; Harun, 2002; Pailing, 2002): effective e-learning programs require more time in design and development processes than traditional courses which may be outsourced or delivered by internal training departments (Heathman and Kleiner, 1991; Zhang and Zhou, 2003). However, once e-learning programs are purchased, acquired, or designed and created internally in the organisation, significant cost savings are possible (Boisvert, 2000; Harun, 2002; Pailing, 2002).

Instructor-led training is still the most popular and most used training method within organisations (Acton and Golden, 2001; O'Donnell and Garavan, 2003; Young, 2002). However the use of e-learning within organisations is increasing, with 44% of organisations now using e-learning as part of their training strategy (O'Donnell and Garavan, 2003).

2.3   E-Education Success

Many factors impact the success of e-learning projects, some of these include clearly defined objectives, content creation, senior management support, usability and project evaluation.   Missing elements from most e-learning programs are clearly defined objectives and consistent strategies. It is important for organisations to have a strategy outlining what each e-learning program must deliver (Ismail, 2002; Little, 2001).   The training department must be aware of the organisation's strategic direction and implement an aligned training method capable of moving people in that direction (Daniels, 2003).

E-learning programs must contain content that is relevant to target the audience and their needs. Such content must support achievable training goals and be organised in a way that makes sense to learners (Hert, 1994; Ismail, 2002). E-learners desire content that assists them in performing their work more effectively and efficiently. Content must be informed, and largely be defined by the priorities of the e-learner. If possible, content should be tailored to the individual e-learners needs (Rossett and Schafer, 2003). Although these concerns are replicated in traditional classroom training, such user-centricity poses a challenge to management to provide relevant and effective learning experiences in an 'e' environment.

Management can play a major part in ensuring training provides maximum value. Training managers must ensure they have top management support for e-delivery (Beamish et al., 2002; Daniels, 2003; Gold, 2003; Strand and Thune, 2003). Organisations can also provide incentives for employees to partake in perhaps less formally structured e-learning sessions: such incentives may include career advancement, peer recognition or rewards (Beamish et al., 2002; Little, 2001; O'Donnell and Garavan, 2003).

2.4   E-Education Evaluation

Essential to the process of creating training products is the importance of considering issues of usability. E-learning must be easy to implement, easy to access and easy to use (Little, 2001). If an organisation is to invest heavily in implementing an e-learning solution it is essential that e-learners use and accept it (Ong et al., 2003). Furthermore, the need for evaluation of training programs is essential (Al-Khayyat and Elgamal, 1997; Boisvert, 2000; Read and Kleiner, 1996).   Organisations often fail to evaluate the effectiveness of their training programmes. For e-learning to become a core part of the training strategy of organisations they need to be clear of the business benefits it delivers (Acton and Golden, 2001; Little, 2001; Mann and Robertson, 1996; Young, 2002). Only by measuring the results will organisations reveal the exact worth of e-learning (Hert,

1994). Evaluation can include an assessment of whether objectives and goals were met and how programs might be improved. It also includes an assessment of the development process itself. With the advent of e-learning the ability to measure results has increased considerably. Most e-learning systems include facilities for tracking items like learner responses, quizzes and time spend on tasks. While most training programs still do not measure how learners apply new skills to their work, the capability to at least report on the data of how the program is administered can be a great benefit to training managers. Possible outcomes include: a decrease in costs, increases in productivity, and enhanced employee satisfaction. Strategic outcomes may include: increased creativity, well-timed and proficient development of specific services and programs to meet organisational goals (Hert, 1994).

Training evaluation experts have developed return on investment models, that is, frameworks to view return on investment both from a human performance and business performance perspective. Kirkpatrick (1994) developed a return on investment framework containing four levels. The first level 'reactions' measures employee satisfaction with the training. It is a short-term evaluation based on learner attitudes to training received in terms of method, materials and facilities. The second level 'learning' measures the learner's ability to perform in new ways. The measures used should be objective and quantifiable and should be carried out through pre/post skill tests. The third level 'behaviour' measures the extent to which learners can apply learned knowledge and skills. It is linked to measuring job performance. Individuals who leave the training with belief that they can successfully perform the tasks that they have been trained (that is, with high self-efficacy) are more likely to apply what they have learned in the work environment (Gist et al., 1992; Tannenbaum and Yukl, 1992). The final level 'organisation' measures the extent to which training has contributed to measurable profits in terms of productivity, sales turnover or market share.

2.5   Small and Large-Scale Learning

As increasing amounts of content is being developed for online learning it is becoming clear that there is a pressing need for means of storing, cataloguing and sharing materials. If organisations are to achieve maximum return on the development of training material they should preserve and make material available for re-use and re-purposing. This will prevent "reinventing the wheel", save time and encourage wider cooperation between business units (Ismail, 2002; Oakes and Rengarajan, 2002; Wild et al., 2002). Technology-based training has reinforced the trend toward breaking up instruction into smaller manageable chunks known as 'learning objects' (Boisvert, 2000; Ismail, 2002). The development of learning objects is the next step in e-learning and will enable the convergence of e-learning with knowledge management (Ismail, 2002).

A learning object is a "self-describing, self-contained small chunk of learning that accomplishes a specific learning objective" (Oakes and Rengarajan, 2002, p103). The amount of time employees spend in training rooms is decreasing, and as a result the attractiveness of offering information in smaller portions (chunking) is rising. E-learning has reinforced the trend toward breaking down information into rapidly absorbable units and categorising them so that they are easily found via a keyword search. To maintain an effective 'e' strategy to learning and knowledge transfer organisations need to shift away from delivering rigid training programs towards creating a growing repository of learning objects (Govindasamy, 2000; Hamid, 2001; Wild et al., 2002). The collection of these learning objects creates an electronic infrastructure from which trainers and learners obtain ready-made instructional components quickly when needed (Boisvert, 2000; Gold, 2003). Employees can obtain instruction in real time and on demand as required. Besides instant access, another advantage of learning objects is the ability to reuse and

share them across training courses (Govindasamy, 2000; Hamid, 2001; Oakes and Rengarajan, 2002; Wild et al., 2002).

3.   Research Approach

From a learner viewpoint, this study assesses the effectiveness of learning objects in an organisational context using Kirkpatrick's framework, in particular the framework's learner-centric levels (reaction, learning, and behaviour). If e-learning could be shown to be at least as effective as traditional instruction then it would have added benefits such as accessibility and flexibility. If e-learning is not as effective as traditional instruction then research into potential reasons and ways to make it more effective should be pursued (Merchant et al., 2001). The central question is:

> "Is e-learning a more effective method than traditional instructor-led training for the delivery of small modular learning objects?"

Through a case study within the Department of Communications, the Marine and Natural Resources (DCMNR) in Ireland, using an interpretivist approach this study gauged learner-centric differences in the perceived effectiveness of traditional classroom-based instructor-led training versus a self-paced e-learning approach to small, modular training requirements (that is, estimated short-time training requirements that may not warrant or justify the costs and time associated with organised dedicated instructor-led training sessions). An initial survey questionnaire of 40 randomly selected employees was used to identify three modular job-related software-focussed learning tasks where employees indicated a need for training, and where the identified tasks were suitable for both classroom-based and self-paced e-learning delivery. Of the initial 40 employees, 5 performed self-paced instructor-free asynchronous computer-based training sessions at their office desk using specifically designed bespoke e-learning materials accessed via the organisation's intranet, and 5 others received structured classroom-based instructor-led training (based on the same teaching materials) in the accomplishment of a number of job-related software-focussed tasks. These tasks were all intellective problems with similar levels of complexity, with each task designed to take about 15 minutes to complete. The tasks were MS Office-based, and involved a) the insertion of hidden comments in Powerpoint presentations, b) creating dependencies between Office documents, and c) the recording and use of macros in Excel. After receiving one of the two types of training, subjects completed these tasks. Using a combination of the think-aloud technique (where learners verbalise their thoughts and concerns in the presence of the observing researcher as they complete each task sitting at their normal work desk) followed by open-ended questions as part of individual interviews, subjective measures of the following items were gathered: user satisfaction with the training type, attitudes towards the training taken, and perceived usefulness of the training type.

4.   Results

Kirkpatrick's (1994) 'reaction' level measures employee satisfaction with the training. Factors such as content, user interface, customisation and learning performance can affect employee satisfaction. Indeed satisfaction is a crucial determinant of future usage intention and complaining behaviour (Wang, 2003). All participants believed that the learning experience was beneficial. Both groups found the training method and material useful and easy to understand. At the reaction level there were no differences in satisfaction between the e-learning training delivery method and the instructor-led training session.

Kirkpatrick's 'learning' level measures the learner's post-training ability to perform in new ways. All participants could complete the tasks. Both training sessions were effective at this level and all participants agreed that the learning experience was effective. Closer observation showed that e-learning participants experienced fewer problems and were faster to complete tasks. E-learning proved more effective at this level. Kirkpatrick's 'behaviour' level measures the extent to which learners can apply learned skills in the workplace. All participants considered the performed tasks directly relevant to their work. Although both training delivery methods were effective at this level, e-learners had a higher level of self-efficacy than the instructor-led group.

All participants indicated that e-learning was the most appropriate delivery method for these learning objectives. The entire e-learning group believed that they learned more via e-learning than they would have learned if they had participated in an instructor-led training session. In the instructor-led group, all but one of the employees agreed that they would have learned more if they had conducted the training via e-learning. In the delivery of small learning objects the majority of participants in this research believe that they have or would have learned more via e-learning.

E-learning was the most preferred training method, with 8 out of the 10 employees stating generally that they preferred e-learning to traditional learning. The major reason was that e-learning fosters self-paced learning. One research participant noted,

> *"I like the way e-learning enables me to learn at my own pace. If I don't understand something I can spend more time trying to figure it out in my mind".*

Participants also liked the fact that e-learning required no physical attendance and they could learn on their own schedule. One research subject voiced,

> *"I can learn when I have the time to do so. E-learning offers me great flexibility in this regard".*

Participants enjoyed the interactive nature of the e-learning process. They feel that learning by doing is a more effective way of learning. One employee remarked,

> *"hands on learning is a more effective way of learning as the individual is more likely to retain the information".*

The major drawback of the e-learning approach was the lack of communication between the learner and the instructor, and between learners. E-learners felt intimidated or at a disadvantage without an instructor to approach with problems or difficulties. Work-related 'distractions' made e-learning at their desk difficult. Furthermore, chances of learners skipping important parts of the training material are increased with the more learner-controlled e-environment. One participant remarked,

> *"I can't remember how to do that because I didn't get a chance to do the last page".*

Commensurate with previous studies (Cheong, 2001; Little 2001; Rosenburg, 2001, Wild et al 2002; Young 2002) learners preferred e-learning as it did not require their physical attendance at a venue. In the case of e-learning learners no longer need to attend training session on a fixed schedule or travel long distances to remote locations. Instead they can work through a training program on their own schedule, from their own desktop.

5.   Discussion

The primary objective of this research was to determine if e-learning is a more effective training delivery method than classroom-based instructor-led training for the delivery of small modular learning objectives. Learning effectiveness was measured using Kirkpatrick's Return on Investment (ROI) framework.

Both training delivery methods were effective at the reaction level of Kirkpatrick's framework. There was no difference in employee satisfaction between e-learning training and instructor-led training. This result is similar to Zhang and Zhou's (2003) findings related to large-scale e-learning implementations. At the learning level, e-learning training proved more effective than instructor-led training. E-learners performed better. They retained more information and experienced less difficulty in completing the tasks. At the behavioural level, all left training believing that they would be able to apply learned tasks in the work environment (i.e. with high self-efficacy). Bandura (1977) indicated that learners who leave training with the belief that they can apply the skills they have learned are more likely to use their new skills in the workplace. In the study here, e-learners had a higher self-efficacy than instructor-led learners. As such it is more likely that e-learners will use the skills they learned (Bandura, 1977; Gist 1992; Ong et al, 2003).

While employee satisfaction was equally high for both training delivery methods, e-learning was more effective in the 'learning' and 'behaviour' levels of Kirkpatrick's model. These results indicate that e-learning can be more effective than traditional instructor-led training for the delivery of modular learning objectives.

With instructor-led training sessions, material is delivered in a manner that assumes the perceptual and intellectual uniformity of all potential learners. In contrast, e-learning programs can easily be tailored to the needs of individuals. This concurs with previous research indicating that e-learning delivery inherently accommodates personal learning speeds and intellectual differences (Harun 2002; Read and Kleiner, 1996; Rosenburg, 2001; Rosset and Schafer, 2003; Shih et al, 2003; Shoninegun and Gray, 2003, Wild et al, 2002). Similar to findings by Zhang and Zhou (2003) in this study e-learners valued the ability to potentially revisit previously learned material for review at their convenience.

This study found that having control over the learning experience was a major reason why learners preferred e-learning to instructor-led training. Conversely, it was also the main reason for potential non-completion of the learning agenda, a point discussed by Brown (2001). To ensure that learners use the control provided by e-learning sensibly, organisations must provide incentives for employees. According to Callahan et al. (2003), pleasure, self-esteem and career advancement are key motivators for adults and as such incentives may include career advancement, peer recognition or rewards. Indeed incentives can act as a motivation for employees to complete e-learning training sessions (Beamish et al., 2002; Little, 2001; O'Donnell and Garavan, 2003).

6.   Conclusion

Investment in people is a key differentiator between successful and unsuccessful organisations (Little, 2001; Harun, 2002). E-learning is a facilitator for organisations to keep up with changes in the global economy (Hert, 1994). Traditional training methods alone are no longer able to satisfy the demand for the continual updating of employee's skills and knowledge (Little, 2001). The development and management of learning objects may be the next step in e-learning. This study shows that employees favour e-learning when learning objects are specified. Organisations can achieve great benefits

such as cost efficiency, increased learning accessibility and flexibility from implementing e-learning strategies in the context of learning objects.

In terms of the lack of instructor-learner and learner-learner communication channels present in traditional training methods but absent or reduced in 'e' environments, organisations considering developing e-learning training programs must ensure that they provide adequate communication mediums to trainees. Coppola et al. (2002) argues the using technologies such as e-mail, online chat and video could help overcome some of the communication loss that results from e-learning.

Contrasting Zhang and Zhou's (2003) finding that learners prefer face-to-face learning to online learning, this research found that 8 of the 10 employees preferred the implemented e-learning format to classroom-based instructor-led training. The central difference may reside in the nature of the objectives as small modular learning objects in this study, where each e-learning module addressed one issue, took less than a predetermined time to complete, was addressing required training, and whose effectiveness could be quickly assessed by the learner. Learners like being able to learn at their own pace and on their own schedule (Brown, 2001; Cheong 2001; Hamid 2001; Hughney and Mussnug, 1997; Rosenburg, 2001). The study here indicates that organisations may not experience any resistance from employees when implementing a well-planned e-learning training program based on learning objects.

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