Frontiers of Multimedia

Ian Lynch reports on the latest trends as identified at this year s Interactive Learning conference.

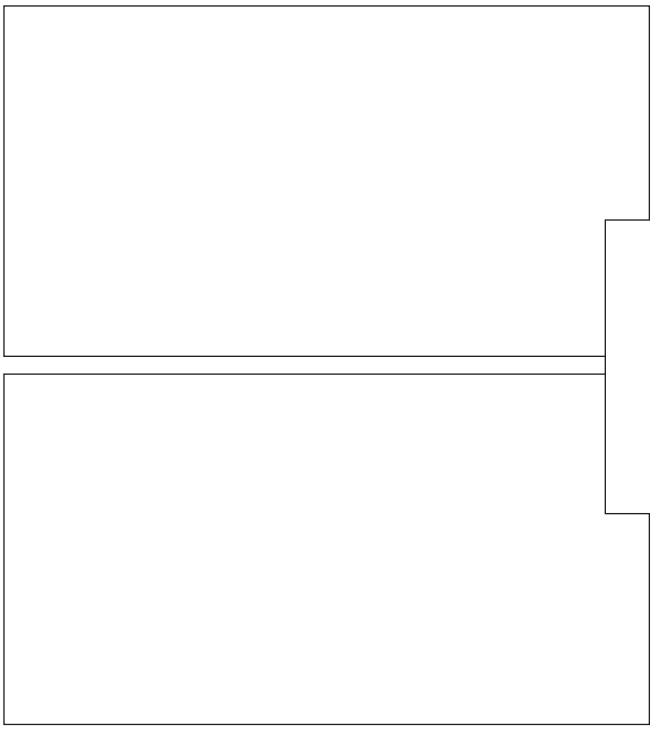
Every year for the past eight or so years there has been a trek to Edinburgh on August Bank Holiday weekend to look at the latest in interactive learning technologies. IL 93 provides an opportunity to give you an update on what is happening in multimedia, and to look at what Acorn is doing in this very competitive field.

INTERACTIVE BOOKS

There was a strong representation from the US this year, with Bob Stein of Voyager demonstrating some amazing user interface presentations developed for interactive expanded books. These take the concept of an ordinary book as a starting point, with facilities to turn over pages, to mark a place etc, and then expand the facilities available through hot link words, searches and so on. The really impressive part of this was the realism and intuitive nature or the software user interface. However, the real question is whether or not it will entice book readers from paper to computer screen. For casual readers I am unconvinced, but perhaps for research it gives plagiarism a new dimension!

FRACTAL COMPRESSION IN PRACTICE

Probably the most interesting technology was Iterated Systems fractal compression, which has come a long way since I first saw it last year. Michael Barnsley, the British mathematician behind fractal imaging, gave a convincing presentation of evangelical fervour. The idea behind fractal compression is that pictures can be described by a finite number of fractal elements rather than pixels, and that fractal elements provide infinite resolution from very compact data.



Normal scanned image (above), with an enlarged fractal image (above left) and manual enlarged image (below left) for comparison.

In fact, although fractal images can be scaled infinitely, they do still depend on the original information from which the fractals were sourced. They give the impression of ever increasing fidelity by effectively guessing what should be there from the context of the surrounding data; and zooming in on a fractal image does not cause pixelation. The final results are impressive with a 10K source file producing final images limited only by the resolution of the display device. In fact, a 3K source file produced a full screen image of a face which was better than many of the mode 15

images I have seen grabbed from a video digitiser requiring 160K.

Demonstrations of software-only video were also good, and the full-screen examples I saw running on a 50 MHz 486 PC were of better graphic quality than Acorn s Replay, though jerky in places and limited in subject variety, so objective comparisons are difficult. Although the software is only at beta test stage and was running from a hard disc, I was told that the video component only needed 80-100 K/s to run, and that CD was the target market. Clearly this is a developing area and shows that digital video will continue to improve both through faster hardware, and also through better application of mathematics.

Although demonstrated on Windows-based machines, there are several reasons why fractal compression is of interest to the Acorn world. The high compression, coupled with good quality as far as the eye is concerned, provides the possibility of storing 50,000 high quality images on a CD, or passing images around a network without jamming it with data. A primary school could store a graphics library of 100 images on a single floppy disc and pass images across Econet without waiting a lifetime. The system outperforms JPEG (the current industry standard for compressing still images), and there is evidence that it is still improving at a significant rate. As computing power increases, a compact mode-independent graphics format, which could be displayed without perceptible delay, is very appealing, and on Acorn machines the algorithms would not be hampered by MS-DOS and Windows.

Acorn could of course opt for a proprietary format of their own - there are some very talented people, Roger Wilson, Stephen Streater and Tony Cheal et al, working on Acorn software - or stick with JPEG. The former option is only worthwhile if the results are so far ahead of the rest (as was the original Archimedes in 1987) that it justifies being different, and the latter will result in being tied to a standard which may well be surpassed and therefore result in JPEG-only users being left behind.

An important consideration is copyright. Like PhotoCD from Kodak, this is a proprietary system and Iterated Systems have copyrighted the Fractal Transform which is the mathematical technique upon which the technology depends. Copyrighting mathematics is rather dubious - if Newton had copyrighted the laws of motion we might live in a very different world - but mathematicians should be rewarded for creative work. Quantel have successfully copyrighted routines in the world of TV imaging, so I guess we have to live with it.

The crux of the matter will be a reasonable pricing policy which enables mass use, and therefore the establishment of a de facto standard, at the same time as providing Iterated with enough income to continue and grow. Getting this right might well be more important than the quality of the technology itself. Having said this, Microsoft s endorsement of the product, as demonstrated with their Encarta encyclopedia on CD-ROM, is of major significance. I saw Tony Cheal of Oak Solutions reading Michael Barnsley s book on the mathematics of how the system works, and so perhaps we might see fractal compression and decompression in commercial Acorn products before too long.

MEANWHILE, SOMEWHERE IN HAMPSHIRE...

Back from the world of speculation, Martyn Wilson of Hampshire Microtechnology Centre was demonstrating work by children from Hampshire schools, and this made a refreshing change from the marketing hype, slick demonstrations and expensive hardware which dominated this conference. Interactive learning is about what the target user can do, not what a multi-million pound marketing machine can produce, and it is probably the emphasis on the latter which has dogged multimedia and interactive learning. Despite the occasional criticism, Acorn certainly have a better idea of this country s education market than any of the others at this conference, and this obviously matters. There was constant talk of downsizing and the industry lacking a market, but I think that the fact that Acorn are still here proves that they have done and are doing some things right. The multimedia offerings of Hampshire schools brought comments from visitors from the USA such as Gee, we don t have anything like this going on back in the States , which seemed at odds with Margaret Bell s keynote speech praising what she had seen on a visit to the States with NCET.

OVER TO ACORN

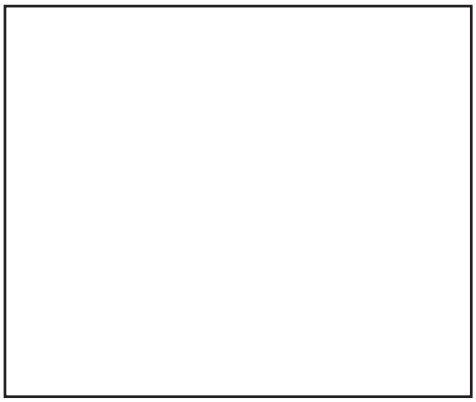
Virtually every machine, PC, Mac and Archimedes was running digital video. Malcolm Bird demonstrated cutting a CD-ROM in twenty-five minutes, emphasising the affordability of the equipment involved. The sheer volume and variety of new products for all the machines is bewildering, and there is no doubt that the Windows and PC combinations on fast 486s have improved the utility of DOS-based machines considerably. Acorn s strength is in delivering inexpensive solutions on its full range of machines. Don t forget that many of the later PC applications require 4Mb to 8Mb of RAM to run, local bus architecture etc, etc. This means that the user still has to radically upgrade a machine and pay hundreds if not thousands of pounds for software.

If Acorn are to continue to thrive, they need to keep an eye on comparative costs of delivering the real solutions users need, rather than trying to compete on sheer computing power as some commentators are suggesting. These are the arguments of five years ago, not today. The key area of improvement in the multimedia field from a technical point of view is good quality moving pictures at an affordable price. If Acorn can produce a machine that can play VHS quality video full screen at a low price, they are half way to staying in the game irrespective of processor speed. The other half of the equation is in producing well-presented applications that end users want to buy, and this is much more likely to be reliant on third parties such as Oak Solutions, ILP or New Media.

One thing that concerned me about this conference was the continuing rhetoric about change. We hear year after year how learning styles must change, and the vision of every student with access to a computer in the brave new (?) world of multimedia. Some of the best practice - Granny s Garden, Flowers of Crystal etc. - on BBC Bs is methodologically far more appropriate than many of the mega-buck systems claimed as the new panacea. It seems that there is an insistence on regression to a zero base when new technology arrives despite the fact that in essence, although the graphics might be prettier or the sound better quality, the all important game play is what really matters. Since teachers are the

main agents of change in schools, a reasonable strategy would be to make a driving thrust in broadening teacher use of IT including suitable incentives to do so.

Government quangos distributing CD-ROM drives to schools is not the answer, and neither are politically correct bland statements which do nothing to encourage the evolution of information technology in support of learning. All it tells me is that those in high places who should be providing leadership are incapable of doing so.



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There is no doubt that multimedia has a major part in the future of general purpose computing, and that data and information formats are becoming more important than processor and operating systems as far as standardisation is concerned. This is good news for Acorn provided they can remain focussed on manageable specialist markets providing quality applications at prices their traditional customers can afford.