

## CHAPTER – 5

### EVALUATION OF EFFECTIVENESS OF CBT

*"In a time of drastic change, it is the learners who inherit the future. The learned find themselves equipped to live in a world that no longer exists.*

**Eric Hoffer, Vanguard Management, 1989**

**CBT may not be perfect but it is immensely practical:** Various forms of computer-based training have gained popularity over the years because they can increase the speed with which organizations can impart learning, reduce costs, increase flexibility, reduce learning time and improve retention of knowledge. The cost reductions generally result from reduced travel expenses for the students and instructors, and reduced salary costs for instructors. In addition, after the development is completed, the incremental costs for adding students are low, making electronic training particularly cost-effective for larger groups. Flexibility comes from being able to learn in various locations and (except for instructor-led distance learning) at user-determined times. Learning time goes down because the student can move quickly through familiar material, rather than being constrained by the pace of other students. Also, the material is usually presented more concisely in a CBT format. Finally, retention is increased because computer-based training products are often highly interactive, which promotes effective learning, and review of the material is convenient.<sup>27</sup>

---

<sup>27</sup> Lamont, Judith. "E-Learning & Web-based Training" (Online)

Available: [hrmanagement.gc.ca/gol/hrmanagement/site.nsf/en/hr/11560.html](http://hrmanagement.gc.ca/gol/hrmanagement/site.nsf/en/hr/11560.html).

While it is also true that e learning has certain shortcomings, they really do not matter. Organizations are happy to put up with the insufficiencies to enjoy its unparalleled convenience.

## **5.1 Learning and Retention**

### **5.1.1 CBT allows more room for different learning curves of learners.**

Learning and retention is a widely researched subject. The dynamics of human learning are complex and beyond the scope of this study. However generally people remember:

10% of what they read

20% of what they hear

30% of what they see

50% of what they hear and see

70% of what they say or write

90% of what they do and talk about.

CBT, which uses audio and visual aids, simulation and interactive tools, increases retention, more so because learners are in a position to repeat the training at their convenience and pace it to their speed of grasping the material. Of course, it goes without saying that other conditions of effective learning have to be present, such as inculcating in the learner an urge to learn, learning content that is made innovatively, in a manner that promotes interest and learning etc. These conditions are equally applicable to traditional learning. However, what is

---

(accessed 8 September 2008)

clear from the review of literature is that CBT can enhance learning and retention.

**5.1.2 Retention higher for CBT learners:** A study was conducted at a large pharmaceutical manufacturing site located in Eastern North Carolina to investigate the effectiveness of computer-based training (CBT) versus the standard or traditional lecture method. "Subjects were chemical processors in the bulk chemical production division (N=54). All subjects completed a comprehensive hazardous chemicals safety training program, with one treatment group completing the course via a self-directed computer program (n=27) and one completing the course via traditional instructor-led sessions (n=27). Both delivery formats were identical relative to learning objectives and content. Level of learning was assessed via a 33-item pretest and posttest. Subjects were also administered a 33-item retention test one month following completion of the program. Subject biographical data, including educational level, were collected by questionnaire and the Computer Anxiety Index (CAIN) was administered to assess subjects' level of computer anxiety within the CBT group. Satisfaction with training was assessed in both treatment groups. Results indicated 1) both groups demonstrated significant learning following training, 2) there was no significant difference in level of learning between the two groups, 3) retention after one month was significantly higher in the CBT groups, 4) there was no correlation between educational level or computer anxiety and learning, and 5) there was no

significant difference between the two groups on satisfaction with the training experience”.<sup>28</sup>

5.1.3 “A similar model (blended training) is working well during a trial with another organisation that also requires high levels of competence in staff in what can be complex situations. Early indications, using a control group indicate that those staff with access to a computer simulation program to practice on, prior to attending face to face training, are achieving better learning outcomes”<sup>29</sup>

## 5.2 Time Saving

5.2.1 **Large number of employees spread over several geographical locations can be trained simultaneously:** By making available course content simultaneously over geographically dispersed location, enabling large number of employees to be trained simultaneously, CBT on its own or in a blended learning form can result in considerable savings in time. Some instructor led training programmes also get replaced entirely with electronic content delivery. This leads

---

<sup>28</sup> Williams, T Craig and Zahed, Hyder, “Computer-based training versus traditional lecture: Effect on learning and retention”, *Journal of Business and Psychology*, Vol 11, Number 2, Dec 1996 (Online)

Available: [www.springerlink.com/index/BP2492N20H375U68.pdf](http://www.springerlink.com/index/BP2492N20H375U68.pdf) (accessed 23 February 2009)

<sup>29</sup> Bennink, R op.cit pp 5

to added gains by way of savings in traveling time and availability of the trainee at the work place. The urgency to train employees within a shorter time has spurred many organizations into adopting CBT as the following case studies reveal.

### **5.2.2 The Mother-Child protection card CBT (Government of Maharashtra).**

**Training for health workers across Maharashtra:** This CBT programme is aimed at providing training to health workers and other programme participants and beneficiaries in Safe Motherhood , Care of the New born, Child Growth and Development, Nutrition, Immunisation and The Importance of the Mother Child Protection Card

#### **. Training is provided to:**

- Families / Program participants
- Anganwadi workers of ICDS (Integrated Child Development Scheme)
- Nurse midwife
- Supervisors of health and ICDS

**Time saving and certification:** The current method of classroom training would have taken years and also does not have a certification process. The CBT includes a certification program and is available in two languages. The CBT would accelerate the current pace of training to health workers by using over 1,000 computer literacy centres throughout Maharashtra.. The health workers can also access the programme at their own homes. It would provide a better learning experience through interactive computer exercises, and, when

necessary, give an option to the trainee to complete the training module at a modified pace.

Using Education to Home (ETH), an already existent and functioning educational network, local health workers, regardless of their computer proficiency, will be accommodated and taught the contents of the guide book currently being used. However, the CBT will be quicker, monitored, more consistent, contain more interactive exercises, and will allow a vehicle for certification of health workers.<sup>30</sup>

### **5.2.3 A Case Study of introduction of Blended learning in South Australia Police**

The South Australia Police introduced new computer-based training for their force of almost 4,000 officers and cadets. The Department was finding it difficult to train their officers as they work in shifts and a lot of their time is spent out on crime sites. Another challenge was that of a workforce that is geographically dispersed across remote and rural areas. Yet it was critical they receive regular training to keep up to date with not only the latest legislation, but other critical skills areas like preserving crime scenes and electronic crime.

**Blended learning approach:** To meet these challenges they developed training material that is cost effective and tries to make effective use of the information

---

<sup>30</sup> The Mother and Child, Health and Education Trust. "Mother-Child Protection Card CBT" (Online). Available: <http://hetv.org/programmes/mother-child-protection-card-cbt.htm> (accessed 1 March 2009)

technology (IT) system that they already have in place, They could thus meet the training needs of their police force in a flexible and effective way and at the same time ensure that their resources are used effectively and efficiently. They used a 'blended learning' approach that combines online training and train-the-trainer sessions for supervisors based in stations throughout the State.

**South Australia Police could offer training that used to take approximately two years to complete in just six weeks.** Instead of a trainer traveling to each police station, police officers have immediate access to the training online, and this is combined with a practical component that can be supervised by a superintendent at each local station. All that the officers need to know for the online training is how to use a mouse and keyboard. A spin off of the e-learning path has been that their entire police force is now competent using a computer and since all police work revolves around a computer, this has been a big benefit.

**Short online courses:** Their approach to computer based training has been to develop short online training courses for both operational police and cadets. While some of these can be done entirely online, most have a practical requirement which can either be supervised at local stations or at the Academy.

Another interesting development is that though the training courses developed by South Australia Police are not formally recognised by other States and

Territories, there is a growing culture of sharing common training resources that are not limited by different jurisdictional legislation.<sup>31</sup>

### 5.3 Cost Effectiveness

**5.3.1 Saving in training costs the organisation:** Costs of training, whether traditional or computer based, are often so high that many organizations decide to train only those personnel who necessarily need to be trained. Other employees have to make do with informal, on the job training or even less. In the long run, such decisions cost the organisation as employees take longer to reach productive levels, and they may make errors that are expensive to correct.

**5.3.2 With e learning costs of training decrease:** Cost of training in house not only includes expenses of infrastructure such as land and building, trainers and course material etc but also trainee costs such as travel, boarding and lodging and loss in days at work. A literature survey reveals that organizations that have implemented CBT have experienced a substantial reduction in costs by way of

---

<sup>31</sup> Australian Flexible Learning framework. "Case Study, South Australia Police Uphold the Law with e learning". (Online)

Available: [http://pre2005.flexiblelearning.net.au/casestudies/casestudies/sa\\_police.pdf](http://pre2005.flexiblelearning.net.au/casestudies/casestudies/sa_police.pdf) (accessed 19 February 2009)



expenses on travel, boarding and lodging, human resource overheads and cost of employee time off the job.

**5.3.3 Economies of scale can offset development costs:** While it is true that cost of developing content can be rather high, for a large organization like the Railways, the economies of scale and benefit of a better equipped workforce would more than offset the costs of development. "Cost-effectiveness increases when there are larger numbers of learners (by decreasing the cost per student), the instruction is offered many times (by decreasing the cost per student), learners normally have to travel to receive their training, the material is stable with respect to content (the product can be used both now and in the future), and the materials can be inexpensively distributed, through the Internet, through an intranet, or via CD-ROM)" <sup>32</sup>

**5.3.4 Blended training is also cost effective:** With less time spent on instructor led training at specialized training centres, there is also reduction in cost. In one example an eighty hour face to face program was reduced to forty hours of face to face workshops combined with seven hours average online learning prior to the workshops, with no reduction in quality of learning outcomes. Obvious benefits to the organisation include a significant cost reduction in training and staff replacement. <sup>33</sup>

---

<sup>32</sup> Fenrich, 2005 Ibid.

<sup>33</sup> Bennink R, 2004 Ibid

5.3.5 A scoping study undertaken for the IDeA (Improvement and Development Agency for local Government), UK, by Epic Group Plc pointed to compelling financial benefits for a common training need such as health and safety. "Assume that 20,000 staff in local government require health and safety training each year. The cost of delivering training to these staff using conventional classroom training is estimated at £86 per user for a one-day course. This equates to £1.72 million for 20,000 staff. An equivalent online course could be developed for £100,000. However, this course can be distributed over the internet at virtually no cost to all local authority staff. The course is also available online at any time a person needs it; and can be updated centrally so that staff always has access to the most up to date material. These financial benefits accrue to the whole of local government who would no longer have to incur the costs of delivering this training through the classroom. Even if only five per cent of local authority training was moved online the savings to local government could be in excess of £30 million per annum. This represents a return on investment of over 600 per cent and also enables a far greater number of staff to be trained with the same or less resources"<sup>34</sup>.

---

<sup>34</sup> A briefing paper, "Briefing : e-learning in local government" (Online)

Available: [www.idea.gov.uk/idk/aio/1702668](http://www.idea.gov.uk/idk/aio/1702668) (accessed 23 February 2009)

5.3.6 In so far as the Railways are concerned, the economies of scale and repeated use of the material would offset initial costs. Strategies such as **using existing materials, standard presentation formats and simplifying the training and innovative presentation techniques** could be adopted to keep even the initial costs low. Cost of media such as CD ROMs has fallen drastically in the last couple of years. In the long run, apart from its several other advantages, CBT would also be a cost effective proposition.

## **5.4 Other Positive externalities**

5.4.1 **An organization capable of adapting to change:** CBT can usher in a revolution in the learning process. People who know they can learn are eager to learn more and are able to learn quickly. An organization whose people learn quickly can react to change faster. The benefits to the organization are immediate and permanent making it easier for the organization to adapt to change.

5.4.2 **CBT can be used to create a multi skilled workforce:** This would result in better utilization of staff and thus cut staff costs. An incentive system for possessing a set of allied skills could be introduced. This would also make it easier to **re-deploy surplus staff**.

5.4.3 **Objective assessment through CBT can become a basis for future promotions:** One of the advantages of CBT is the scope of a completely objective assessment that can be built into the training software. An employee

can complete different levels of CBT training at his/her own pace and obtain the evaluation/certification prescribed. These could form the basis for assessment of various capabilities such as skill sets, knowledge and aptitude etc which could, in turn, become the basis for future promotions. The present system of conducting examinations for selection to higher posts could be eliminated. The Sixth Central Pay Commission has already introduced a system of running pay bands. An attempt has been made to delink pay from promotions. This would make it simpler to implement a system in which an employee would become eligible for the next grade pay subject to completion and certification of the prescribed training modules.

**5.4.4 Incentivising learning.** CBTs could be used as a basis for incentivising people to learn. The incentive could be monetary, in the form of a cash award or increment on passing a course, or certification, or a combination of both. Certification would also be a great motivation: employees would add to their portfolio of skills, and the organization would be benefited by the increased capabilities of its employees, a win-win situation for both.

**5.4.5 Innovative use of training infrastructure can bring revenue to the Railways:** The infrastructure for e learning could be used by other government or private agencies on payment basis. The site could be used for advertising or generation of revenue by other innovative uses. This could drastically bring down the cost of training. The use of the infrastructure by other Government agencies

such as the Department of Health and Family Welfare would result in positive spin offs.

**5.4.6 Productive use of spare time, better bonding:** The deployment of e learning content at various railway units such as sheds and depots would not only help employees make effective use of their spare time, it could also become a meeting point and thus help employees bond better.

**5.4.7 Multiplier effect:** E learning facilities could also be extended later to family members of Railway employees. This would have a multiplier effect and be of immense benefit to the society at large.

**5.4.8 Enhancing quality of life for railwaymen:** E learning content that is of personal benefit of employees, such as their compensation and benefits, spiritual content eg. yoga and content that is of benefit to their families such as information regarding career options, competitive examinations etc could also be deployed. The possibilities are endless. This would result in a happier work force.

**5.5 Summary:** In addition to the advantages of flexible learning, e learning is an effective tool for the organization in terms of cost and time, and retention for the learners. If implemented successfully, it would provide a number of other positive externalities.