Delivering e-Learning . . . is CD-ROM dead?

The Compact Disc (CD) is 34 years old! Invented and patented by American physicist James Russell, it wasn't until 1982 that Phillips and Sony launched the first CD audio players.

Since then the format has evolved to provide a medium capable of storing 700 megabytes of digital data (the complete Encyclopedia Britannica!) or many hours of MP3 audio.

CD-ROM writers have plummeted in price from £2,000 in 1990 to as little as £30. From waiting an hour to burn a CD, the process can completed in the time it takes to make a coffee. CD duplication even for modest quantities is down to under 20p each. CD-ROM is cheap, fast, reliable, is compatible with even the most humble PC and offers huge capacity.

So why is CD-ROM losing popularity for distributing e-learning?

CD-ROM is well suited to e-learning solutions as it provides a fast and sizeable medium on which to distribute the media-rich content of modern titles. However, words like 'distributed' and 'burned' worry many organisations since the continual updating of a course would involve having new discs duplicated and sent out to learners. There would be no way of making sure learners were using the latest version and urgent changes to content could not easily or quickly be made.

The Press continually hype new technologies which allow fast internet connections on existing copper wires. This, they claim, means the end of CD-ROM for content delivery. Broadband connection has certainly made e-learning a more attractive proposition, with all content held in a central – and therefore easily updated - location.

In the rush to get e-learning 'on-line', sacrifices have inevitably been made to the richness of the content. Often there has been a backward step to the dull 'page-turning' presentations of the past in an attempt to reduce the inherent delays of the Internet.

This latency is down to 'bandwidth': the bigger the pipe the greater the rate of delivery. Even with the latest Broadband offerings, Internet delivery of e-learning has a long way to go to match the rich content enjoyed by CD-ROM. Satisfactory Internet delivery of a course depends upon having a fast connection but what speed do you develop for? In some countries a standard dial-up is the best learners can hope for while in others, fast corporate VPNs (virtual private networks) are commonplace.

The problem is that CD-ROM and now DVD-ROM are still the best way to distribute large media files, especially video. This is born out by the entertainment sector, who are normally the ones who push storage and communications technologies in a quest to create the best on-line games. Currently the preferred method of distribution is a *hybrid* CD-ROM / Internet combination that sees the beautifully rendered, fast action video sequences, 3D models, scenery and music delivered on the CD, with many interface and program components maintained *on-line* and which are transparent to the user.

This 'hybrid' delivery approach can work very successfully with e-learning titles too. In the development stage the program, interface, media and textual content can all be structured separately and held *externally* on a web server whilst the rich content like 'Welcome videos', '360 degree virtual tours', narration or a media library can be held on a CD-ROM. Normally the CD-ROM would also have a copy of the program that launches on CD insertion.

On launching the course, a 'transparent dialogue' takes place between the web server and the e-learning program to determine where the most up-to-date material is held and to allow this to be used to populate the screens within the training itself.

This gives central control over the content, menu items, all on-screen text and a way to monitor use which could be passed to an LMS, allowing organization-level reporting or on-line accreditation. An added benefit is that it then becomes simple to offer updates and foreign language versions.

The large capacity DVD-ROM now makes an even stronger case for the 'hybrid' distribution option to allow Subject Matter Experts and Script Writers the freedom to give their audiences the best possible interactive learning experiences – *without* the compromises imposed by limited bandwidth on-line connections.

CD versus Internet delivery

	CD-ROM	**Internet**
Centrally updated?	No (but embedded links to web pages provides limited access to volatile information)	yes
Delivery speed (min)	2 megabytes /sec	0.28 megabytes /sec
Delivery speed (max)	8.4 megabytes /sec	1 megabyte /sec
Use without an internet connection?	yes	no
Quality of embedded video	very good	poor
Overall richness of training delivery	excellent	poor to medium
Cost per learner (not including development costs)	£0.30 - £0.50	no extra costs
Pass progress data to AICC LMS	yes	yes
Platform independent?	no (You must develop for PC or MAC or create a dual platform CD-ROM.)	yes and no (If written in HTML then any browser will provide access but much of the rich media will make use of plug-ins which would then be needed by learners.)

Summary	The' medium on which to distribute the best possible interactive learning experiences without compromise.	Centrally held courses with a global reach. This technology is improving and it will not be long until CD-ROM quality e-learning can be delivered to anyone, anywhere at anytime.

So the outlook for CD-ROM is 'wounded but a lot of life left'. Not until *all* learners have access to on-line connection at CD speeds will the CD-ROM finally lie down and die. And we're a few years from that.

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