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## **New and traditional educational media : how to choose between them**

### **Teachers' Choices**

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**Abstract:** This article, Alain Chaptal's presentation at the Macao Conference of the International Council for Educational Media, looks at the whole question of choice for teachers and considers the meaning of 'new' in the context of new media, and what choices teachers have had. It looks at the time taken for the development of new ideas in education, and what practices teachers adopt, and who decides on these. It looks at what is happening with digitisation, and finally concludes by offering ideas on what are the conditions for realising the success of the new era in education.

### **Introduction**

It seems to me that the question of choice, which is the theme of this session, is a very pertinent and very interesting question. It brings together in a very simple way, with the introduction of information and communications technology into education, many problems which have been posed for decades. During my presentation I will look at some of these: What exactly does new media mean? Has there ever really been a choice? Isn't time a relative idea? What practices are there? Who decides on them, and which are those chosen by teachers? What is the context of new digitisation? I will then conclude by offering you my own conviction that we are entering into a new era of educational technology.

### **What exactly does new media mean?**

What can we use to measure how new a technology is? Basically a rather absurd question if we think, looking back, of the announcements made by manufacturers which have had a totally different significance when looked at from the point of view of the user. We can see that a number of new systems have had a touch of déjà vu about them (for example, interactivity); or that new technologies get out of date before they have even come into existence. Who, to day, talks about information highways versus the Internet ? Furthermore, falling prices is the key for a global mass medium market as we can see on this TV units sales chart from InfoTech. Let us put this in a less scientific but more pragmatic way. In France Education Inspector General Guy Pouzard suggests, with a rather light touch, that another method of evaluating the degree of novelty of a technology is to look at its accessibility. If the cost is less than \$US 200 the technology is 'obsolete'; more than \$US 1000 it is 'new'! Between the two it is 'mature'. Using this scale, which with some adaptations of

prices could apply to many countries, the micro-computer is just entering the era of maturity.

This question of 'new' takes on a different significance when we are speaking of education. Why should we call those technologies 'new' which have been available to the general public for some 20 years? Videos for example. The recorder, invented in 1956 in the professional field, became widely used with the appearance of VHS in 1976. Of course, this explanation has nothing to do with technology. The novelty arises from how little the new technologies are used, and mainly on the fringes of the educational system. We really must have the courage to face up to this, and not just talk about it. It seems to me that the situation can be summed up in the words of a French researcher, Monique Linard: 'the integration of technology into teaching depends on results which locally are positive, but disappointing globally'.

### **Has there ever really been a choice?**

In the second place we must ask ourselves whether the question of choice of this or that medium is anything other than a formality. Of course, for several years, models for selecting media have existed, based on the research carried out since Thorndike on the question of the effects of media. One of the better known is that suggested by Reiser and Gagné in 1982. From this idea of the technological range which is at the disposal of teachers there arose some quite amusing technological monstrosities, at the time of teaching machines, for example. What really is it that is specific to each medium? Let us carry out a test.

What type of material is it that allows us to demonstrate procedures which are not otherwise accessible, i.e. changes in time and space? Which brings about a greater acquisition and a longer period of retention of information? Which seeks out and retains the interest of pupils? Which brings experts and resources into the classroom? Is it the micro-computer? The Internet? No. In 1965, according to James Kinder it was audio-visual. What is specific is sometimes relative, then....

Larry Cuban, professor of education at Stanford University, has demonstrated very well this succession of enchantments/disenchantments which mark the development of educational technology: still pictures, films, television, teaching machines, videos, computers...Larry Cuban spoke of the exhilaration/ scientific-credibility/ disappointment/ teacher -bashing cycle. During each of these cycles the forecasters and the salesmen eulogised the merits of the new technological miracle in announcing it as the next educational revolution; and most of the specialists jumped onto the band wagon. If we look at the literature of the period we cannot help but be struck by the return, at regular intervals by the almost identical arguments applied to different technological systems. These never-changing ideas cover the opening up of the school to life, the improvement in the efficiency of teachers, the possibility of working by oneself, the new role of teachers....We should keep this in mind now that the Internet is with us.

Whatever may be the interest of those carrying out some of the researches, those who are seeking to evaluate the effectiveness of making use of such-and-such a medium compared to the traditional approach, have also shown certain limitations. These are concerned with such things as the complexity and overlap of so many interfering features or the difficulty of measuring something that is new using older reference methods. Researchers, such as Thomas Russel, from North Carolina State University, analysing 248 studies from 1928 to the present day, have highlighted the concept of NSD (No Significant Differences) to sum up their points of view. By the way, at this point, you really must re-read the famous article written in 1983 by Richard Clark 'Reconsidering Research on Learning from Media' criticising comparative studies, in which he reaches the conclusion that

'The best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck which delivers our groceries causes changes in our nutrition' -

An extreme metaphor indeed. Reiser responded to the truck analogy by saying that successful delivery of frozen foods requires the use of a vehicle with refrigeration. Briefly, certain methods cannot be used if the system does not have specific characteristics. On the other hand, Clark, in accepting the neutral nature of tools, overlooks their specifically cultural dimensions. Now they quite as much determine, 'up-stream' formation of thought, as, down-stream they determine its expression. But Clark, in insisting on the over-riding importance of the teacher, raises a very essential point. These critics of certain researches have elsewhere extended beyond just the university milieu; last summer there was, in the USA, the spectacular article of Ted Oppenheimer, *The Computer Delusion* which appeared in *The Atlantic Monthly* which dealt with the pertinence and the validity of research in this field. Let us just remember that despite the existence of interesting signs the absolute scientific proof of the effectiveness of technologies has still to be shown.

### **Isn't time a relative idea?**

Let us look now at time scales. Time scale, like innovation, is a relative notion. Time scale, as far as education is concerned, is not the same as it is for technology. For technology, time scales are short. Life cycles of products continue to shorten. In Detroit, in the 1970s a motor car model could last for ten years. Twenty years later, in Japan, its life is shortened to half that. In informatics, a micro processor lasts 18 months, but a browser only nine months and, to-day, the 'time of the Internet' seems even shorter because of continuous innovations and changes. The cycles of future generations of products become more and more a matter for conjecture.

The time scale for integrating these technologies into education is, on the other hand, extremely long. It was ever so in the past. Larry Cuban noted that it took nearly 50 years before the overhead projector was really available in every American classroom. The time scale for integrating still remains a long one to day. Experiments such as ACOT (Apple Classroom Of Tomorrow) had the great merit of showing how the practices of teachers working in an environment saturated with

technologies evolved, over a period of more than ten years. And it also showed how the results of the research accompanying this project would have been much different, and more disappointing, if the project had lasted for only one or two years.

### **What practical applications, and who decides on their use?**

Let us look now at the practical applications. We should note, first of all, that, generally, a decision to adopt an innovation comes from educational authorities social pressure or from a political will for modernisation. It therefore goes against the grain for teachers who have to suffer a top-down process. One can well imagine, then that here is a situation which is not ideal from the point of view of it being taken up by the users if their immediate needs have not been taken into account. Larry Cuban has shown how much, and indeed too often, the constraints of the methods which determine teachers' actions can then be ignored.

Practical applications do, however, exist. Teachers who integrate educational technology into their activities and those of their pupils are not the exceptions. Only a minority of pioneers. What lessons can we draw from their experience? The first would tend to deny the very choice which is the theme of this session. When teachers have developed a use of educational resources adapted to their strategies and to the needs of their pupil groups, they tend to stick to them however modern the technology on offer. CNDP had this experience in France when in 1985 it transferred 8mm films on the subject of biology onto VHS. The users who were very happy with their noisy but comfortable little projectors which they kept in their personal cupboards, regretted having to make reservations for the only – but very modern – recorder in order to show the same thing. In the same way you will doubtless be surprised to learn that the 16mm film, invented in 1923 (and nearly abandoned for educational use in France in the mid 80s) remains as a support very much used in Germany, and which still represents one third of their revenue for certain media producers. New technologies do not replace older ones straight away, as Paul Saettler has already noted in his monumental history of educational technology in the United States. They bring them to completion.

The second lesson can be drawn from the technologies where the use is more general. Overhead projectors, Mimeographs, then photocopiers were not necessarily friendly technologies which were easy to use (at least for the copier at the beginning). They spread because they were compatible with teachers' practices. This seems to me to indicate something very important. At CNDP we have developed professional tools for the teacher. Their purpose is to save time for the teachers, to make the exercise of their professional skills easier, and to save them from having to produce, each one by themselves, the same tasks. We have also developed, following on from these ideas, a web service designed for lower secondary school teachers called 'Savoirs-collège'. It is essential to so arrange things that the technologies should not be an additional complexity which produces extra work for teachers.

It seems to us, though, that those who support the idea of the integration of information and communication technologies into teaching while, at the same time,

forecasting what will prove to be a necessary change in the role of teachers, commit a grave error of perspective by confusing the long term with the short term. If it is maintained that class structure, organisation by subject, and the 55 minute period all limit the impact of educational technologies, we must be very careful not to overlook the fact that teachers are what Larry Cuban referred to as the 'gatekeepers', the key actors of all successful innovations and the channels of passage which must be passed through before opening up to the pupils themselves. The ACOT example is there, too, of great value.

From this point of view, if the constructivist paradigm sketches a consensus on an evolution of the role of teachers, so that they become more of a 'guide on the side' rather than the traditional model of 'sage on the stage', it is probably very useful to be guided by the example of the introduction of office management into business 15 years ago. At that time the engineers or the secretaries were not told that they would have to give up the skills which they exercised and which they often enjoyed. These professionals were told that the new tools would allow them to exercise their skills better. That is what gradually produced profound modifications of their roles and new abilities came to light, so that today they have different characteristics compared to their original callings. It will probably be the same with education and, at the end of the day, a new paradigm will appear marking probably an evolution from teaching to learning by exploring new methods. Teaching is characterised by its highly structured nature, by use of drill and practice techniques. Learning, on the other hand, means flexibility, communication based interactivity, development of autonomy, and self learning. And this should be achieved through new approaches to learning: learning to learn, problem solving, peer learning, group learning and on-the-job learning.

We must be careful, however, of suggesting a twofold innovation to teachers at the outset. We must remember today that media are a resource not an objective in themselves. Teachers can only be activated to move towards change if multimedia tools allow them to improve their current practices. And it will probably be a determining factor if teachers can, first of all, concentrate on individual use by such activities as course preparation in which is included working collaboratively with other colleagues, before opening up with more open practice in the classroom.

Don't misunderstand me. My proposals should not be interpreted as suggesting any pessimism as to the introduction of technology into schools. The doubts which I have expressed about the relative absence of any form of determining proof about the effectiveness of media are simply the expression of a reasoned scientific doubt, which means that we must be very careful in our introduction of media. But this very introduction itself is, for me, an absolute necessity if we are going to avoid a division, which would be very dramatic, between schools and the rest of society. According to the French traditional vision (which I suspect is widely shared) the school has a double mission of educating and training, and preparing them for living in tomorrow's world. This latter mission cannot possibly ignore the technologies which already are fashioning the human environment. On the contrary, they must face this challenge, and overcome, in advance, the potential risks of a divided society

characterised by the differences between children who have already had access to technology and those who, in their homes, have never had such access to it. I believe, then, that we must act with prudent optimism, with pragmatism, and as technological realists be very conscious of past mistakes. That being so, and remembering that the school must not distance itself from the needs of society, I also recall John Dewey's declaration which he had already written in 1900:

One can hardly believe there has been a revolution in history so rapid, so extensive, so complete... That this revolution should not affect education in some other than a formal and superficial fashion is inconceivable

One century later.....

### **Digitisation**

It seems to me, however, that the digitisation which we are now witnessing, is bringing about a radically new situation by allowing a tremendous use of resources, due to the simplification of the means of access which allows the unprecedented development of networks, as well as the possibilities of modification and adaptation by the user which this digitisation allows too.

From this point of view it seems to me that this digital convergence of technologies of audio-visual, of informatics, and of telecommunications is a phenomenon which is radically different from anything we have seen before. It is in fact a question of a change of scale. For the first time in history, pedagogical tools are also the main tools by which our societies, including the private sector, produce wealth and by which they structure their activities. As is always the case when an innovation has such a wide ranging effect, there is naturally a tendency to overestimate the short term impact – which can generate severe disillusion as for example the Net@ys – but to severely under estimate the importance of the long term effects. The Internet is already in the process of changing the face of telecommunications. The impressive progress in information processing and in memory capacities (which will continue, as far as anyone can see, according to Moore's law, for at least the next 15 years), the tendency for the radical lowering of the cost of the bandwidth, delineates, with a precision which the Soviet planners in the thirties would have envied, the future of multimedia networks. New functions can, in the main, be forecast, notably the audio visual enhancement of multimedia and the emergence of the concept of programmes-on-demand. The order of magnitude of future developments is of the same order as those that characterised the changes in micro-computing in the last ten years. It is only the time scale that remains difficult to be precise about.

### **Looking to the future**

Do not let us fool ourselves, though. As always, it will be some time before digital techniques will be integrated into general educational practices. The conditions which will be the cause of these inevitable delays are themselves well known. Do not think of the new technologies as a solution looking for a problem. Consequently, do

not just use them mainly because they exist, but use them only if they bring added value to what we are doing. Think about them in the context in which they are being used, and bearing in mind any constraints which will be involved with existing organisations. Do not overestimate the immediate effects. These suggestions are not new. They have already been formulated in 1980 by Albert Goldberg in an article with the rather attractive title '*Musings of an Educator-Technologist, or I Never Could Get My Mother To Understand What I Did For A Living*'. And never lose sight of the objective that I have mentioned above: by using technologies, always try to make the teacher's life easier.

These lessons will have greater value now that the technological evolution finally allows for simple tools being available, which can be modified by teachers and can be adapted by them to meet the specific requirements of their pupils and of their own strategy. This is what all the forefathers of educational technologies have dreamt about for almost a century.

As Leibnitz wrote some three centuries ago in a completely different context '*Finis saeculi novam faciem apparuit*'; a new order of things appears with the end of the century. It is a jubilant task to prepare for it.

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