

Computer Based Training (CBT): a journalist's view

by Bob Little

Human beings have always wanted to communicate with each other. Cave paintings, cuneiform, hieroglyphs, papyrus, parchment, paper, the printing press, telegraph, telephone, wireless, television, computers and, now, the Internet are all means to that end.

While we now have more information available to us than ever before, the pressures of work today mean that there is less time to assimilate, assess and act on that information. This, in turn, puts pressure on technology to communicate that information quicker, more efficiently and, hopefully, at lower cost.

*** The history of Computer Based Training (CBT) - mainframe to intranets in 30 years**

In recent years, business communicators have turned to computer based training (CBT) in all its forms (including multimedia based training) - especially in the field of education and training. The last few years have seen the inventive combination of audio, video, text, animation and graphics in an attempt to motivate learners and make the resulting multimedia programmes' training messages more interesting and memorable.

Obviously, there is no benefit in using CBT as a communications medium simply 'because it is there'.

Business needs multimedia technology to help it communicate for two main reasons:

- to present a standard message to a widely dispersed audience relatively cheaply.
- to preserve a unique or rare piece of information or skill (for example, where the people possessing that information or skill could not devote their whole lives to running training sessions!)

What is CBT?

It took mankind many thousands of years to develop the art of writing: recording information for others both of the present and future generations. Not much more than 100 years ago electronic forms of communication emerged which enabled more people to have information faster.

In the early years of this century, we developed radio as a mass communication medium and, in the last 60 years, television has brought more people more information than most of our ancestors would ever have thought possible.

Towards the end of the 1970s, we began to see computers on desktops. As computers developed and proliferated, someone realised that computers could hold a large amount of information and could interact with people to bring about learning: CBT had been born.

These early attempts at CBT, although well intentioned, tended to be boring and were little more than electronic books. They were a lot less portable and cost a great deal more than their printed counterparts. Consequently, CBT was not popular.

However, technology improved. CBT developers became more creative and daring, adding graphics and even a few animations to their programmes, as computers became faster and could cope with them.

Eventually, in the late 1980s, the technology existed to play text, graphics, animations, audio and video combined in one programme. Programmes which contained these elements were known as 'multimedia' programmes. Initially, this material was accessed through exceptionally large hard drives (and, often, additional hard drives linked to the computer) but, soon, developers put their programmes onto CD-ROMs.

If CBT 'began' about 1978, many commentators - notably Janet Billinge of CBT developers APPRIS and who is also a lecturer at Birkbeck College, London - date the birth of multimedia based training as 1986 - and state that Web-based training began in 1996.

*** The current position - including (a) how dead is CD-based CBT delivery? (b) 'fat server, thin client' networked approaches to CBT and (c) the development of the 'virtual classroom'**

In its quest to be more readily available and used within the business community, CBT is constantly evolving. Currently, the main strands of CBT are:

- **CBT on mainframe:** typically text-heavy on a 'green screen'. This was the first manifestation of the genre and made its first appearance some 20 years ago. This approach was later refined to include context-sensitive 'help' for the terminal operator. Although many people prefer to 'buy the book' (read hard copy in the traditional manner) rather than read text on a screen, many exceptionally large companies around the world - notably in the finance sector - still use this type of CBT.
- **CBT on floppy disk** (for use on stand-alone or networked PCs). Although this has an 'electronic book' image, there are a number of courses which use graphics to entertain the user and enhance the learning experience.
- **Multimedia based courseware:** typically on CD-ROM.
- **Interactive video:** contained on laser disk and requiring a laser disk player as well as a PC in order to run the course. This approach has largely been superseded by CD-ROM based materials.
- **CD-I (compact disk interactive):** beloved by a few - notably Rover Group and some NHS Trusts - but not a 'mainstream' technology.
- **Networked courseware** - either via a local area network (LAN), wide area network (WAN), via a server or, increasingly these days, via the Internet or corporate intranet. Here there are problems with 'bandwidth' - basically because audio and video files are very large and take a relatively long time to download.
- **Virtual Reality** - seen by some as an 'anoraky' approach to CBT. The two main types of virtual reality (VR) are immersive and desktop. Where CBT is concerned, desktop VR is the predominant approach. It is especially useful in training people in 'disaster scenarios' where it is easier, cheaper and less dangerous to blow up an oil refinery in simulation than it is to do it in reality, for example.

CD-based courseware seems to be prevalent in the CBT market at present. Although there are relatively few CD-I based training materials, there is a steadily growing number of CD-ROM based courses, configured for a variety of CD-ROM drives (two to 24 speed) and PCs (386 to Pentium 166).

However, there is already a discernible trend towards CBT materials being networked - via a LAN, WAN or intranet. CD-ROM based training materials, which often contain audio and video files which are difficult to transfer over a network because of bandwidth problems, are in danger of 'losing out' when organisations take the 'fat server, thin client' approach. These organisations are the ones which courseware producers want to court, since these organisations tend to have the largest workforces - often widely dispersed - and so often have the biggest need for and can make greatest use of CBT courseware.

The largest and 'most sophisticated' organisations are beginning to develop 'virtual classrooms', where students at remote locations interact - via videoconferencing equipment and/or networked PCs - with courseware and with tutors on-line.

*** A look into the future**

There are a number of potential problems for CBT developers and users.

- **Platform**

Most CBT developers produce material for the PC rather than the Apple Macintosh computer because more people use PCs than use Macs (especially for training and education purposes) but, within the PC-based technology world, there are a number of delivery platforms available - for example, stand-alone (with material produced on floppy disc or CD-ROM for example), mainframe and some sort of network (including the Internet and corporate intranets).

If you are developing a generic programme for a large audience (conventionally the main reason for developing CBT programmes in the first place), do you develop a programme which can be played on a 386 PC or a Pentium 166 - or even one which is really designed to be distributed to a 'slave workstation' via a network for example? Should the machine have a two-speed, a quad-speed or a 24-speed CD-ROM? Or should you wait and develop a programme for DVD - the forthcoming 'super CD-ROM' which can contain a lot more information - that is, audio, video and so on - but which will take a relatively long time to penetrate the market? Indeed, will the market take up DVD, or will it become another 'nearly was' technology, like laser disk or even CD-I?

If you opt for the lower specification machine, you widen your potential audience but you drastically reduce the speed at which your programme will run (and so risk boring the users). This also means that, as a designer, you cannot be quite as creative over screen design and programme content as you might have liked to be.

- **Market Size**

The higher specification machine needed to play your product, the smaller the potential market. Therefore you have to either charge a high unit price to recoup your costs - and risk putting off the potential purchasers - or hope for a long shelf life for the product (which is unlikely, given the rapid pace of technological change - for example, there are still some people hoping to sell their stock of programmes on laser disk!)

- **Price**

Multimedia programmes on CD-ROM which are aimed at the 'home' market sell for, typically, £30 to £50. Those programmes aimed at the corporate market sell for around £800 to £1,200. Bespoke multimedia programmes, typically, cost even more (in a range starting from, say, £20,000). Organisations can only justify spending that sort of money if they have a relatively large number of learners/trainees to undertake the programme.

- **Bandwidth**

Basically, however fast they are, computers find it hard to deal with the large amount of information contained in audio and video files. Consequently, multimedia programmes can take quite a time to download and play - especially if they are being delivered via the Internet. This can be boring, de-motivating and/or just frustrating to users. This is a major drawback if you want the programme to have a beneficial effect on the user!

To overcome this problem, CBT developers have taken to splitting up their courses into 'chunks' or separate, smaller courses; 'streaming' data (as offered by Pathlore Software's PHOENIX), and/or reducing the audio/video content of courses (as offered by Xebec's recently released intranet software).

Alternatively, they opt for 'hybrid delivery', where large files - such as those containing audio and video - and information which will not change, is sent to the learners on CD-ROM. The learners load these files onto their PC from the CD-ROM and augment and update this information with further data (in small file sizes) accessed relatively quickly from the Internet.

Unlike file-based technology, 'streaming' does not mean that the software programme and files must be downloaded every time the application is accessed. By design, all course data is stored on the server, not on the client computer (the student's PC), thus saving space on the client computer as well as reducing download time and drag on the network. Also, while file-based applications store information on the client computer - thereby depriving central administrators of the ability to successfully manage access to the most current version(s) of the course - streaming provides no such problems.

- **Computer literacy of users**

Programme producers need to be aware that there are still a great many people in the working population who are not highly computer literate. Therefore, successful CBT programmes are those which need little 'IT' knowledge from their users.

- **Compatibility**

Not all multimedia programmes will run on a given PC without that PC having to be re-configured. This is time consuming and may prove to be beyond the skills of many users - or even open learning centre administrators. It is as well to take impartial advice about the programmes before buying them, if at all possible.

When should you use CBT?

Organisations may opt for one or a combination of types of CBT - in addition to more 'traditional' forms of training (for example, classroom based) - to achieve training objectives. It is important to remember that the technology should serve the training need.

When should CBT be used *in preference* to traditional classroom-based training?

- When you need to train a large number of people
- When you need to train a widely dispersed workforce
- When you need to promote a standard message (human trainers will, inevitably, put their own 'spin' on any training course and impose their own personality on the training messages of the course. By contrast, a piece of courseware gives the same message to each user.)
- To reduce the costs of training a large number of people. CBT may be expensive to buy but, for example, a CD-ROM costs pence to produce and pence to distribute. Compare this with the travel and subsistence costs involved in bringing large numbers of people to regional locations for meetings or training sessions.
- To benefit employers and employees. CBT programmes can be used out of working hours (to the benefit of employers) and don't have to involve trips away from home (to the benefit of the employees).

When should CBT be used *in addition* to traditional classroom-based training?

- When a large number of geographically dispersed people need to have a certain amount/level of knowledge (for example, product knowledge or behavioural/management theory) before going on to practise related skills (for example, sales techniques or recruitment and selection skills). Here, the CBT can be used to good effect as pre-course study material and, in certain circumstances, also be used for post-course testing; while the practical skills - such as selling - based on the theory can best be taught in classroom/role play sessions.
- As a 'taster' to attract otherwise reticent potential learners onto courses.

How do I find the *right* CBT courseware?

There are two basic types of CBT: generic (often costly) and bespoke (even more costly). There are hybrid options. For example, a number of producers such as Xebec and Easy-i will 'customise' their generic products for the customer (for example, adding company-specific sections/logos to generic courseware).

It can be difficult to find objective advice on what courseware is available and whether it is right for your organisation's needs. You can get help from preview centres/re-sellers, such as Flex Training, or from 'multimedia systems integrators', such as CC Information Systems and MultiMedia Training Ltd, the multimedia arm of the MarCom Group.

Can I make my own CBT?

Although this is possible, it is not as easy as some people make it sound. To produce courseware, you will need to become proficient in at least one of the main CBT authoring tools: Macromedia's Authorware; Asymetrix's Toolbook, IconAuthor and CBT Express; Pathlore Software's PHOENIX family of products; Allen's Quest and Designer's Edge. There are others, notably C, C++, Visual Basic and even the ageing TenCORE.

To produce worthwhile courseware needs the skills of a top class trainer (to structure the programme and decide on the teaching points), a top class designer (to make the screens

attractive and motivating to the user) and top class programmer (to make the courseware work). It is unlikely that any one person will possess all these skills and only the largest and wealthiest companies can afford to employ people with these skills 'in-house'.

With the current rapid technological changes, how can I safeguard my investment in CBT?

Some companies have invested heavily in CBT which cannot now be played because of the advancement of technology. These companies are, understandably, reluctant to invest in CBT again unless there is a guarantee that their investment will be future-proofed.

Consequently some CBT companies are developing 'migrating tools' and architectures which allow any piece of CBT, written in any authoring language, to be played on any technology - from mainframe to corporate intranet. For example, Pathlore Software's Distance Learning Environment (DLE), based around the PHOENIX authoring tool, allows CBT to be 'migrated' to different delivery technologies and helps safeguard companies' investment in CBT.

As this becomes widespread, organisations should have nothing to fear from investing in CBT.

Can CBT be used more widely?

Education and training are two of the major uses of CBT, yet many organisations seem to fight shy of using this delivery mechanism.

This could be because:

- in-house 'stand up' trainers fear that using CBT will make their jobs disappear
- companies are not convinced that self-paced learning is effective (that is, they believe that people do not apply what they learn via CBT, compared to their behavioural and attitudinal change after attending classroom-based training sessions)
- the value of CBT has not been 'sold' to senior managers and/or the workforce
- organisations are not prepared to invest in the hardware and courseware needed to provide their staff with access to CBT courseware
- organisations have already invested in training delivery technologies which have largely been superseded; they have a stock of what they consider to be largely useless courseware, and are unwilling to invest again
- organisations' staff are not 'computer literate', particularly geographically dispersed or require training in cognitive (rather than affective or psychomotor) skills, where CBT can be particularly useful
- by contrast with computers used in the home, computers in the business world tend to be 286/386 machines running Windows 3.1 which do not have multimedia capabilities - so they cannot be used to run multimedia courseware
- pricing of CBT courseware, although currently confused, is significantly higher than the cost of 'edutainment' titles available in high street shops. Paying £1,000 + for a piece of courseware can only be justified if that courseware will be used many times by many people - which, for all sorts of reasons, may not be the case

Web based training

As the Internet and the World Wide Web (the Internet's collection of hypertext linked documents, accessed via a browser) has grown in power, capability and importance, CBT developers have turned their attention to producing courseware which can run via the Internet and corporate intranets.

While many CBT developers use a CBT authoring tool to produce a course and then adapt it for delivery via the Internet, others are turning to Internet authoring tools to help them develop their CBT. However, Internet standards, which are based on HTML, tend to produce CBT reminiscent of the unfashionable 'electronic page turning' variety; do not allow for student feedback or analysis of student responses, enable administrators to keep track of

students' progress or provide a database on information concerning a student's training history.

Adding CBT functionality to HTML-based applications requires programming and may slow the development effort. In addition, large courses are difficult to maintain when they are HTML-based. Unlike streaming technology, current HTML standards cannot support computer-managed instruction, security, record keeping, or the course management functions that are integral to CBT authoring and delivery products such as Pathlore Software's Phoenix system.

CBT developers can look beyond the capabilities of HTML to add CBT-specific objects. This is usually done by low-level programming using Java, C++ or CGI scripting. Whichever approach is adopted, it increases the level of programming expertise required of a CBT author.

Training managers and would-be CBT authors may feel that, with all these difficulties and challenges to be overcome, the time is not yet right for delivering CBT via the Internet (that is, Web-based training). Yet there are advantages - in cost, administration and ease of use terms - of using this method of training delivery.

Using the Internet to distribute CBT eliminates the cost of distributing proprietary software and publishing material on CD-ROMs - unless, that is, the producer opts for 'hybrid delivery'.

When delivering training materials via the Internet, the producer has only to produce the course once - and carry out each update once - and can be sure that any learner logging on to the course has the latest version of that course to study. Training materials producers cannot be so certain that all learners are using the most up-to-date versions of their courses when these courses are contained on distributed CD-ROMs, for example.

Having begun his career as a management trainer, Bob Little began writing open learning materials and graduated to becoming editor of 'Transport Training' (a tabloid newspaper) in 1983. Having 'gone freelance' in June 1990, he was asked to edit Training Technology & Human Resources magazine and did so for some three years. More recently, he has written on CBT/multimedia/IT-related topics for many magazines including IT Training, Training, Training Officer and Chemistry & Industry. In addition, Bob edits the TACT Tile, the newsletter of the Association for Computer Based Training. He is writing the CBT/Multimedia chapter of the new edition of the Gower Handbook of Management Development, due to be published towards the end of this year. Since May this year, Bob has also been the editor of Management Skills & Development magazine.
