Multimedia - a Revolution for All?

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It is probably wise to maintain a sceptical frame of mind in the face of the hype surrounding Multimedia computers. There have been many technological innovations that have heralded a "revolution" in learning. Yet with time they have not lived up to their initial promise. At present the jury is still out on the Multimedia revolution and the likely form of its impact on education, but all the signs are that computer based learning is here at last.

All learning technologies seek to harness rewards or reinforcement, stressing the importance of active *(as opposed to passive)* learning, in order to equal or improve on good human teaching. The aim is not always to replace the parent, teacher or book, but more to complement these and add an extra dimension.

This short article is the personal view of a psychologist, programmer, parent and retired university teacher.

History
It has been said that the principles of Computer Assisted Learning *(CAL)* were really first discovered by Socrates. The modern study of the psychology of learning goes back more than a hundred years to the work of people like Ebbinghaus *(1885)*, Thorndike *(1898)* and others, and 70 years ago Pressey built what could be considered the first teaching machines. Despite this, technology advanced little from chalk and board, and books until Skinner's work on teaching machines *("Programmed Learning")* in the late 1950s. Even then, the impact on most people's education was slight or nonexistent.

The psychological principles do not demand sophisticated technology. In fact Skinner's view was that the use of computers was overelaborate and would divert attention from the nitty gritty of the learning process. All that is required are very carefully composed questions and answers and these could take the form of a simple book, as in Holland and Skinner's programmed text, The Analysis of Behavior, published in 1961.

Unfortunately, teaching machines and programmed texts continued to make only slight inroads into the learning industry. The former were perhaps expensive and labour-intensive to set up for small audiences, while the latter were seen as boring. Perhaps what was needed was a widespread, cheap device that could be easily set up or programmed and could educate without the user nodding off.

As computers have become cheaper and cheaper they have been used more and more for Computer Assisted Learning (CAL), first in schools and latterly in homes[1]. Their use has been predominantly as wordprocessors and calculators rather than explicit educators, but increasingly sophisticated learning software has become more and more common. The proliferation of computers has led to the commercial viability of educational software. In the past, relatively poor sales have meant that quite small sums have been invested in the quality of educational software. Now, all that appears to be changing, although in the UK the relative lack of IBM PC-compatibles in schools remains a matter of some concern. *(Although in the run up to the general election [May 1996] all parties appear to be addressing Information Technology, regarding the dearth of PCs and Internet connections in schools.)*

Multimedia
Ten years ago you could buy a series of computer "books" for your child's Amiga computer - "Robot Readers" which would speak and with which the child could interact. The objects that the child could click on were relatively few, the speech did indeed sound "robotic" *(perhaps a "plus" in those days)* and the books were very short, but a few children found them fun and for some they undoubtedly were helpful alternatives to mum or dad doing the reading, providing a significant aid in learning to read.

Today's equivalent is epitomised by the brilliant "Living Books" series. Place an old Robot Reader on an Amiga beside a new Living Book on a PC, and our youngest barely gave the older software a second look. The question remains "Does this new software represent a significant innovation in the learning process or is it simply *(like videos and the video recorder)* "mental chewing gum" and a new form of child minder?" The CDROM with its vast and cheap memory has enabled much greater sophistication in graphics and sound.

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[1]According to an Olivetti market report in early 1996, Britain leads the way with almost 45% of homes with schoolchildren owning a computer. However, it is less clear how many of these machines represent realistic learning platforms

Has this been put to good use?

Modern multimedia educational software has learnt from games software and seeks to maintain its user's interest. Has it got the balance right? To my mind some undoubtedly have while others appear to offer education in name only.

It is also possible that the world Wide Web, Cable and Digital Broadcasting *(due late 1997 in the UK)* may yet also play a significant role in distributing multimedia software.

The computer has great virtues including infinite patience but we should, of course, not forget that despite virtual reality it is still incapable of a good quality cuddle, and there will always be a place for a book at bed time.

Input Devices for Young Children
There is a dearth of software aimed at the very young. Three years of age is the minimum usually mentioned although sometimes the software will say "two years and up". It is only when you open the package that you may find that perhaps most of the product suits a four-year-old and a three-year-old will need to be bounced on a parent's knee and even then only appreciate a small part of what is on offer. Matters are made worst by parents *(including those of gifted children)*, who tend to buy toys too advanced for their children.

Despite this, some software strikes me as excellent for two and three year olds. And of course even younger children may gain from what is on screen. The problem for the really young is that they lack the ability to independently control the computer, the means to interact with the program.

A similar problem was faced by developmental psychologists trying to find out what infants see and hear - it has been a slow, uphill struggle for them. Babies can't tell us what they see and psychologists have looked for early responses in infants - head and eye movements, startle responses, and so on in the pre-verbal child.

More and more specialised input devices for children are appearing, to bring forward a child's independent interaction with a computer - eg keyboards with fewer and larger keys, with lowercase letters on their faces. Although expensive, these may be worthwhile - I am not sure. As everyone knows the ordinary QWERTY keyboard is not even ideal

for adults, but solutions which may be more ergonomically-sound have never really caught on and remain limited in their applications. Perhaps the same can be said for children's keyboards unless they are used as a stop gap measure with a short life - a stepping stone to proper keyboards. Even quite young children can be taught touch-typing - witness the appearance of software tutors for children. At GM&C NAGC we have taught touch typing very successfully to motivated children as young as seven and eight.

Other input devices have been used - touch screens and touch pads but the vast majority of software has failed to cater for these. In contrast, the mouse is easier to use than a keyboard and has brought its own revolution in computer use. It has made life easier for keyboard-illiterate adults and is undoubtedly easier for a child to use although remaining awkward for the very youngest.

In late 1995 Microsoft introduced their EasyBall for children. Based upon the roller ball - essentially an upside down mouse - the EasyBall differed in being far larger and having just one button. Designed for use by children aged 2-6 years of age it undoubtedly offers advantages at the lowest ages. A child will be able to use the EasyBall before a mouse, but by the age of three a mouse may well already be a far better tool. *(It will all depend on the individual child's manual dexterity. It has to be said that many of us have come across intelligent adults who use mice with an expertise approaching that of someone supping soup with a fork.)*

We bought an EasyBall for our youngest as soon as it came out *(when he was two)* as up until then he had only had limited success with the mouse. Unfortunately, its working life was very short because within a few weeks we had to send it away for repair. By the time it came back he had became reasonably adept with the mouse. We chose then to abandon the EasyBall because there are some common actions with it *(like "click and drag")* which remain awkward even for an adult.
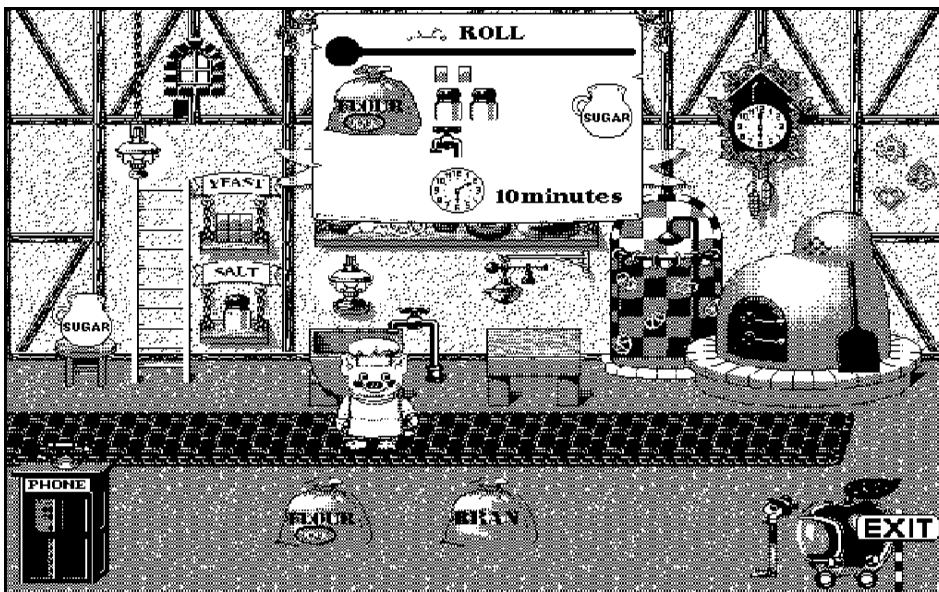
Of course one day voice control will become cheap and suitable for children… but don't hold your breath!

Good Educational Software?
Based upon ten years of experience with our children *(from two to 12 years of age)* using computers, there appears to be relatively little educational software that one could

Dorling Kindersley's My First Incredible, Amazing Dictionary

Richard Scarry's How Things Work in BusyTown

Living Books' Dr. Seuss's ABC

enthusiastically endorse. A lot of software is fairly useful, a great deal is pretty duff, and gems are rare, but things are improving.

Amongst contemporary software, with two and three year olds, the **Brøderbund's Living Books** series is brilliant and could well be the help one needs with starting to read - eg **The Tortoise and The Hare**, **Little Monster at School** and even **Dr Seuss's ABC**. The last would be even better if it had explicitly included alphabet phonetics and one would hope this will come about as Broderbund continues the Anglicising of its titles. *(It is a shame that none of these books build on the Robot Readers series' brave attempt to teach each word's phonetics.)* The late Richard Scarry's books are not always viewed with favour but the **BusyTown** and **How Things Work In BusyTown** CDROMs both intrigued our youngest. Has the foundation now been established, for example, for a full understanding of road construction and the cycle from growing wheat to baking bread? **Dorling Kindersley**'s **My First Incredible, Amazing Dictionary** also gets the thumbs up - surely painless learning for the child of nursery age?

Young children like to imitate their older brothers and sisters, and this provides a further spur. They don't need to know that big brother and big sister are not fact using educational software - but DOOM II!

Up until now, paint programs and wordprocessors have perhaps been the bread and butter of computer use for everyone, with grammar checkers yet to make a real breakthrough.

There are many programs which attempt to teach maths and English and many of these remain dated, virtually untouched by the introduction of the CDROM. This is not to say they are not useful but they do not generate great excitement. An older program which did impress is **Lander**'s **Hooray Henrietta** - a simple and effective tool for teaching arithmetic with an upper limit guaranteed to stump even an intelligent parent! Unfortunately, later programs from the same stable failed to live up to HH's early promise.

For older children there are some really excellent games written with young adults in mind. Maybe this is the future. One would like to think there is real educational content in today's simulation games like **SimCity** and **SimTower**, and **Civilisation II**.

These days more and more, the young *demand* to be entertained while they are being educated - whether it be in school or in university, or at home on the computer - and the word "edutainment" make this clear. The crucial ambition has to be for the teacher, parent *and* computer program to get the balance right.

Probably it has always been so…

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