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Wanted —

new media for vocational training!

Vocational training

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Contents

Dear Readers,

The term 'new technology' is on everyone's lips, in all the newspapers and in every television programme.

At Community level, within the 12 Member States and throughout the world, there is an explosion of conferences, seminars, work groups, trade fairs and exhibitions extolling all the bright prospects being opened up by the new communication media, the media that keep us in constant touch with what is happening in the world and introduce their audio-visual products into our homes.

The working world has been invaded by new types of instrument, exerting a considerable influence over the economic and social lives of everyone who works.

Are training and education, too, stepping into the age of 'digitalization'? What is behind all those buzz-words like 'video disc', 'computer-aided instruction' and 'satellite-transmitted teaching'?

There is a good deal of talk, but what is actually happening at grassroots level?

Those of us with good memories will recall that the situation in the world of education and training is very much the same as the situation that arose 20 years ago.

At that time, it was thought that the arrival of new education technologies would radically alter the education and training system.

The euphoria of the time has evaporated and, in reality, spending on education and training has been steadily rising without really becoming any more effective.

The social science experts of the time, however, expressed serious doubts as to the results of applying these new instruments without due forethought. The world of education and training paid no heed, and it is still today sending out messages and warnings.

What is the situation today, both technically and in the practical application of new technology to education and training?

The prevailing education/training technology is data processing, broken down into:

- information and the general numerical processing of information;
- magnetic, optical and other storage devices;
- network interconnections.

Instruments have become more user-friendly, easier to handle, because they are miniaturized and more *intelligent*.

Television is no longer just a television set, the telephone is no longer just a telephone instrument.

Engineers can offer us any solution we want, for, technically speaking, nothing is impossible any more. To exaggerate a little, it could be said that we can find 'the solution' but we have not yet touched on 'the problem'.

When it comes to applying new technology to the practice of education and training, we come up against the wall of conservatism and tradition of conventional teaching methods; above all, we have to work in an institutional framework which does not favour 'innovation' in the 'art of learning'.

Of course, every country has its pacemakers who have on occasion successfully applied new technology to both distance education and computer-aided instruction. They are still the exceptions that prove the rule, for today's schoolteacher still relies mainly on the blackboard and chalk, not the video disc or computer.

The problem today, however, is altogether different from what it was 20 years ago. The cost of both hardware and software has steadily fallen, making them more and more accessible. They have already invaded every sector of the economy, both industry and services. This self-generating process of change has been brought about not by any education and training policy but by purely economic and technological factors, and teaching methods have apparently played no role in that change.

Are we to infer that education and training policies will in the future be constructed to fit in with trends in the growth needs in a given industrial sector? As far back as in 1979, the Club of Rome said that 'The method of learning depends more on the structure of the telecommunications industry than on the innovatory potential inherent in these new techniques.'

Obviously all the new technologies exercise a certain attraction on young people, who use them in the form of 'entertainment' (pop videos) or 'games'. If young people are attracted by 'novelty', could we not devise some way of using this to create better motivation for training?

To do so, we would have to take vocational training out of the academic realm by innovatory teaching projects, not constructed around new technology but using to the full the potential afforded by that technology.

It is unfortunate, but in the world of training there is little contact between new technology and its potential users. The reason why trainers do not use new technology and in some cases know so little about it is the lack of a coherent training strategy designed to make the teaching/learning process more effective, in which new technology can be used as part of an innovative teaching system.

However that may be, one thing is certain: in the teaching and learning process, the machine will never replace man but will be a tool in the service of man. Provided that the trainers realize this, machines will become an instrument in their hands.

Those who have not managed to make their voices heard for so long *must* have the right to speak. The social scientists *must* at last go back and talk to the engineers. Technology *must* be placed in the service of man for his education and his training, in order to improve the quality of his life.

This can be done only if the political world realizes that structures must be set up which provide scope for 'innovation' in education and training.

Innovation will come about through dialogue and reform of this kind.

Georges Dupont
Norbert Wollschläger

Some of the articles in the *Vocational Training Bulletin* have been taken from a colloquium organized in cooperation with the Commission of the European Communities in Berlin on 3 and 4 September 1987 on the subject of 'Audio-visual technology and vocational training in Europe — a dual challenge'.

Message on the occasion of the CEDEFOP conference, Berlin, 3 and 4 September 1987

The title of your conference, 'Audio-visual technology and vocational training — a dual challenge', is very appropriate. In our fast-changing world, training and retraining agencies must constantly adapt and acquire a new dimension, and audio-visual techniques obviously have a major role to play in that process.

The media are among those that are immediately responsive to technological, economic and commercial change. With cable and satellite television and video, and with the end to the public-sector monopoly in radio and television, the consequences are twofold: broadcasting has become a European affair and is no longer the responsibility of individual countries; and there is a great expansion in the number of channels and the number of hours to be filled.

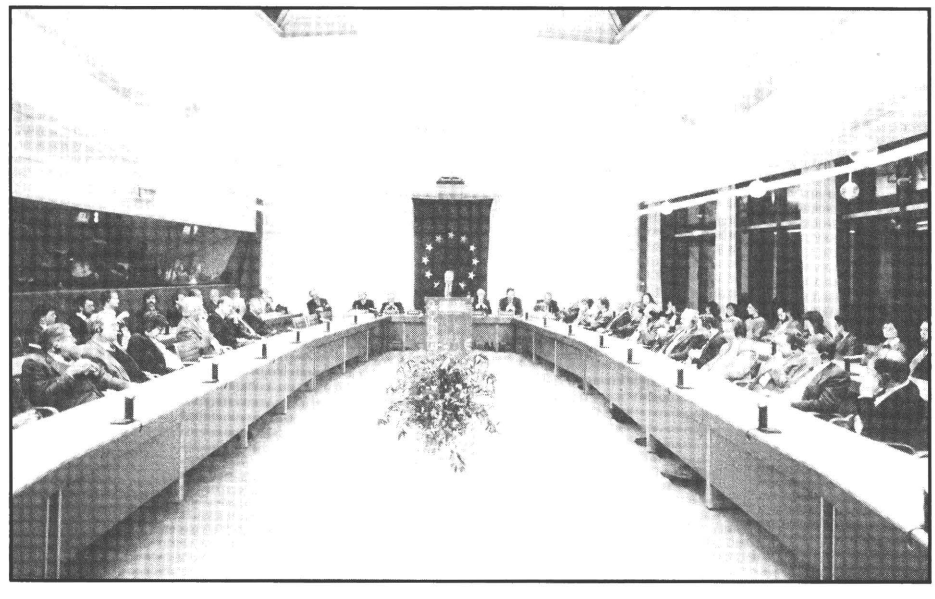
And what about the citizen of Europe, what is he to see on his television screen? Unless Europe responds to the challenge, we and our children might well be fed a diet of American, Japanese or other TV programmes, serials and films, with all the inevitable cultural, political and economic implications.

The European Year of Cinema and Television 1988 has taken as its aim to make the general public and political and professional circles aware of not only the dangers but also the barely tapped wealth of what we produce in Europe, with all its potential!

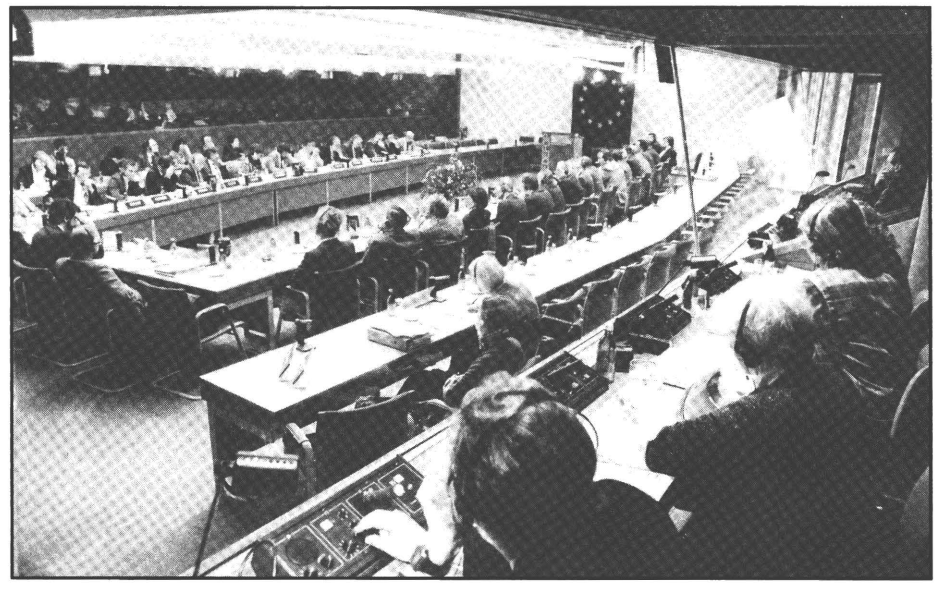
But the media professionals must be made more aware of the concept of European partnership, just as the governments of all countries must be made aware that they must seek ways of backing the development of a Europe-wide industry.

The media are, by all accounts, effective — indeed, essential — tools for training. But the training acquired must help the film and television professions to work better on a European scale.

The media and vocational training are, I feel, an inherent part of our own times.



Stephan SCHRAPS



Stephan SCHRAPS

Simone Veil

President, European Year of the Cinema and Television 1988

Audio-visual and television technology: Towards a Community policy

With the passage of time our society becomes more and more complex. This is reflected in a strong demand for people with higher levels of professional training. In many European countries it is now recognized that universities and other institutions of higher education will be unable to deliver the required number of graduates at least up to the year 2000. This is a problem which has serious implications for the future of Europe, because the shortage of suitable qualified professionals will affect the competitiveness of industry in general and therefore employment as a whole.

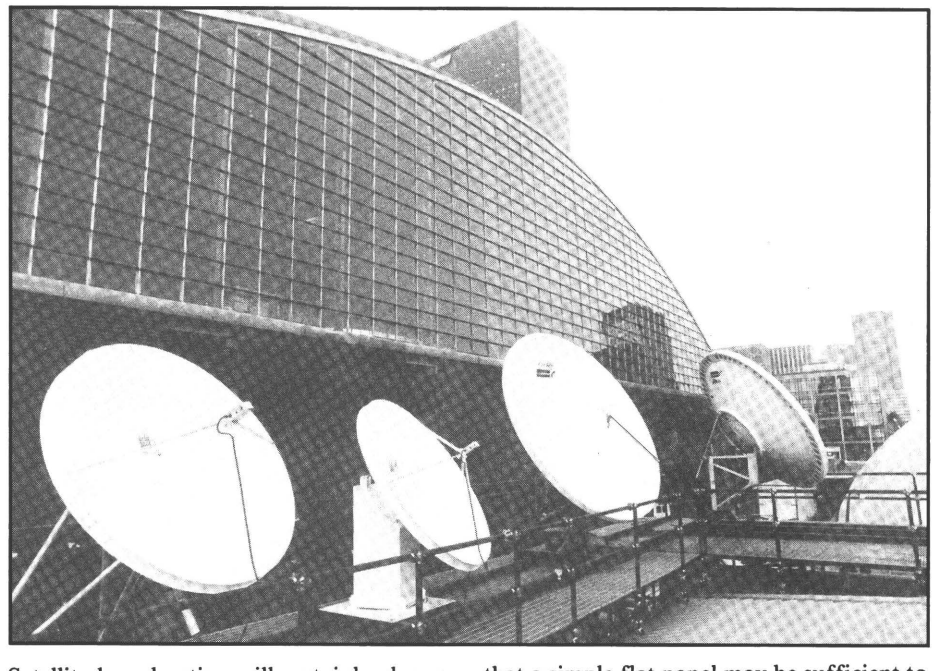
It is recognized that modern technologies could offer opportunities to enhance the efficiency of our education systems. Various actions and programmes are being initiated by the Commission in this field, the field which provides the terms of reference for this conference.

In this presentation I will report on current and future audio-visual developments in Europe and also on two Community projects, namely 'Delta', to stimulate the development of new learning methods, and 'Media', to stimulate the programme-making sector.

The current audio-visual framework in Europe is characterized by a multitude of national programmes intended for people in only one country. In some countries cable TV enlarges the choice by adding the programmes of neighbouring countries. The small size of national markets for video-productions has enormously influenced what European producers have to offer, and in many countries screens show mainly American films and series. The European identity is in danger with such a limited choice of programmes of European origin.

The technological advances which are going to take place will bring opportunities as well as dangers for programme production.

Let me first review the technological changes which will influence the sector.



GAMMA/Raphaël Gaillarde

Satellite broadcasting will certainly change the scene. Until now satellites have been used for transmitting programmes to cable TV head-ends but in future the sky will be full of direct broadcasting satellites (dbs). The launch schedules herald a whole series of European satellites. And remember that only Europe is launching direct broadcasting satellites!

- in 1987 the German TV-SAT 1 and the French TDF-1;
- in 1988 the Astra from Luxembourg;
- in 1989 ESA's Olympus, a Swedish satellite and most probably a British one;
- in 1990 the first of four Eutelsat dbs satellites.

By 1990 a total of 22 dbs channels may be receivable across most of Europe. The four Eutelsat satellites will provide more than 60 additional channels.

Of course the reception techniques need some improvement. Today, a 1-metre disc antenna is required to receive the signals from the dbs satellite, but research in electronically steered antennae indicates that a simple flat panel may be sufficient to receive signals from all satellites without any mechanical adjustment of the direction of the antenna. This amounts to a revolution because it would also mean that cable TV distribution would no longer be economical, at least not with today's broadcasting quality.

The resulting hardware markets which will be opened up for industry are enormous — approximately 2 000 million ECU for satellites, launches and the transmitting ground stations; approximately 10 000 million ECU in the coming five to seven years for antennae, decoders and other equipment

Professor Tjakko M. Schuringa
Director Telecommunications DG XIII-D Commission of the European Communities

for direct home TV reception from satellite (based on a 20% penetration in European homes).

A number of direct broadcasting satellites are to be launched by European concerns. This is in line with the wish of their respective governments that a sound infrastructure be established for broadcasting. Although it is recognized that this exercise is expensive, the cost might be justified for large countries if compared with the cost of alternative solutions.

With a number of satellites over Europe broadcasting over a specific country but overspilling to others, there is a danger of what could be called 'cultural pollution'.

If and how one should and could prevent the reception of TV signals from satellites remains an open question. It is known that TV is a much more powerful intruder than radio. This means that direct TV broadcasting also challenges the free societies on the question of whether they should and could control what programmes are offered.

This problem has to be discussed between the interested States with a view to reaching some kind of agreement on protecting national cultures. However, such agreements are not enough, and additional action is necessary to create a favourable climate for the film industry to produce culturally sensitive programmes.

Two other technological changes in the TV sector, Mac and HDTV, point the way to solutions for the problems of programme-making.

Let us now recall which actions the European Community has already taken to respond to this challenge.

In June 1984, the Commission published a Green Book on 'Television without frontiers', a report which attempted to identify the foundations of what could be a Community policy for television. Its main logic consisted in recalling that the Treaty of Rome, by its very existence, obliged its signatory Member States to respect the principle of free circulation of services. And, since programming can be considered a commercial product, television clearly falls under the definition of a service.

Following the wide-ranging debate triggered off by this Green Book, in spring 1986 the European Commission distributed a draft directive intended to bridge the legal gap in the audio-visual field by coordinating certain national positions concerning broadcasting. The draft directive attempts to take a measured initiative — it leaves to

Paul GLASER

Member States their autonomy in fixing the rules which they judge necessary for broadcasting on their national territory, whilst requesting them to prevent these same national rules hindering the distribution, over their territory, of programmes coming from other Member States. In order to achieve this, the draft directive underlines the necessity of at least a minimum of coordination of national legislation in two fields: that of advertising and that of programme content and sources.

The rules of advertising concern in particular the duration of programme-time interruption by advertising, the rights of young people, the exclusion of advertising for tobacco products, and the limitation of advertising for alcoholic drinks. It is proposed that no broadcast from another Member State for which the advertising content does not exceed 15% can be refused by Member States.

As for programme content, the Commission proposes — aside from a clause concerning the need for control to ensure the protection of young people and the protection of authors' rights — that 60% of net 'air-time' (advertising, news, games and sport not included) on all channels transmitting from Europe should be reserved for material produced within the Community. To encourage the emergence of new productions in the Community, all European channels should allocate 10% of their programme budget for purchasing material produced by independent Community companies. The draft directive thus has as an essential goal, the creation of a market of sufficient size to justify the required investments.

Regarding satellite television technology, on 3 November 1986 the Council adopted a directive on the use of the Mac-packet family in the Community. These standards were developed jointly by the European Broadcasting Union and European industry. They make for compatibility within the Mac-packet family, provide better image and sound reproduction and also permit the simultaneous use of an image channel with several sound channels. The Mac (Multiplexed analoga components) standard thus allows for the broadcasting of multilingual programmes. It will also pave the way for HDTV (high definition TV): the Mac standard will be followed by the HDTV standard. The Commission directive foresees immediate and exclusive use of the Mac-packet standards for direct broadcast satellites, with a progressive transition for terrestrial broadcasting and cable distribution; this will avoid any need for consumers and producers to replace, radically and abruptly, their hardware. Further, at the meeting of the CCIR in Dubrovnik in 1986, the Community Member States, coordinated by the action of the Commission, took a unanimous position which made it possible to avoid the choice of a single world standard proposed by Japan for high definition television production which did not allow for progressive evolution and did not take into account the 50 Hz specificities of our 50 Hz mains environment.

However, the various initiatives taken by the Commission — whilst important, even essential — represent only the first steps of a more active Community policy in the audio-visual field.

Future actions in the audio-visual field relate to technological and industrial co-operation and to the stimulation of applications and programming.

Technological actions

The agreement on common Mac standards for television broadcasting is a great achievement for a unified Europe. However, the definition of a worldwide standard for high definition television is still a major issue for the future. Here, it is important to continue research and development work in order to produce a truly worldwide standard which, unlike the proposals made so far by the Japanese, takes into account the evolutionary character of the technology and the need to ensure, in the interest of all, a certain compatibility between existing installed receivers and future transmissions in high definition. If these objectives are to be reached and an equitable opportunity is to be ensured on the world market for European equipment and programmes, it is necessary to react rapidly. The agreement of Dubrovnik provides only a short breathing space, and above all care should be taken not to underestimate the Japanese who, in spite of the technical disadvantages of their system, have built up a considerable advance. They, in fact, have already developed all the equipment and invested time and effort in making that equipment available to interested users (in the United States, Canada and Italy, for example).

It is with this in mind that the Commission is attentively continuing to strengthen the technological capacity of the Community industry concerned. A Eureka project has been launched to allow for work to be carried out on defining a balanced worldwide HDTV production standard. The RACE programme of research and development, which is now in the launching phase, aims at preparing the technologies required for the broadband networks for audio-visual interactive communication services: in this framework, it will also contribute to the development of high definition television standards and technology.

The excessive fragmentation of the European consumer electronics market and the resulting difficulty in preparing the production of new equipment call for co-ordination and stimulation measures. The Commission has started consultations with the main actors in the sector to identify possible solutions.

Audio-visual technology is further faced with two major issues of a mainly international nature: orbit space and the shortage of radio frequencies.

Communication satellites positioned at the height of 35 800 km above the equator in so-called geostationary orbit appear stationary from the surface of the earth, thus providing communication over large areas using fixed antennae. The characteristics of the receive/transmit ground antennae allow satellites to be separated by a minimum of 2 000 km, which in turn permits a maximum of 120 orbital slots. These limitations cause problems of position allocation, problems which were addressed by the ITU as early as 1977. As the situation has evolved, ITU is again planning a World Administrative Conference to be held in 1988 to discuss the utilization of the orbit.

The frequencies required for TV broadcasting are reasonably high though still in the spectrum-sector which has the characteristic of light. Due to the ball-shape of the earth, terrestrially transmitted TV signals can be repeated with the same frequency at distances of 600 km. But satellites cover half of the planet and cannot be used in a multiple way. The large bandwidth necessary for HDTV explains why HDTV is not possible with terrestrial broadcasting. But satellite-based transmission for HDTV

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could be a problem because of the poor reception quality in bad weather conditions. The use of broadband networks is therefore envisaged for HDTV. If one recalls that the mobile telecommunication service will need huge frequency bands in the future, the potential conflict in this area becomes obvious.

Use of the audio-visual infrastructure

From the economic point of view, the programme industry is as important as the equipment industry, financially as well as in terms of employment. The emergence of more stations calls for a marked expansion in programme production, and success here in turn determines the rate of growth in new equipment. In fact, the programme sector is as much a challenge as the technology. How European producers can best profit from the new opportunities provided by the continental size of the Mac and HDTV broadcasting market is not too obvious since American productions already occupy the main part of the European market.

Two programmes are being launched by the European Community to safeguard our own cultural identity by promoting creative resources and to utilize the opportunities of audio-visual broadcasting for distance learning.

The 'Media' programme is intended to stimulate the development of the audio-visual industry. The projects are to be defined this year. A number of pilot projects will go on trial in 1988, the year of cinema and television. The programme should be in full swing by 1989.

The objectives of the programme are to be achieved in two ways:

- by promoting the reputation of the Community's audio-visual industry with the establishment of European networks and the introduction of multilingualism,

- by promoting coordination and cooperation among the European industries to make them more competitive, thereby stimulating the use of new technologies, the training of professionals, and the development of script-writing and also new methods of financing which draw on the advantages of the single market.

DPA/Hoffmann

I would like to mention another very significant EC programme which I have deliberately left until the end since it seems to be of major importance for Europe's future. There is another important field in which direct broadcast satellites will be involved in the future: distance learning. Concerned with Europe's lack of expertise and knowledge in the field of distance and open learning, and the urgent need for continuing education for the survival of Europe's industrial and commercial base, the Commission has decided to react to a potentially dramatic situation by drawing up the Delta project.

Delta is concerned with the development of European learning on the basis of technological advances using, *inter alia,* direct broadcasting satellites, which can meet the future need for more flexible learning supports. ESA and Eutelsat have already offered the Commission the use of dbs on an experimental basis. The Delta programme is intended to provide stimulus and develop expertise in a field in which Europe will have to invest a large measure of effort if it is not to forego in the very near future its edge in industrial and scientific expertise, skills and know-how which have shaped its reputation throughout the rest of the world. The future of our industries depends primarily on human resources and ideas.

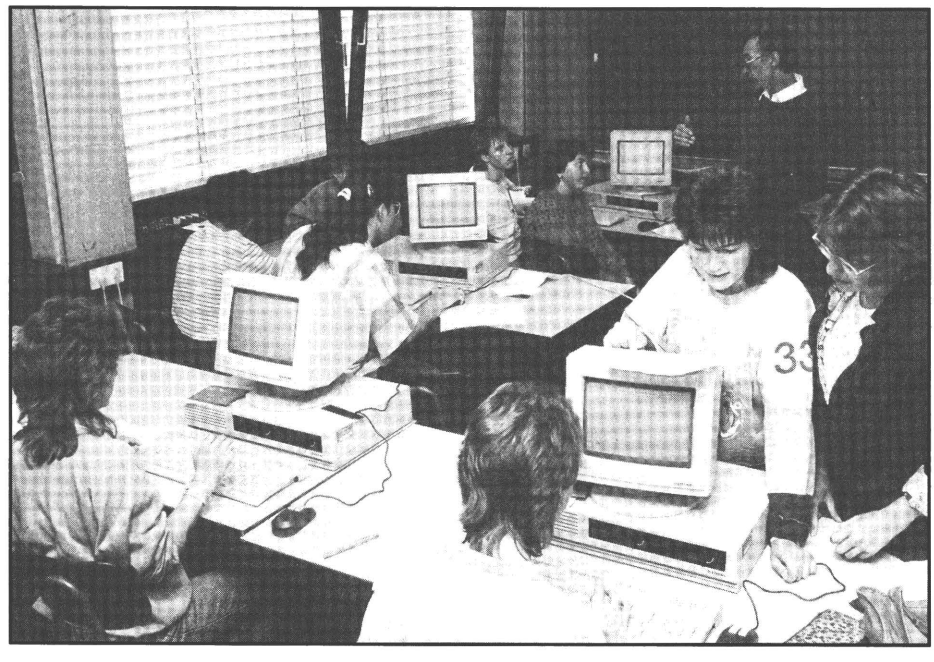
The Open University in the United Kingdom and the Fernuniversität in Germany are excellent examples of the use of broadcasting as a systematic support for continuing education. It is thus time to react and launch experiments throughout Europe to meet industrial demand for a specialized work force. By launching the Delta programme this year, the Commission is demonstrating its awareness of this problem; it will be contributing towards identifying solutions with the next direct broadcasting satellites.

The time available unfortunately does not permit me to go into detail on all the initiatives taken by the Commission, and this outline will have to suffice here.

None the less, it is possible to draw certain conclusions concerning the future of Europe. I would stress again that here we are only talking of the first steps in what, of necessity, is a broader action to be conducted in full consultation with all interested parties. The Commission wishes to stimulate this European consultation process in order to highlight the Community-wide dimension of the problem. Imperative and critical is the need to support European industry in facing up to the challenge before it if Europe is to remain well placed on the very important audio-visual market. Equally, the Commission is committed to making a renewed contribution towards creating a Europe of advanced television and audio-visual techniques, a Europe of new technologies, a Europe for culture, and a Europe for its citizens.

Audio-visual aids in vocational training: The experience of the last 20 years

Twenty years ago the third and, as far as I know last, EBU international conference on educational radio and television was held in Paris. It is instructive to look back on that conference in the context of our meeting on 'Audio-visual technology and vocational training in Europe: a dual challenge'. One striking change at least has come about in our field in these two decades. It would be impossible today to conduct what was, in effect, a world conference attempting to present a comprehensive review of the state of the art of educational radio and television without giving a prominent place to vocational training. In fact vocational training and related areas received only the scantiest reference. The term *vocational training* as a specific educational activity requiring the application of task-related audio-visual methods and means is almost totally absent from the 680-page report of the conference.



DPA/Witschel

Even the use of the term *education* was a somewhat daring innovation. As the guidelines for the conference pointed out 'Since the previous conferences in Rome and Tokyo, the increasing use of radio and television for university teaching, adult education, social advancement and literacy campaigns has led the European Broadcasting Union and its organizers to modify the title of the conference. The term "school" radio and television was felt to be too limited and has been replaced by "educational". This change in the title indicates the wider scope foreseen for this conference in Paris.'[1]

Clearly vocational training was widespread in 1967. But out of about 110 educational television programmes screened during the conference only two were classified as relating explicitly to vocational training. These were included in the generic category of programmes for *adults* of which there were 30. This category comprised also basic education (2 programmes), social sciences and psychology (8), science (1), national languages (2), mathematics (4), foreign languages (3), history (1), hygiene (2) and economics (5).[2] When one looks more closely at the actual programmes, it becomes evident none the less that they included a good deal of material which might today be classified as vocational training. Much of the material on foreign languages, mathematics, physics and chemistry and to some extent sociology and psychology, was used both for students in secondary or higher education and in adult vocational courses. But there were no programmes about engineering, computing, information technology and only one programme on a specific management subject.

Yet another respect in which the field today has extended beyond the conception of those organizing the 1967 conference is the range of delivery systems. In Paris 'it was (also) decided that the conference was to be limited to the field of *open circuit* educational radio and television'.[3] At the time the alternative delivery systems were closed-circuit radio or television, delivered by coaxial cable usually within a single education or training institution, films, slides, correspondence material and, indeed, the most venerable of them all, the book. As yet no viable video cassette or other recording and replay system had been invented: the video recorder with which a consortium consisting of RCA, Agfa and ICI experimented in the mid-1960s had turned out to be a commercial failure. Cable systems existed mainly for the relaying of radio and were used for the improvement of signal quality. Satellite television had hardly appeared over the far horizon.

George Wedell *is Director of the European Institute for the Media and Professor of Communications Policy in the University of Manchester. He was for several years in the 1970s responsible for the development of the EEC Commission's vocational training policies and was Professor of Adult Education in the University of Manchester from 1964 to 1975.*

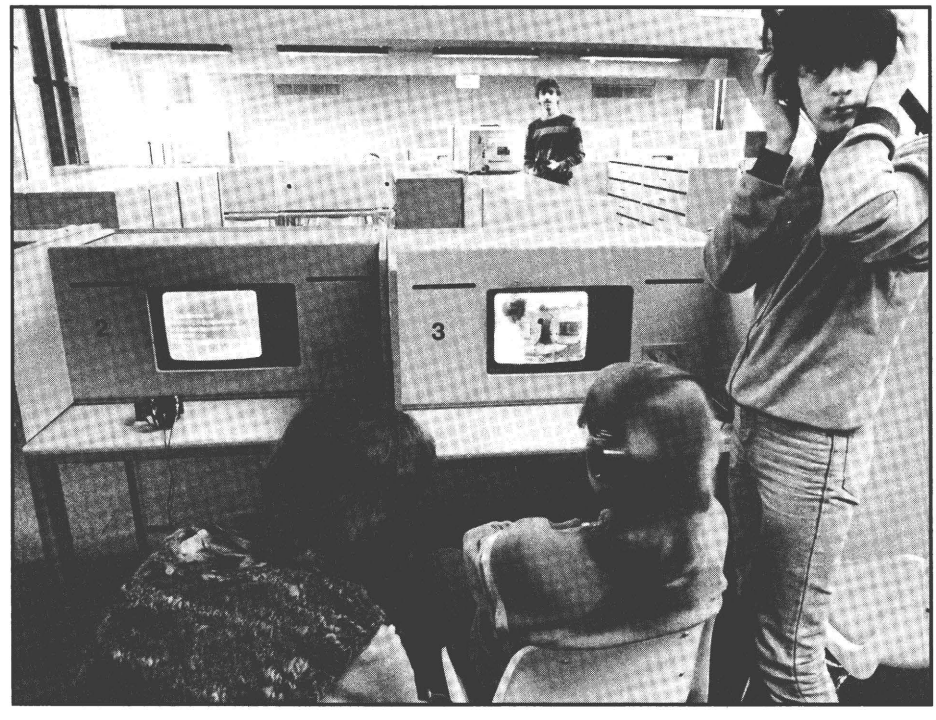
It is interesting to note the criteria by which the educational character of a television programme was distinguished from the broad field of cultural programmes. The organizers decided that 'the educational nature of the programmes should be marked

- by the aims pursued: they should lead to a systematic acquisition or improvement of knowledge;
- by continuity: as educational objectives can be reached only by regular and progressive programming;
- by the supplementary material used: since the programmes must, in theory, be accompanied and reinforced by supporting material;
- by reception conditions: reception, whether individual or collective, supervised or not, must be active and must lead to an examination, or at any rate, results must be checked in some way.'[4]

This quotation *in extenso* is justified by the healthy emphasis it places on radio and television. Much of the orderly progress, which was ensured at the time by the national public service broadcasting organizations, has since been lost. These had a virtual monopoly of all broadcasting including educational broadcasting. Thus they carried on into this field both the disciplined processes developed for the general output and the didactic expertise of their specialist educational advisers. There is no doubt that the widening of the field since then has brought with it an enlargement of the range of quality in this area of production. The best programmes are a good deal better, but there is also a good deal of material of indifferent quality.

The classical model of vocational training

The need for vocational training is at least as old as the emergence of the division of labour and the identification of discrete skills, the mastery and practice of which made it possible to distinguish between one master craftsman and another. The butcher, the baker, the candlestick maker, as much as the blacksmith working in metal, the joiner working in wood and the cobbler fashioning leather into footwear, all had skills which were clearly identifiable, and which needed to be passed on to the next generation. This transfer of skills soon came to be linked to the regulation of numbers being trained in each skill. The craft guilds were understandably anxious not to depress the value of their skills by training too many people. Thus training became as much a method of regulating access to a trade as a means of conveying the skills needed to exercise it. Thus was established the nexus between training and the economic condition of an industrial sector.



LAIF/Jürgen Bindrim

The need for an audio-visual element in training lies at the basis of the traditional apprenticeship system. The apprentice often lived with, and certainly worked next to, a master craftsman. He learned the craft by watching them, seeing how they adapted generic skills to the need to solve specific problems. He spent much of his three or four years sweeping the workshop floor and (certainly in the United Kingdom) making the tea. But he also began to learn and little by little, to exercise the necessary skills and to refine them into an understanding of the whole production or maintenance process. This archetypal vocational training model of the apprenticeship is today much criticized for its wasteful use of the apprentice's time and for its task-specific rather than sector-specific, orientation. But we must admit that, in a period when young workers had plenty of time this slow maturation through experiential learning of one task after another had strengths, some of which we tend to lose in these more streamlined and autodidactic days. The need for the broader training to cover a whole sector was met largely by the journeyman years which followed apprenticeship. Here again the audio-visual element was an essential ingredient. The journeyman had the opportunity both of working with a variety of masters, to watch them at work and learn to compare their skills. He also learnt to cope with the different contexts of his work in different places, and, in general to see something of the world outside the narrow confines of the apprenticeship.

Of course the industrial revolution changed all that. Apprentices were still needed, but came to be members of a relatively small elite class of skilled craftsmen in the making. The vast majority of workers needed were either unskilled or semi-skilled. The concept of learning by 'sitting next to Nellie' derives from the way cotton operatives learnt their jobs; again by watching some more experienced worker do the job and gradually picking it up.

An interesting element in this classical model of vocational training is that it was essentially experiential as well as audio-visual. Thus it contained all the positive elements, as well as the drawbacks, of learning from one specific master, be he good, bad or indifferent. The experiential element was omnipresent and, on the whole, beneficial. But it might well block out the conceptual element in the understanding of a process, which is central to modern vocational training methods. Nowadays we regard it as essential to build an understanding of the principle into the design of a training programme. Perhaps this element is occasionally exaggerated to the detriment of the fact that much learning begins with practice which, when mastered, will make it easier to grasp the principle.

Last but not least, the traditional apprenticeship system was universal, at least in terms of Western Europe. A craftsman trained in one country had skills which were recognized in most others. The free movement of labour was taken for granted. Only

in this way could supply respond to changing demand as between one region or location and another. And the fact that much of the learning was experiential made language less important than it is today when an audio-visual programme in one language is likely to be incomprehensible to those learning through the medium of other languages.

I suppose the main drawback of this classical model of training was its once-and-for-all character. Once a master, a craftsman was a master for life. At a time when the rate of change was slow, this did not matter too much. Nowadays, when skills in many areas have constantly to be renewed and up-dated, it is a significant policy issue to decide both what initial training is appropriate and what is an acceptable period of validity before updating and, when necessary re-examination becomes essential.

The audio-visual element in modern vocational training

We have seen that audio-visual methods are taking some time to penetrate the established patterns of vocational training. The modification of the classical model appears to be occurring only slowly. We have also noted that there are elements in the classical model which retain their validity, such as the importance of experience and the element of encounter over time between trainee and trainer. But the paucity of articulate analysis is well described by Professor Ashamer in his introduction to his book on AV Medien: 'Reporting on audio-visual media in vocational training is a daring enterprise for several reasons. Very little can be found in the relevant literature on the theory of media in vocational training and it is even more difficult to obtain any information at all on the ways and extent to which these media are actually used in practice. The main reasons for this are underdeveloped didactics and methods in vocational training, insufficient research into instruction and media in this field, and the lack of transparency on the market and in practice, a factor which is hardly surprising given the many varied systems of vocational education and training. It would not be enough to try to excuse this deficit in vocational education by pointing out the theory and practice of media in general schools; we have no founded knowledge or experience concerning their transferability to vocational training.'[9]

In this paper I therefore can but sketch a few vignettes which are indicative of progress. In the course of this conference we shall hear about other significant pilot projects and innovations.

The first vignette comes from France. The reason for this is that I searched the useful series of descriptions of the vocational training systems in Community countries which CEDEFOP has published in recent years in the hope of finding some tangible evidence that audio-visual methods have been incorporated into the structures of vocational training in our countries. The report of the French system (which, alas, appears to have no date) only contains one oblique reference to audio-visual methods. This is the initials RTS in the glossary which, I was informed, stands for Radio Television Scolaire! There is no substantive reference to the impact of educational technology or of audio-visual methods.

The CEDEFOP series deals with the structures of vocational training rather than its content and methods. None the less it is significant for the isolation of much vocational training from what one may call the cutting edge of technological development that the most significant development in our field could not find a mention in the report. This is the introduction of *Minitel* as a form of vocational training on a broad front and of a clientele who were, and are, largely unaware that they are being trained in the new information technology.

The development of Minitel is, I suppose, one of the boldest initiatives in training by audio-visual means undertaken anywhere in the Community. It matches in scale the creation of the *Open University* in the United Kingdom in the early 1970s. The provision of a learning experience in the field of the new information technology appears to have been a government decision taken without reference to the normal channels of decision-making in the field of vocational training. As I understand it, it was decided that the best way to ensure that a large section of citizens became familiar with the computer as a polyvalent tool for a wide range of present and future occupations was to create an existential need to use this tool for the ascertaining of telephone numbers in place of printed telephone directories, and to enable the PTT to make an investment substantial enough to equip users with the hardware free of charge. The fact that the demand for the hardware (which is distributed free of charge by the PTT) would create new sources of revenue for the PTT and at the same time provide a useful boost to the French computer manufacturing industry does not minimize the remarkable character of this initiative in effective vocational training which, I think, has put France well ahead of other Community countries in the general level of computer competence. The distribution of Minitel terminals has increased from 108 000 in 1983 to 2.2 million in 1986.

My next vignette comes from the Federal Republic of Germany. It relates to the training for computer-controlled manufacturing techniques in the machine-tool sector. I am indebted to Mr Godehard Neumann and Mr Karl-Heinz Pohl for this example.[5] They found that in the training of lathe-operators it is nowadays essential to cover the use not only of conventional machinery but also of computer-controlled and computer-numeric controlled machinery. This is particularly important at the stage of advanced training which needs to be industry- rather than enterprise-specific. At this stage the training process needs to provide a qualification which is applicable to a variety of systems and independent of specific manufacturers. Moreover, it must cover elements peripheral to the actual computerized production process, such as tool-making, the preparation of work and of tools and a thorough mastery of workshop technology. Only in this way can the training process enable the trainee to learn both what is needed to handle the system with which he or she has to deal immediately, and what is likely to be required in the wider context later.

The practical effects of moving from a traditional training programme for the machining of a graded bolt to a training programme for a computer-assisted machining process is illustrated in the two figures below:

Training programme for machining a graded bolt (old method)

prepare:
Instructor explains intention by means of drawings, transparencies, blackboard and sample piece.

demonstrate:
Instructor demonstrates the working process. He supports the demonstration by means of a video film. The working area of the machine is illuminated for better observation.

imitate:
The student imitates all steps of the working process under the supervision of the instructor.

practise:
The student repeats all the steps of the working process with increasing accuracy of measurements or with workpieces of comparable difficulty.

Manfred VOLLMER

Training programme for machining a graded bolt (new method)

prepare:
Instructor explains the overall configuration (operational area, interaction of equipment, etc.). He explains the workpiece which is to be made by means of drawings, transparencies and sample piece.

demonstrate:
Instructor writes the first programme — including explanations — on the blackboard/overhead projector.

imitate:
Student copies the programme on to a programming sheet.

test:
Student feeds programme into the controls of his work place. He tries to solve problems together with his 'team colleague', at the work place or he asks for the help of the instructor. Having completed the programme in-put the student activates the simulator at the work place. If mistakes become apparant, the 'student team' will try to find them or they ask the instructor to help. Special problems can be made visable for all students on individual monitors as well as on large-size monitors. After the correction of the programme is completed, it is punched out on paper tapes or printed out in text form. Should it be useful for the situation, the programmed workpiece could be printed out in the form of a drawing.

The machine is then prepared (adjustment of the tools, the workspace, etc.) and the machining process can then start. To demonstrate particular machining problems (for example special material) a video film is often shown before the process.

practise:
Repetition of the programme in-put process with other workpieces.

Whereas testing does not form an explicit element in the old training method, it occupies an important place in the new. Trial and error becomes an active ingredient in the new learning process while it is virtually excluded from the old. The role of the trainer evolves from that of a dominant controller of the learning situation to that of an interactive partner in the teaching/learning situation. The trainee, under the new method becomes more independent of the trainer: for example he, and not the trainer, decides the point at which the viewing of a simulation exercise may be useful.

We have here the effective application of audio-visual technology to a specific industrial training objective. No doubt there are many more examples in many skill areas which members of the conference could cite.

My third vignette comes from the United Kingdom. The Open University is not, of course, a vocational training institution any more than are the more traditional universities. But its importance in the development of audio-visual methods during the period under consideration is such that it would be foolish not to benefit from that experience. Moreover the model of the Open University has now been adapted to the needs of a more vocationally-orientated category of learners in the Open College, as well as being used for the development of a wide variety of multi-media learning situations.

Many people have claimed paternity of the Open University. I am not among them. I have, however, to confess to authorship of one of the memoranda which contributed to the formulation of what was originally called by the then Prime Minister, Mr Harold Wilson, the 'University of the Air'. I alluded at the beginning of this paper to the substantial impetus given to audio-visual education and training by the expansion of terrestrially transmitted national television services in the 1950s and 1960s. The essentially new element which television was thought to contribute to the extension of educational opportunities, particularly for adults, was the possibility of providing education at a distance from the point of origin of the teaching process; and the multiplication of the impact of (it was hoped) the best of teaching practices.

In a report on education by correspondence to the Council of Europe in 1970 I said 'As the educational systems in most European countries have grown and developed since the Second World War it might have been expected that correspondence education would wither away, particularly in those countries in which it had traditionally been regarded as a substitute for formal face-to-face teaching. The contrary has, however, been the case. As educational provision of the traditional type has expanded, so has the demand for education. Thus all forms of provision have had to face an increased demand, and correspondence education is no exception'.[6] It was this continuing expansion of demand that the new generation of distance education sought to meet. One of the most insistent sources of demand were the non-graduate teachers, largely in primary schools, who had been trained under the old system of two-year courses (or less in the immediate post-war period) and who aspired to graduate status so as to bring their status to that of graduate secondary school teachers. Similar demands were made by various types of social and health workers, technicians and people with sub-graduate qualifications in commerce and industry.

LAIF/Jürgen Bindrim

It was this demand, as well as a demand from people without any professional or academic qualifications that the Open University set out to meet. Here, as in the case of Minitel in France, the political impetus was given by the government. It by-passed, to a large extent, the existing institutions of distance education and set out to provide a quite new and much better quality of distance education by a multi-media mix which included correspondence courses, radio and television series, face-to-face contact with a tutor as well as short-period residential sessions. The determination to secure equality of esteem between the new university and the existing ones forced the government to fund the new institution on a scale not heard of before in distance learning. It attracted excellent staff and, together with the BBC, undertook significant development work in the whole area of distance education on the basis of careful systems analysis. The audio-visual element derived particular benefit from the analytical and task-orientated approach that had characterized the best of BBC and ITV educational production. Its quality compared very favourably with the majority of the then extant models, located mainly in the United States.

The Open University itself has in the last decade and a half undergone substantial changes of policy. Having begun as an institution committed to providing mainly undergraduate courses leading to first degrees, it has broadened out into a wide range of courses which still include an excellent first degree programme but now also try to meet the needs of post-experience students who wish to study a particular aspect of a subject for purposes of professional competence rather than for qualifications.

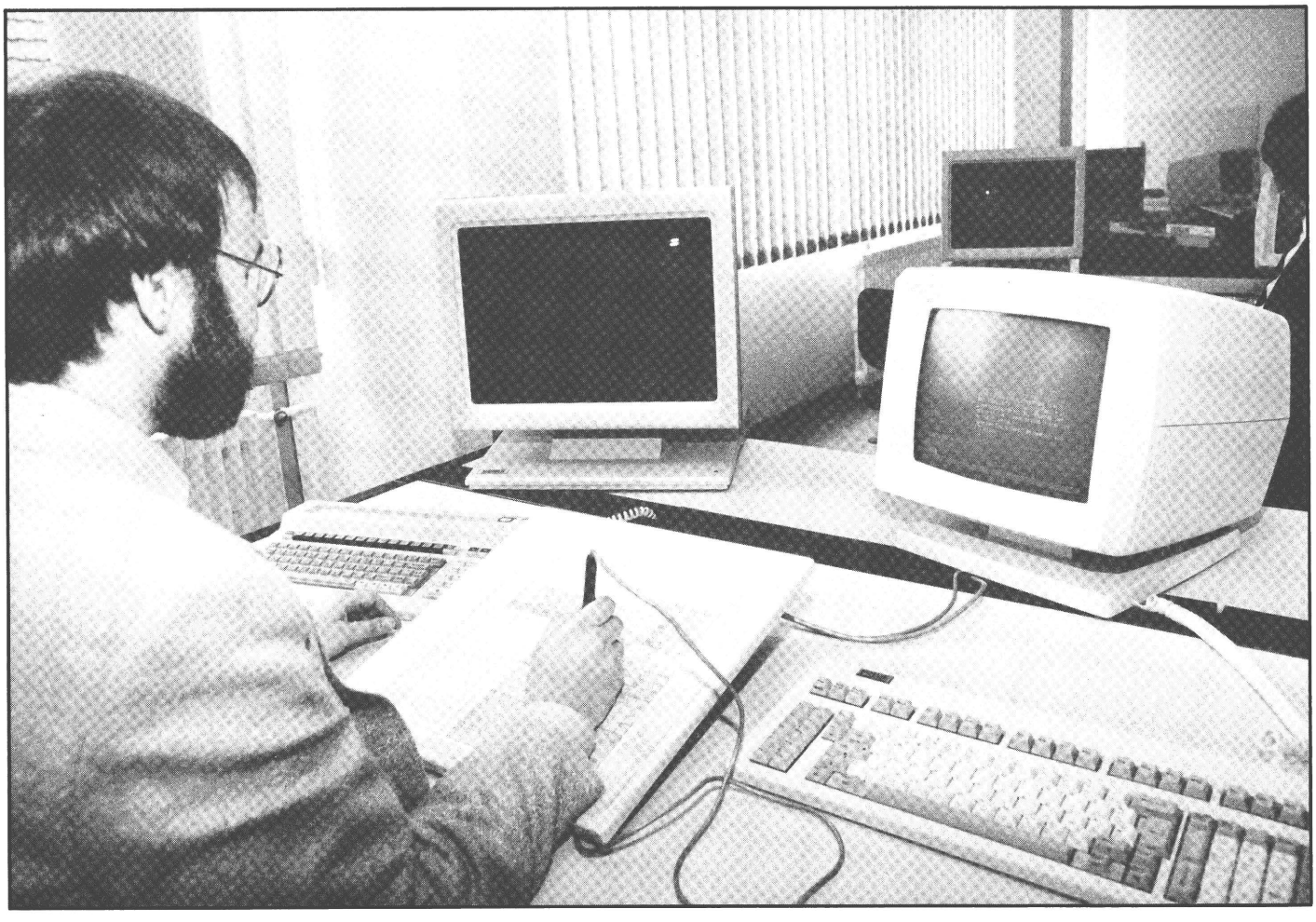
We shall later have a more detailed account of an area which is particularly important in our field, and where the Open University has done important pioneering work: that of the economics of multi-media distance education. Let me here, therefore, confine myself to saying that this is one of the areas in which the application of evidence appears to be difficult. The undoubted usefulness of much in the audio-visual field should not blind us to the fact that unit costs have to be contained. One of my senior academic colleagues said to me recently that he had discovered an excellent learning aid: it was flexible and could contain variable amounts of information, both written and visual; it was semi-permanent so that there was no difficulty in retaining the information for future reference; it was relatively light and could be transported; it required no hardware and the software could be read without special equipment; and it was relatively inexpensive. Its one drawback was that it could not reproduce moving pictures. It was, in fact, a book.

The lessons of two decades

The developments in our field since the mid-1960s have been both rapid and slow, as we have seen in this brief survey. Let me try to draw some lessons which may help us to chart the future less erratically.

■ The need for a functional approach

Two difficulties inhibit the objective short to medium-term assessment of the utility of recent audio-visual developments, particularly in the fields of microelectronics and information technology. The first is that their development tends to be supply-led rather than demand-led. The stimulus is provided by the development of a new technology rather than by clearly-identified consumer demand. And since we are no longer in the age of the flannel-graph (a very useful audio-visual aid) the supply side has grown ever more expensive. Thus its success depends increasingly on the fast build-up of a sizeable market. Hence claims, often extravagant, are made by the developers for the extent to which the introduction of a given audio-visual techno-



DPA/Tschauner

logy will revolutionize the learning process. The second difficulty is that many of the largest areas of application of audio-visual equipment are in the public domain. If a developer succeeds in persuading a small number of education and/or training experts that a particular new technology may be useful, the returns in terms of sales may therefore be substantial. The experts may well exercise patronage in terms of capital investment on behalf of a large teaching institution, a local authority responsible for education and training provision or, indeed, (though more rarely) for the training system of a whole country. Two of the examples I have cited, in France and in the United Kingdom, result from relatively far-reaching investment decisions of this kind: in France by the PTT, in the United Kingdom by the Secretary of State for Education (strongly backed by the Prime Minister).

It is often difficult, at the stage at which the investment decision is made, to undertake a conclusive functional assessment of the marginal utility of the new technology. And, by the time such an analysis becomes practicable, it is usually too late to change course. The development has passed the point of no return and the reputations of those responsible for the decisions have to be safe-guarded. I am sure each one of us can think of more than one such expensive mistake in our respective countries as, indeed, in a number of Community contexts. It would be excellent if we could devise ways and means of ensuring that during the next two decades our vocational training systems suffer fewer expensive misjudgements in the educational technology field than during the last two.

■ The individualization of learning

Probably the most significant qualitative advance achieved in our education and training systems during the last two decades has been the move towards the individualization of learning opportunities and systems. This has marched alongside the move towards more 'open' learning systems, open in the sense that thresholds which were once immutable (such as matriculation as a condition of university entrance) have become more mutable, particularly in the education and training of adults. Learning systems are being centred more on the needs and circumstances of trainees and less on the economics of scale assumed to derive from the grouping of students into standardized groups or categories.

This move away from standardization has been made possible largely by educational technology which has allowed educational systems to escape from the tyranny of the staff/student ratio. As long as the only means of teaching or training a student was by incorporation into a standardized group in which he or she had to move forward at a pre-determined pace to cover a strictly prescribed syllabus, the learning opportunity provided could not claim to be either 'open' or individualized. But it was the best that could be done, given the constraints on the resources available for teaching staff.

And, I would guess that between 75% and 85% of learning situations are still today structured in this way. The very expansion of demand for all kinds of education and training has reinforced the need for economics of scale and the constraints which these impose.

But the expansion of demand has also increased pressure for the development of learning systems which effectively enlarge the number of students whom a given body of teachers or course tutors can carry, by making the student less tutor-dependent. And the development of recording and replay devices; of point-to-multi-point programme broadcast services; of computer-

aided interactive learning; as well as the refinement of modular correspondence courses and the more task-oriented use of tutors in face-to-face situations (or by telephone) has launched a revolution in the range of available learning situations of which we have as yet seen only the beginning.

■ **The logistics of a multi-media system**

A learning system which effectively combines appropriate audio-visual means gains in value on a geometric progression. Matters which are not made clear by one means are understood by another. The logistics of this combination frequently prove too difficult for the agencies concerned. As a result, one or other of the elements is emphasized at the expense of the others and the full benefit of the multi-media approach is lost.

But the difficulties arise not only on the side of the providers. In the open-circuit television context the phenomenon of concentric circles of participants is well known. It was first identified in the United Kingdom in 1968 in the context of a physics course leading to the ordinary level of the General Certificate of Education. This experiment combined an open-circuit television course transmitted throughout the country, with a supporting text book, a correspondence course, an experiments kit which allowed the participants to obtain hands-on experience in their own homes, and an element of face-to-face teaching. The ascertainable figures for the use of the different elements in the multi-media package were:[7]

	Total figure	Percentage of TV audience
Average television audience (estimate)	250 000	100 %
Purchases of support book	8 941	4 %
Purchases of experiments kit	3 970	2 %
Purchases of correspondence course	680	0.3%

Similar results were obtained in Sweden in 1971-74 and in the UK in 1976, as set out in Anthony Bates' study of *Broadcasting in education.*

The Open University in the United Kingdom and many other multi-media teaching institutions have grappled with the logistic problems, not all of them with success. When the European Institute for the Media surveyed institutions which might have an infrastructure adequate to enable them to use time on the Olympus Satellite for educational purposes it found only a few.[8] It is in the area of logistic integration, therefore, even more than that of methodology, that the integration of audio-visual resources into the broad field of vocational training needs to be undertaken.

Conclusion

This brief survey of the development of the use of audio-visual aids in vocational training leads to four conclusions.

■ In the first place it is evident that a large area of unexplored potential exists in the application of modern audio-visual techniques to vocational training. Little conceptual work, and less empirical research have been undertaken.

■ The most striking evidence of the benefits of audio-visual techniques in this field relates to the substitution effect for the teacher/tutor and the consequent possibilities which they open up for the individualization of the learning process. It has to be emphasized in this connection that the development of techniques can now be regarded as a substitution for learning from experience.

■ Development work on methodology and methodological standardization should bring about significant economies of scale as well as improve performance on large areas of vocational training.

■ The obstacles to a significant growth in the application of audio-visual techniques to vocational training derive from the widespread inability on the part of policy-makers to undertake effective functional analysis of training needs and from the failure of training management to achieve logistic integration of the different elements of multi-media systems into a coherent didactic process.

Much of this work is generic in nature and can be undertaken most economically at the European level. It is to be hoped therefore that CEDEFOP may become the place where the developments are promoted and monitored.

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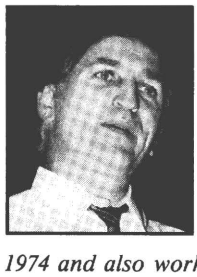
Media in vocational training: challenges, dangers, opportunities

Teaching/learning concepts 'from above' or the implications of a naïve attitude towards the use of media in teaching

A review of the recent history of the media in teaching[1] from, say, 1965 reveals a remarkable and continuing lack of interest in the subject in the late 1970s and especially the late 1980s. The great euphoria of the 1960s over the much publicized opportunities presented by programmed instruction[2] was followed in the 1970s by a persistent attempt to establish a sound scientific and practical basis, with the question of media in teaching extended to include the whole range of available media, particularly the audio-visual media. After the large-scale introduction of complex multi-media systems in vocational training in the Federal Republic failed to live up to expectations in the latter half of the 1970s, didactics in the 1980s has virtually ignored the subject.[3]

What had happened? Not only was it apparent that the media had not been integrated into actual teaching processes and fields of learning to any appreciable degree: it also became clear that the considerable sums invested in development and implementation were not automatically followed by a qualitative improvement in teaching/learning, since neither the developers of media or media systems nor the users had sufficient professional pedagogical/didactic and system-specific competence to cope organizationally or in terms of the psychology of learning with the complete integration of media and media systems into the complex business of teaching/learning.



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The proposition advanced by this analysis is that the sociological incompetence of both developers and users which stems from a naïve attitude towards the use of media in teaching is to blame for this failure of the media as teaching aids. This naïve attitude takes two forms:

(i) the more restricted variant, in which the sociological basis of learning processes is ignored;
(ii) the broader variant, where the question of ensuring quality and transfers, the question of practical implementation at a wide variety of levels, by sociological means, is also either overlooked or again consciously ignored.

Re (i): Since the early 1960s — with the development of and the attempt to introduce programmed instruction — all deliberations and efforts have always centred on two aspects of teaching media:

- the thematic and specialized question of a scientifically acceptable elaboration of specific subjects, questions, principles, etc., to be taught in each case, the main issues of the selection of examples and the reduction of subject-matters being, typically, ignored as before;

- the technical question of a specific carrier medium as *the* main determinant of the planned teaching structure.

This constant, unprofessional exclusion of crucial sociological aspects of teaching/learning processes, i.e.

- social psychology,
- individual psychology,
- the theory of socialization,
- the psychology of learning, and
- teaching methods,

has resulted in the naïve, outmoded teaching 'from above' that is typical of a narrow-minded, one-track standpoint. Teaching with media in this way is not only retrograde and reactionary but also unusable in more demanding pedagogical/didactic work and therefore superfluous, since the whole emphasis in this concept is not on the learner and his learning problems but on the teacher or the subject being taught. Any attempt in the late 1980s to relaunch practical teaching under the influence of the 'new media' can therefore succeed only if the naïve, one-track technological narrow-mindedness of the 1960s and 1970s is cast aside. At all events, teaching with media in the 1990s *must* be didactically professional in the described sense, or it will fail to get off the ground (or fail to be effective).

Consequently, a warning must be issued specifically against continuing in the style of the 1960s and 1970s: single-media, one-dimensional teaching/learning systems, complex multi-media systems and even the new media and telecommunications systems have no didactic value in themselves. They will not be pedagogically worthwhile unless they are used in correspondingly worthwhile teaching/learning situations. But they cannot become an integral part of these situations unless they are *also* planned, developed, organized, implemented and evaluated in accordance with the principles of social psychology, the psychology of learning, didactic methodology and the theory of socialization. Anything else is scientifically veiled eyewash which, unless overcome, will bring about the early failure of the debates on and innovations in teaching with media that are now beginning to emerge.

Re (ii): The second aspect of the naïve attitude towards teaching with media is also bound to result in the failure of all efforts in this field, since ensuring both the quality and transfer of media innovations calls for a broad sociological view, in which careful consideration must be given at various levels to the professional conditions that must be satisfied if the intended relaunch is to succeed in a qualitatively acceptable form.

New media and telecommunications systems

This is a reference to the longer-term use of recently developed audio-visual carrier systems and their software in initial and continuing training, whether combined with traditional classroom instruction and other media or aimed through public media at the target group consisting of 'independent' distance learners.

Although technological advances are constantly being made, a distinction can today be made between the following new media and telecommunications systems of relevance to education and training:

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- direct transmission systems;
- conventional and satellite television systems;
- interactive teleconference and wideband cable systems;
- interactive videotex systems;
- videocassette systems;
- stand-alone videodisc systems (e.g. CD-ROM; CD-I by Philips);
- computer-assisted, interactive videodisc systems (e.g. the Sony View system).

As with the closed learning systems, the question of a sound sociological basis is particularly important in the case of the new media and telecommunications systems, since here teaching is usually teacher- and subject-oriented because this media type emanates from a technically centralized form of transmission. This train of thought therefore indicates that for this type of media the following are essential:

- exemplary selection of subject-matter based on sound didactic principles;
- general elaboration of teaching methods;
- incorporation of direct (possibly tutor-assisted) instruction phases;
- incorporation of interactive programme-controlled learning phases;
- general preparation of support material.

The general elaboration of teaching methods should concern the following:

- varied references to practical work, practical examples;
- treatment of basic questions and questions about the purpose of activities;
- frequent visualization;
- simple, comprehensible language;
- structured subject-matter;
- clear learning steps appropriate to the stage reached;
- systematic references to learning techniques and learning aids;
- introduction of as varied learning activities as possible.

If such aspects are taken into account during planning, elaboration and implementation, there is no doubt that at present the following four systems of this media type rightly have the best chances of establishing themselves in vocational training:

(i) direct transmission systems;
(ii) interactive teleconference and wideband cable systems;
(iii) videocassette systems;
(iv) stand-alone and computerized, interactive videodisc systems.

Given a sound sociological and educational basis and an appropriate team of qualified experts, the introduction of these four systems, especially in the quaternary sector of continuing training, is highly recommended and should be encouraged for the following specific reasons:

- The new media and telecommunications systems provide simple and effective means of gaining access to continuing training courses, especially for people learning on their own, without any links to an institute of learning, and are democratic in that they enable everyone to participate in education and training.

- The new media and telecommunications systems are able to bring continuing training courses to a wide audience by simple means.

- The new media and telecommunications systems make for flexible association with and integration into an institute of learning and can be combined with traditional forms of continuing training without difficulty.

- The new videodisc systems, being a genuinely new type of media, are a particularly remarkable step forward because of their high quality, didactic flexibility and interactive facilities.

It must, of course, be realized that the new media and telecommunications systems still pose major problems:

(i) the serious shortage of suitable software;
(ii) the equally serious shortage of professional media experts to ensure the creation of high-quality systems and software as demanded here;
(iii) the enormous cost of both introducing the systems and writing the software;
(iv) users' unwillingness and scepticism with respect to media intended for didactic purposes, partly because of problematical programmes and experience in the past;
(v) the lack of didactic skills and specific training in the use of didactic media among vocational trainers/teachers;
(vi) the lack of support for new developments from universities and scientists: scientific continuing training has fallen behind, and there is scepticism about media and fear of contact with industry and its interests.

Constructive criteria for models of teaching with media

What, to summarize, now needs to be done as regards the planning, design and use of the various types of media?

(i) Where the professional use of individual media in vocational learning and education processes is concerned, two conclusions should be drawn for teaching with media:

(a) In future more individual media should be designed and developed as relatively self-contained units, quasi-modules, accompanied by concise support material for teachers/pupils. Such didactic elements could be used by trainers/teachers flexibly for a wide variety of purposes. In the audio-visual sector in particular such forerunners as the 'single-film concept' might be followed up. There would, for example, be no difficulty in designing 5- to 10-minute videofilm units for variable use in teaching on half-inch recorders: for entry, for illustration purposes, to depict problems, as a working basis for teaching/learning processes centred on the learner, for summaries, for revision, for exiting, etc.

A very interesting question is whether this type of individual medium would not be eminently suitable for transfer to the new media and telecommunications systems. The various videocassette and videodisc systems would be particularly appropriate in this case, especially as experience shows that the cautious linking of innovative media with traditional forms of classroom instruction is more likely to result in adaptation and acceptance on the part of the users (teachers/trainers).

(b) Support material for trainers/teachers should include didactic suggestions, supplementary information, hints on consolidation, ideas and exercises that lead on to other things, didactic alternatives, etc., in a concise form in order to give a pedagogically and psychologically broader basis and so make work with the medium concerned more effective.

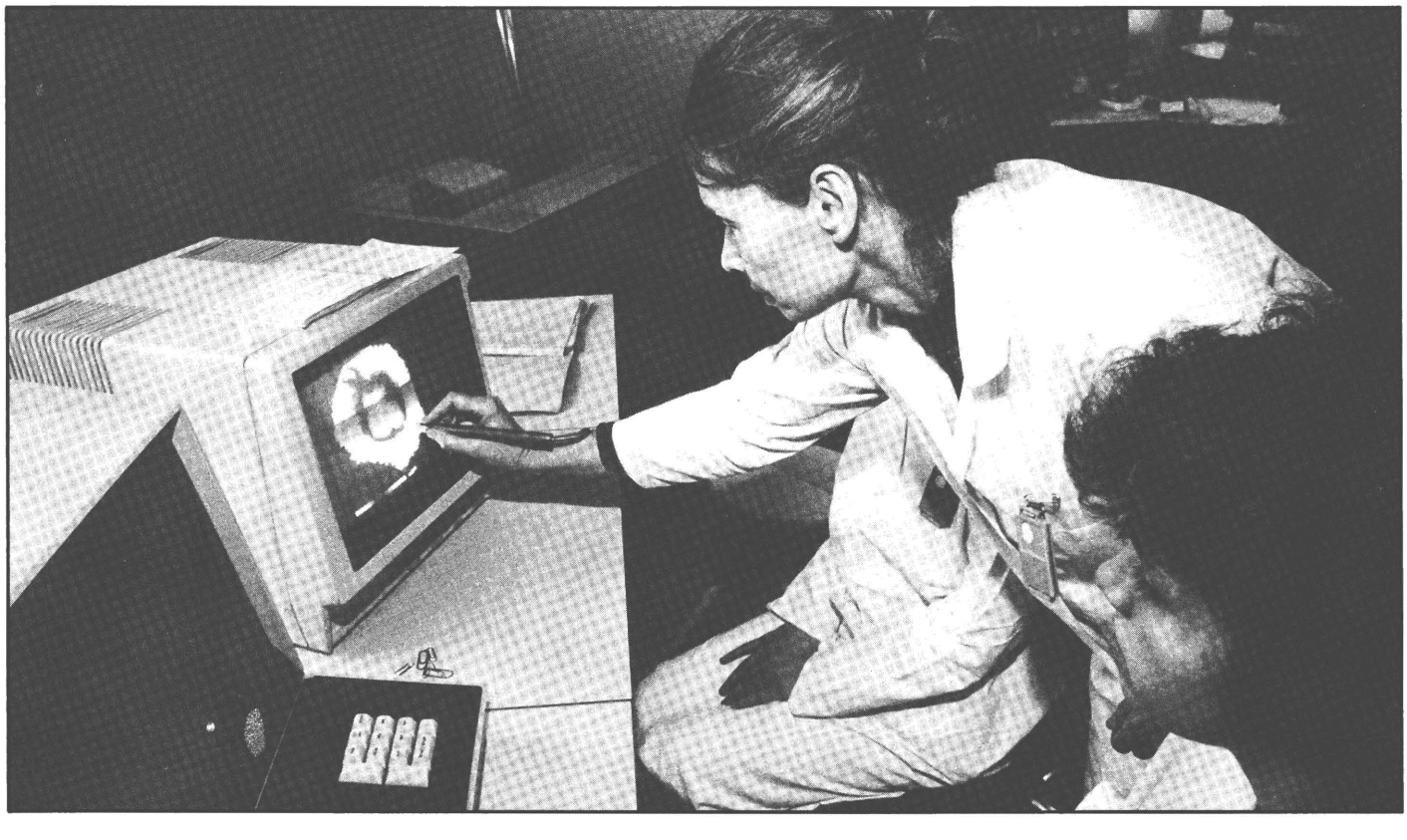
(ii) One-dimensional learning systems for the shaping of longer-term learning processes should in principle:

(a) be designed and developed as open or semi-open systems which make it easier for, or even prompt, the trainer/teacher to structure the learning process as a whole didactically, to make it variable and varied and to introduce more processing by means of supplementary, motivating material; (b) help to ensure that the goal of sociological enrichment, extension and consolidation is achieved with the aid of concise support material for the trainer/teacher.

(iii) Complex multi-media systems should also be developed in an open form that enables trainers/teachers, as described above, to vary their teaching methods and keep a grip on the planning of instruction. The need for support material for trainers/teachers is self-evident in the case of complex multi-media systems. It is primarily designed to explain, clarify and stimulate and as an aid to didactically professional work.

(iv) As with educational and multi-media systems, solving the problem of developing, using and evaluating the new media and telecommunications systems for vocational training purposes, a problem which will largely arise in the future, will undoubtedly call for cooperation between media specialists, specialists in the subject to be taught and educators, with the emphasis on didactic methods. The didactically varied potential and extremely wide impact of the new media and telecommunications systems indicate that scientifically sound preparation of the urgently needed software and of the support material will be essential.

(v) As a general rule, innovations in the didactic media field should be sociologically supported, consolidated and safeguarded at various levels. As pedagogical aids, media and media systems serve no other purpose than to make it easier for the learner to learn. Although the didactic support and help they give the trainer/teacher, if they are of good quality, takes second place to this primary purpose, it none the less provides an extremely interesting opportunity to use them as an almost constant didactic continuing training course.



LAIF/Jürgen Bindrim

DPA/Wilhelm Leuschner

The responsibility of innovators of didactic media

Media are necessities which are didactically interesting and essential in terms of the psychology of learning. They enable vocational learning and training processes to be made more professional and so qualitatively more convincing and effective. They not only intervene as a central element in the learner's learning processes but can also help to improve and shape the work situation and efficiency of trainers/teachers and of the systems they represent.

As has been shown, however, they also hold dangers which experience in the last three decades shows can be avoided, dangers that lie primarily in the perpetuation of obsolete authoritarian learning situations and ideas on learning.

Failure to take account of sociological aspects in the planning, elaboration, use and evaluation of media designs encourages didactically irresponsible *naïveté,* in which nothing like sufficient account is taken of the current state of either research on learning or vocational training for adults. Such *naïveté* is dangerous principally because didactic media occur in the guise of technological innovations and apparent modernity and are thus easily able to conceal their sociological backwardness.

The harassed trainer/teacher and institute of education cannot therefore be spared the task of making a careful distinction between professional and unprofessional media. A didactically acceptable course must be charted between the Scylla of a new media fetishism, with its reactionary implications, and the Charybdis of an anti-media abstinence, with its backward and old-fashioned teacher-centred, abstract-verbalistic procedure for imparting knowledge. It may be possible at this 'front' to make some lasting progress in teaching methods to the benefit of the theory and practice of adult training.

Summary

This paper is intended as a constructive attempt at helping to ensure that the 'right' course is plotted at the beginning of a new European upsurge in the use of media in initial and continuing vocational training. The process of developing a range of continuing training determined by modern media which has rightly been triggered by the new media and telecommunications systems both presents real opportunities, which must certainly be seized, and holds considerable dangers, which must just as certainly be avoided from the outset. To conclude, then, the following can be said in clarification:

1. The development and systematic expansion of the quaternary education sector, continuing vocational training, to produce 'compulsory education for everyone until retirement' — with its unmistakable implications for the secondary school level and the tertiary level, higher education and initial vocational training — is undoubtedly among the most important educational innovations in recent decades.

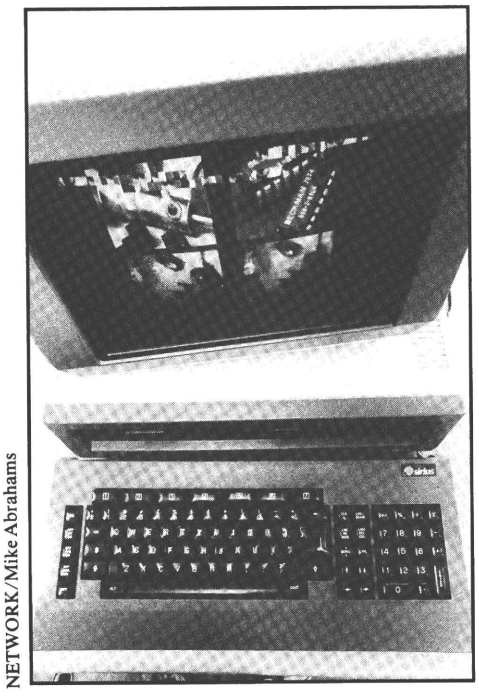
2. The social and cultural trend labelled with such terms as 'information society', 'communications society' and 'learning society' certainly does not stem from any euphoria over continuing training invented by pedagogues but from clearly discernible social needs which all the experts predicted would be imperative. These needs are implied partly in demographic, partly in scientific and technical, partly in social, labour market and structural developments.

3. Vocational training can therefore rightly demand the greatest possible sociological

attention. Teaching/learning facilities in this socially so important sector of education must be both qualitatively improved and, in accordance with democratic and social principles, made freely and easily accessible. To this the new media and telecommunications systems in particular must, should and can make a professional contribution as a matter of course.

4. They can do this, however, only if they not only satisfy standards which are adequate technically and in terms of the subject-matter, as revealed by qualitatively usable criteria, but are also up to date in terms of the psychology of learning and didactic methods, as revealed by the state of the art in sociology and pedagogy. Otherwise there is a danger of 'old wine in new bottles' or 'stones instead of bread' being offered in vocational training. If, for example, the new media were to result in a 'gigantic reincarnation' of a learning situation in which the teacher stands in front of the class as the focus of attention, abstract concepts and verbalism predominate, fact follows fact, the learner can see no connection between theory and practice, and there is no action, communication or interaction, they will be not a step forward but rather a multi-media hazard or an 'innovative step backward'.

5. The difficult attempt was then made to advocate that, while the new media and telecommunications systems should indeed be integrated into initial and continuing vocational training, they should be viewed, treated and classified didactically like the familiar, traditional media and media systems. The new media do not need a special place, they do not have a 'value in themselves': they are a modern version of



NETWORK/Mike Abrahams

teaching aids incorporating new didactic means whose use is appropriate and desirable only if they are qualitatively acceptable, efficient in the results they produce and professional in use.

6. While, therefore, an explicit warning is issued at this early stage against a naïve attitude towards technical aspects and subject-matter, which leads to the belief that the specific and pedagogically acceptable elaboration, implementation and evaluation of the media in vocational training is unnecessary, the author is aware that such *naïveté* is also to be found in the academic camp.[5]

7. A fresh start on using media in vocational training can, in the final analysis, succeed only if policy-makers, industry and scientists work responsibly in an atmosphere of trust and mutual respect on the development and expansion of the quaternary sector, with the new media and telecommunications systems included. Fear of contact must be overcome, naïve euphoria over technology should be avoided just as much as silly opposition to media on principle or the kind of technological thinking that ignores all other aspects. What is needed is a balanced relationship between the technical and sociological aspects of the use both of the media in general and of the new media and telecommunications systems in particular. This paper is intended as a constructive contribution to the achievement of this goal.

Notes

1 See Issing, L.J., Knigge-Illner, H. (eds), *Unterrichtstechnologie und Mediendidaktik,* Weinheim/Basle 1976.

2 See Correll, W., *Programmiertes Lernen und Lehrmaschinen,* Brunswick 1965.

3 Clear, and also symptomatic, portents of this are to be found, for example, in the closure of the FEOLL (Research and Development Centre for Objectivized Teaching and Learning Methods) at the University of Paderborn on 31 December 1983 and the fact that chairs of media didactics are no longer being created or are being gradually phased out.

4 These are silent film loops lasting three to four minutes shown with a special simple daylight projector.

5 Particular reference must be made here to the opposition to technology found among conservative pedagogues who like to place the emphasis on teaching centred on the person, i.e. the teacher, in their teaching/learning situations. There is also the naïve attitude peculiar to European academia towards industry and technology and their needs. The fear of contact, which still abounds here, has resulted in a degree of neglect of scientific continuing training that is scarcely acceptable today.

Audio-visual technology and vocational training in Europe

The two articles that follow are summaries of the panel discussions that formed part of the seminar of 3 and 4 September, organized in cooperation with the Commission of the European Communities, on the subject of 'Audio-visual technology and vocational training: a dual challenge'.

The first discussion, on the theme of 'The future has already begun', was chaired by Professor Wedell of the European Institute for the Media in Manchester.

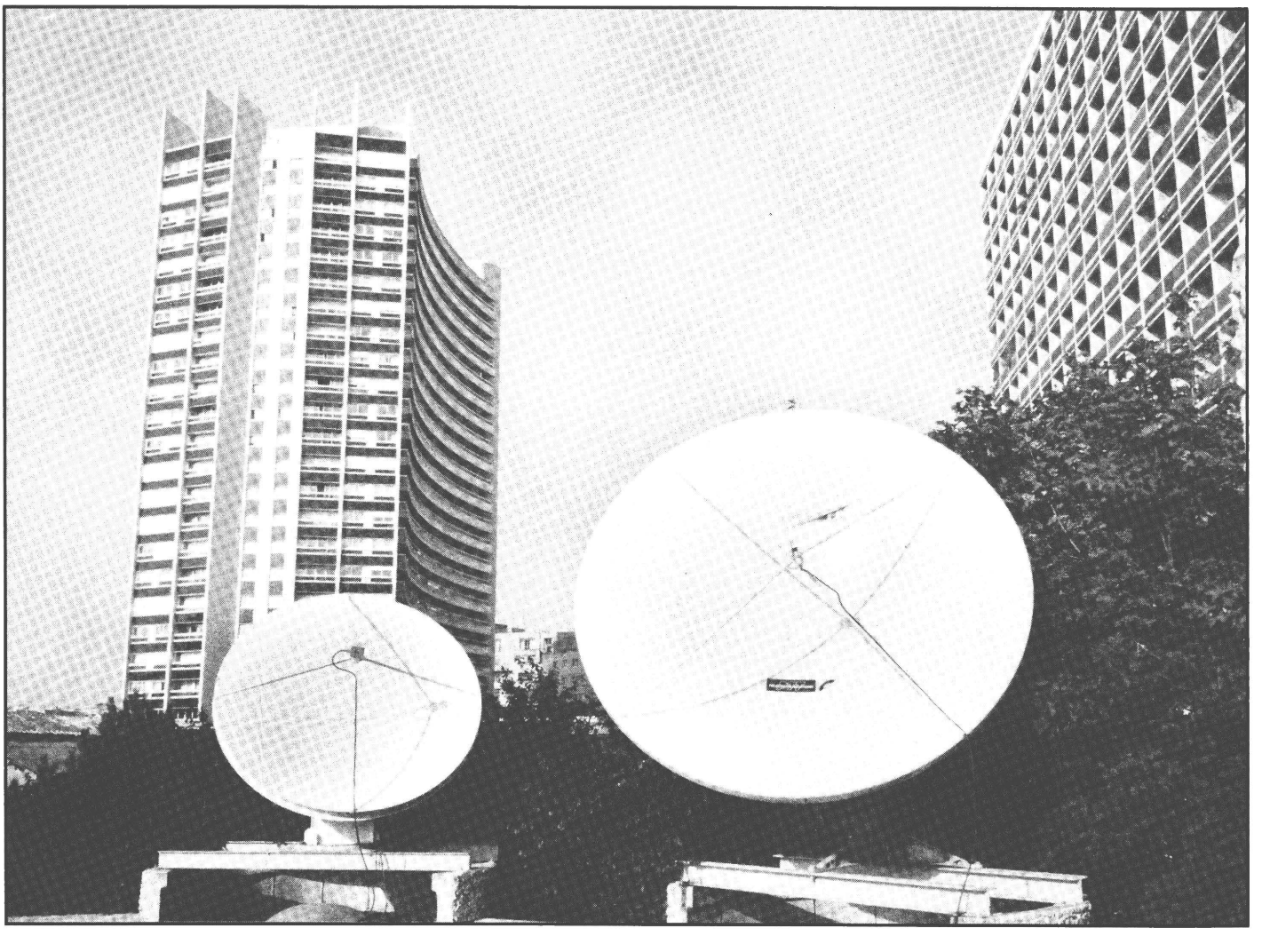
The following took part:

John Duke, Olympus/ESA, Paris
Klaas Jan Hindriks, NOS Netherlands Television, Hilversum
Sheila Innes, The Open College, London
Martin Lam, Delta programme, Directorate-General XIII, Commission of the European Communities, Brussels
Normal Longworth, PACE/IBM, Brussels.

The second discussion, on 'Cooperation in the Community', was chaired by Dr Carl Otto Lenz, First Advocate-General at the Court of Justice of the European Communities, Luxembourg.

The following took part:
Claus E. Bäumler, Digital Equipment GmbH, Munich
Fuesanta Candela Castillo, Directorate-General X, Commission of the European Communities, Brussels
Roger Melmer, International Foundation for Computer-based Education in Banking and Finance, Luxembourg
Rolf Svensson, European Broadcasting Union, Swedish Educational Broadcasting Company, Stockholm
Fritz Rath, European Trade Union Confederation

We should like to thank Mrs Susanne Seeland and Mrs Claudia Strauven for their contribution.



R.E.A./Pitois

Brave new world

The future has already begun

Classroom training is dead. Long live the educational technologies! That, briefly, is how the future that has already begun can be described, the cost-benefit calculation being perhaps not crucial, but certainly a determining factor, as Norman Langworth (International Education Centre, IBM) made clear during the discussion. At any time 7 % of this company's total workforce were attending in-service training courses, particularly in view of the constant advances in technology. In recent years, the demand for courses had doubled, as had the costs. But as the money was not available, more cost-efficient training methods were being used. Rather than forming trainees into groups and teaching individual learning, i.e. learning with the aid of educational technologies (videotapes, videodisks, computers, etc.), in the company or at home. Classroom training would be reduced by 25 % this year alone.

Unlike these new, individualized forms of learning, continuing training courses designed for a mass public have been available for many years. Regional and national radio and television bring the syllabus right into the living room. Trainees thus no longer need to attend an institute of education, and the teacher — once he is on the screen — can speak to millions. It is hoped that by the early 1990s distance teaching and courses by satellite spanning several national frontiers will be a reality.

Susanne Seeland
Degree in political science, journalist

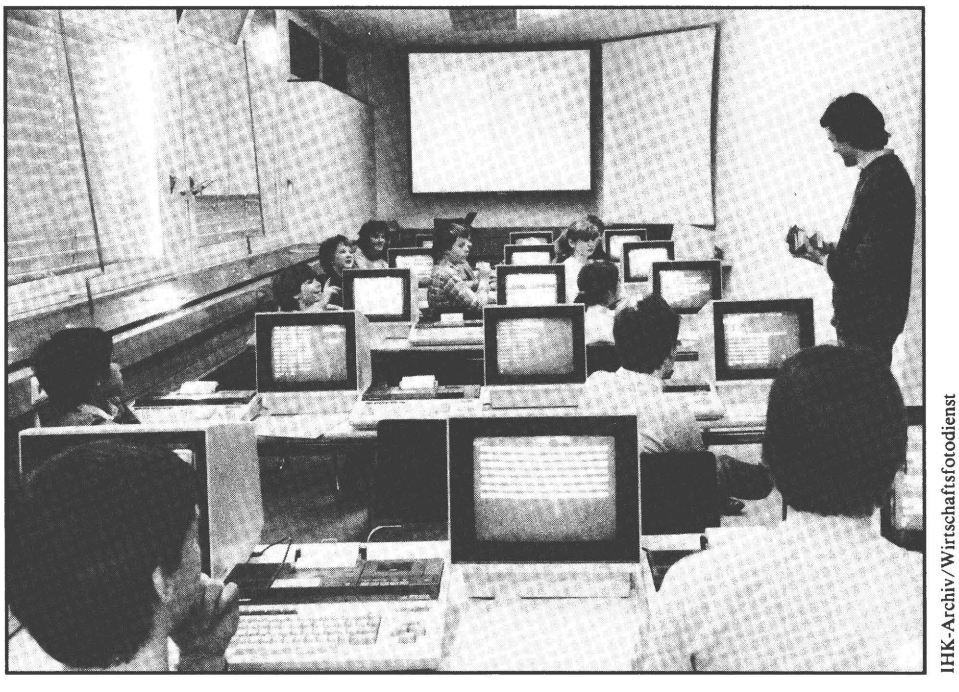
Claudia Strauven
Journalist, specializing in the programme for women of the Sender Freies Berlin (SFB)

The two forms of learning prompted the discussion leader, George Wedell (European Institute for the Media, Manchester) to ask what chance these learning systems have of surviving: 'Are education and training programmes aimed at a mass public not doomed to extinction like dinosaurs if the new educational technologies enable virtually everyone to stay in bed and learn by computer, telephone, various monitors and similar devices?'

Sheila Innes (The Open College, London) felt that programmes for the masses would continue to exist primarily because in the age of the entertainment industry they could attract many people to the education sector. The less the listener's or viewer's motivation to learn, the more important these programmes were. Highly motivated people would undoubtedly learn on their own with the various technologies. But everyone else needed stimulation. Their interest in improving their education first had to be aroused. The media were particularly suitable for this purpose because listening to the radio and watching the television were now normal, everyday activities.

Stumbling blocks in the education channel

Whatever the medium, however, programmes intended for a mass audience always presuppose that all the learners speak the same language, as Professor Anthony W. Bates (The Open University, United Kingdom) pointed out. While the language problem might be of secondary importance in a country like Britain, India's experience was food for thought. An educational programme had been broadcast simultaneously in the country's five main languages, no problem technically, but the programme could not be understood by the Indian public in the different regions. Production for the various language areas had then been decentralized so that better account could be taken of the differences. Furthermore, Professor Bates added, the role played by cultural differences should not be underestimated. A farmer in region X did not necessarily have the same problems as a farmer in region Y. The land and soil differed from one area to another. Professor Bates felt that linguistic and cultural differences should also be considered in a global, European education programme.



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'But I do not think,' reported Klaas Jan Hendricks (NOS Netherlands Television, Hilversum), 'that India and Europe can be compared.' Europe's cultures, he explained, were closer, making for greater willingness to understand one's neighbours. People were simply more inquisitive and more willing to go and have a look at their neighbours. The European television channel should therefore allow viewers to choose their own subtitles, by teletex for example. The programme would then be transmitted in the original language — English, German, French, etc. — and every viewer could opt for subtitles in his own language — Portuguese, German or whatever it might be. Hendricks did, however, foresee certain difficulties in the North-South gap. Given the different levels of education, it must surely be considered whether news or information from the North, translated directly into such southern languages as Turkish and Greek, would really conform to the viewer's experience.

Martin Lam (Delta programme, EC Commission, Brussels) felt the language problems in the European Community should not be underestimated. They should not, on the other hand, be seen as an excuse for continuing to do things at national level. He thought it unnecessary for every country to develop its own hardware and software: basic maths courses, for example, could be compiled and then adapted to the various national languages without difficulty. The courses would remain comprehensible even if maths were taught differently in the various countries.

Far less confidence about linguistic and cultural differences was shown by Maria Marques (Instituto Portuges de Ensino a Distanzia, Lisbon). As an example she described the situation in her own country. Portugal — a very small area by European standards — was divided into three zones. They included areas that were so poor and disadvantaged that enormous communication problems were encountered in the zones. In this context, Professor Marques asked: how can material broadcast by satellite be adapted to the level of the person wanting to learn in the country? How can he be prepared for chains of thought and conclusions to be drawn from them?

Without answering these questions, Pierre Bonjean (Telcom, Direction de la formation professionelle des télécommunications, France) proved how important they are. Telcom already had experience of satellite broadcasting. This showed that the information was certainly assimilated, but the users were quite clearly fairly well educated. They were able to evaluate and process the material. The larger category of learners, such as apprentices and people undergoing practical training, could not cope with it, however. It was therefore essential for the programmes to take account of their abilities and skills so that the information might actually reach its target. Pierre Bonjean considered this problem to be far more serious at both national and European level than language barriers.

John Duke (Olympus Training User Group) was also in favour of distance courses geared to the target group. As an example he referred to British Columbia, where 10 % of the population took part in such courses. The explanation was simple. Learners were asked what they wanted, and that was what they got. John Duke suggested a similar approach for the European satellite programme. Local groups should establish the needs, and commercial or public services should meet them.

Conceptual confusion

The increased use of all educational technologies was roundly condemned by Fritz Rath (European Trade Union Confederation) in the final phase of the discussion. He referred in particular to what was known as the individualization of learning due to educational technologies. As the technical opportunities offered by satellites, for example, were profitable only if large numbers of people could receive the programmes, Rath felt that de-individualization and cultural levelling were more appropriate terms than individualization, especially as this 'individualization' was associated with the general isolation of the learner: he sat alone before his equipment, without a teacher or fellow-learners.

Nor, Rath believed, were working conditions devoid of risks. Studies by industrial psychologists had long since shown that the greater the use made of audio-visual media, the greater the strain on the senses, especially sight. It was recommended that only 50 % of the working day be spent looking at a screen. When it was remembered how much more time consumers devoted to audio-visual media outside working hours, in learning and leisure activities, the health problems were obvious. 'Nor am I sure,' Rath concluded, 'that the advice given to such consumers as pregnant women on the amount of time they can devote to education programmes without endangering their health does not, in the final analysis, fall victim to commercial interests.'

Sheila Innes (The Open College) agreed that the danger of isolation was an important aspect. She felt communal learning might be a counterstrategy: people could form a group and study together.

Against blind faith in technology

Taking the Federal Republic as his example, Werner Gerwin (Federal Institute for Vocational Training) attempted to explain that technological developments need not necessarily determine education systems. Although television stations had been transmitting educational programmes for the last 15 years, trainers in firms and teachers at vocational schools had taken little or no advantage of them in their teaching. An analysis of this phenomenon had revealed that German trainers and teachers preferred a pedagogical situation. In other words, they did not want to be replaced with audio-visual education materials but

LAIF/Jürgen Bindrim

Manfred VOLLMER

to use appropriate programmes only when the need arose and to go through them with the learners. 'Not even satellite television,' Gerwin confidently stated, 'will do anything to change this.' Although audio-visual education programmes could illustrate complex technical or social problems, they were no substitute for the teaching situation. Gerwin admitted, however, that large countries with areas where services were poor would have to adopt a different approach because training personnel were not available in sufficient numbers.

The conclusion drawn by Reinhard Zedler (Institute of the German Economy) from the discussion as a whole was that, although the educational technologies were forward-looking, the future had not yet begun in education. Technological means existed, but they were not being used to meet needs. The various countries of the European Community should therefore step up their educational activities in this area, especially as life-long learning was gaining in importance and the need for learning was gaining in importance and the need for learning and education in Europe growing all the time. It was essential, Zedler emphasized, to develop a European strategy which was not primarily geared to the existing technological possibilities but began with the question: what educational challenges does Europe as a whole face outside the specific interests of its individual countries, and what form must a programme that meets these challenges take? 'This approach,' Zedler concluded, 'would, in my opinion, be a practical example of the change in pedagogical thinking.'

Collaboration at Community level: Deus ex machina

Initial and continuing training programmes that make use of information and communications technologies are emerging everywhere in the countries of the European Community. They employ audio- and video-cassettes, computer-assisted learning systems and videodiscs. They are experimenting with cable television and satellite technology or recalling such traditional media as radio and television. Many of the people working on these initiatives know nothing about each other and yet need nothing more urgently than an exchange of experience across national frontiers. The Cedefop colloquy 'Audio-visual technology and vocational training in Europe: a dual challenge' was an important step towards meeting this need.

During the final panel discussion on 'Co-operation at Community level' it became clear how dependent everyone involved in these new developments — employers and trade unions, the producers of hardware and software, scientists and researchers, decision-makers and practitioners in vocational training, national governments and the EC Commission — is on a European dimension. They see European cooperation as a kind of *Deus ex machina* that could be used to solve many of the quite different problems they face.

Under the chairmanship of Dr Carl Otto Lenz, First Advocate-General of the European Court of Justice, the representatives of the various groups explained their problems and requirements. But it also became apparent that European cooperation in this area is not a thing of the future: it has already begun.

Paul GLASER

Networks of contacts are essential

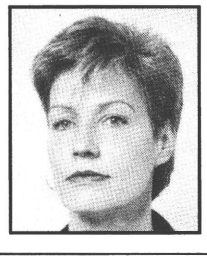
Fuensanta Candela Castillo of Directorate-General X (Information) explained how much all the Community's institutions and services were trying to pull together in this field. Every effort was being made to offer all concerned a constantly growing network of contacts for exchanges of experience. They included contacts with national administrations as well as private and public international organizations.

The audio-visual media sector, Mrs Castillo stressed, was one of the Commission's problem children: American and Japanese competition meant that this industry was having difficulty surviving and needed support. The Commission was not, however, finding it easy with its infant European policy in this area. All too often, it was opposed by national interests, and governments saw the Community's action as interference in their sovereign powers.

The Commission was trying to counteract this trend and to ensure in particular that the costs borne by the European audio-visual industry were reduced to a tolerable level. This was the basic premise of the Community's programme of action to promote the audio-visual production industry. It was designed to encourage production and marketing, to stimulate technological innovation in this sector and to help create viable European financing and marketing structures. Initial and continuing training programmes were also included in the plan, although they played no part in the first stage, which expired in 1988. The only exception was a course for journalists, in which they not only learnt the basic skills of their craft but also underwent advanced training to enable them to spread the 'European message' better and more widely. Provision was made, for example, for exchanges of practical training at various televison stations.

A second Commission representative referred to the initiatives that have already

Susanne Seeland
Degree in political science, journalist



Claudia Strauven
Journalist, specializing in the programme for women of the Sender Freies Berlin (SFB)

been taken as part of the Community's Comett programme. In this case, universities and enterprises from different Member States were to cooperate in the development of joint advanced training programmes. These included both courses and seminars of the conventional type and 'multi-media packages', in which the whole range of new technologies was used to impart theoretical and practical knowledge of these technologies. In the first phase of the Comett programme alone the Commission had received 485 proposals. The projects often combined continuing training activities of universities and firms and covered a wide range of subjects. Seventy projects had been selected, and they had now been formed into a network so that information and experience could be exchanged. Provision was also made for an exchange of students, enabling them to undergo practical training in enterprises in other Member States.

Other applications for assistance had related to short-term programmes, seminars and conferences. They concerned not only information and communications technologies but also new developments in chemistry, biology and mathematics.

Six hundred applications had already been received for the second phase of the Comett programme.

European banks resort to self-help

A European initiative in the use of audiovisual media in a sector of the economy was then described by Roger Melmer of the International Foundation for Computer-based Education in Banking and Finance. The Foundation had its registered office in the banking centre Luxembourg and had been established in response to an urgent appeal from various banks for joint efforts to meet the need for initial and continuing training caused by the large-scale introduction of high-tech equipment into banking and finance. The initiative had been taken by banks in the Benelux countries, where there were fewer large banks than in, say, the Federal Republic and France. The smaller banks in Luxembourg, Belgium and the Netherlands were finding it more difficult to finance their training departments and to offer courses that reflected the state of the art.

Since it had been established at Benelux level in 1984, more and more countries had joined the scheme. In many cases, it had not been easy for the initiators to find the right people to approach in other countries because the organization of the banking sector differed from one country to another. In some the employer's associations in the banking sector were responsible for initial and continuing training, in others certain groups and associations of banks. The appropriate professional associations sometimes had to be approached.

This difficult organizational phase had been overcome, however. Apart from the Benelux countries, the Federal Republic of Germany, the United Kingdom, Italy and Portugal were now members of the Foundation. However, this did not automatically mean that all the banks in these countries were represented in the Foundation.

The Foundation's aim was the joint development or commissioning of computer-assisted initial and continuing training programmes for the banking sector (courseware). It also served as a forum for the exchange of experience, the recognition of trends and information on hardware and software already on the market. It issued joint publications and also offered traditional advanced training in the form of conferences and workshops.

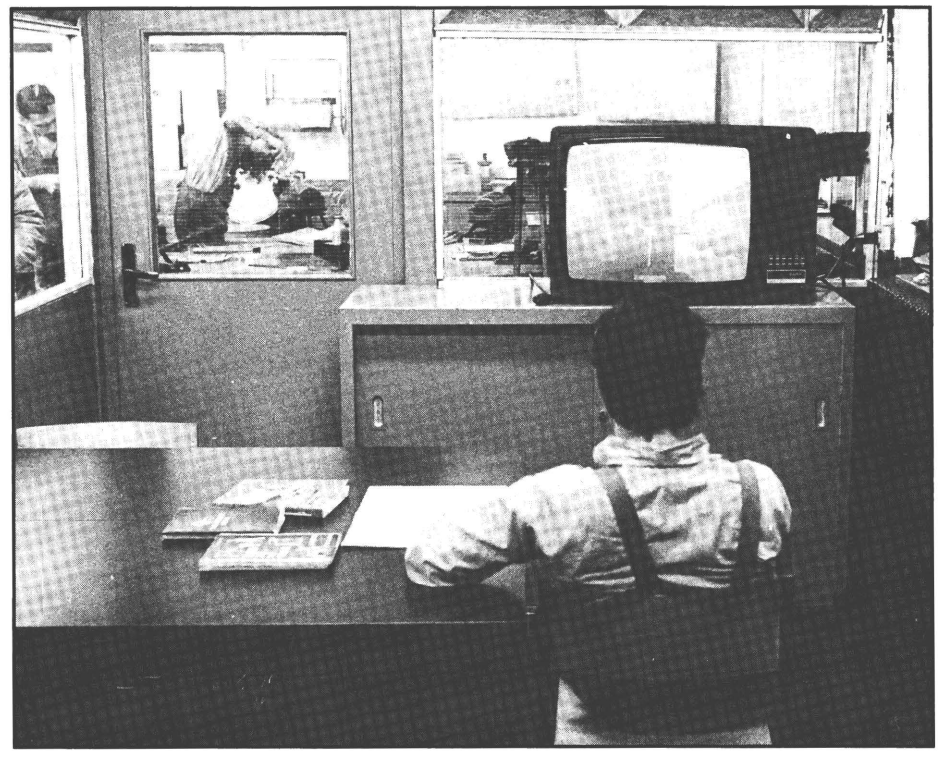
Roger Melmer, who has learnt to appreciate the advantages of transfrontier exchanges of experience in this institution, stressed the importance of the Commission's initiative. He regarded its approach as a counterpart to the Foundation's. It saw itself as the champion of the users of audiovisual media and intended to stand up for their interests. The suppliers had ruled the roost far too long. It was now time for the users to state their needs and demands and put them to the suppliers.

Only quality pays off

Claus E. Bäumler, Digital Equipment's initial and continuing training project leader, described his company as both a supplier and a user of these systems.

Each year Digital Equipment trained 3 000 to 4 000 of its own employees on these systems, especially in the customer service, maintenance and repair sectors. The training programmes took between two hours and four days.

Of course, Digital Equipment also sold its interactive educational programmes to a growing international clientele. The company could not complain about a lack of demand. In fact, the growth of demand was causing the company problems. There were not enough experts able to write good programmes. This called for a highly qualified, smoothly running team, in which creative programme designers cooperated with programmers, who converted their ideas into software, and with training specialists, who then integrated the courseware into a media package. The cost of developing a computer-assisted instruction programme that met the most stringent quality requirements was, needless to say, extremely high. The investment paid off, however, if enough people could be persuaded to use the various programmes (break-even point per programme: 200 users). The cost was



Manfred VOLLMER

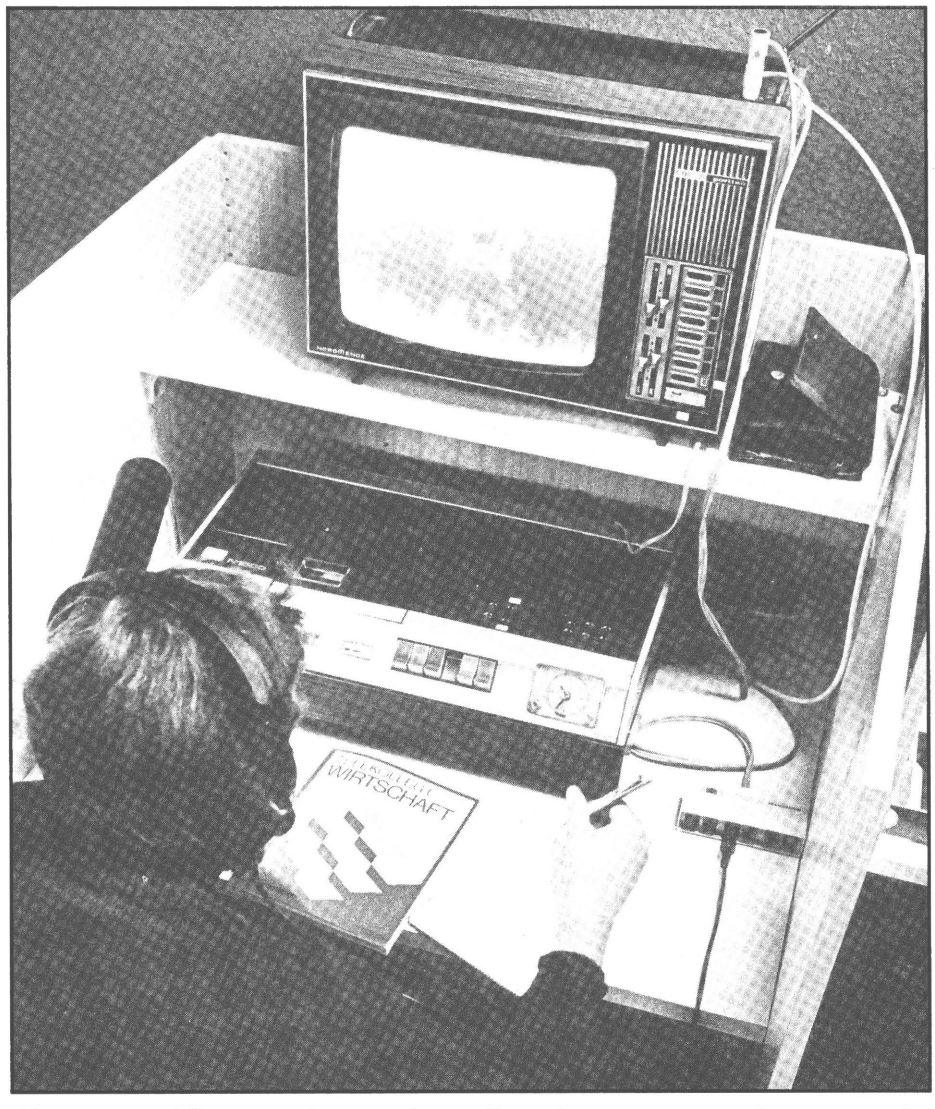
also reduced by the money previously spent on organizing initial and continuing training. Travel expenses were lower, and the company was able to provide initial and continuing training for more employees at the same time. The employees had three options: the in-firm learning centres with their 'learning stations', decentralized, but networked, 'learning stations' and the stand-alone version, which could be set up at home or at the workplace.

Digital Equipment's strategy was to attract more and more users to more and more projects. This was the only way to ensure that the interactive systems could be financed and quality standards maintained. European cooperation was essential in this respect. Quality standards must also remain so high because users would not otherwise stick at it. ('After all, they find sitting in the sun in the park with a book preferable to learning in front of a computer in a darkened room.') The training of employees was vital to the survival of firms. Employees had also come to realize this. Their demand for further training was increasing all the time. Only if companies could reduce the cost of initial and continuing training with the help of new technologies would they be able to meet this demand in the future.

A practical approach in this respect was the formation of 'company pools', in which firms jointly financed the expensive courseware they needed. The use of NC machines, for example, had already shown that 80 % of training needs were common to all firms. Only 20 % differed from one firm to another. A pool thus enabled a joint computer-assisted learning system that each firm could afford to be developed for the 80%. There was nothing to stop such cooperation crossing national frontiers. The repesentative of the industry concluded by warning against regarding computer-assisted learning systems as the solution to all problems connected with continuing training in the new technologies. They were just one element of a pedagogical structure that could be integrated into an overall concept of initial and continuing training.

Trade unions have different worries

Fritz Rath, representing the European Trade Union Confederation (ETUC), similarly called for cooperation at European level, though for quite different reasons. He felt that everywhere in the EC there was a great deal of catching up to be done in vocational training. The work of the trade union sectoral committees had shown that this was especially true of occupations which were particularly affected by the introduction of the new technologies (artists/authors, printers, post and telecommunications).



Manfred VOLLMER

These needs were all the more difficult to meet as, on the one hand, training requirements were growing in jobs where technology was being introduced on an increasing scale while, on the other hand, there was an enormous group of unemployed people who had had little or no training. Young people who had been out of work for years were likely to have greater difficulty coping with this new type of job. The ETUC therefore called for initial vocational training for all young people and for paid educational leave for everyone throughout the Community so that continuing training might also become institutionalized. The trade unions were less concerned about the audio-visual technologies as a learning medium than about the effects of their application in production. Their complaint in this connection was that hardware was installed before trainers/teachers, let alone employees/pupils, had been prepared for it with appropriate initial and continuing training.

Two other aspects were of concern to the European trade unions: data protection and the protection of authors' rights. It was feared that the introduction of the new technologies would result in the employee's every move being monitored, especially if firms also installed personnel information systems. The employee's on-the-job performance and conduct in the firm could easily be combined with social data. The same applied, of course, to performance and conduct during initial and continuing training in which audio-visual media were used. The ETUC welcomed the opportunity for employees to monitor their own progress while learning, which these devices made possible, but called for a strict ban on the establishment of data banks to permit the evaluation of the employee's progress while he was learning.

Authors' rights were becoming increasingly important in the area of educational software. Practitioners — such as teachers and trainers — had done pioneering work in this field after their schools or training centres had been equipped with hardware but before suitable programmes had come on the market. They had produced a great

deal of excellent software, which the media companies, having recognized the size of the market, had bought up at very low prices. The teachers' and trainers' rights had not been protected in any way, whereas the media companies were marketing their educational programmes at a profit.

The ETUC representative also called for harmonization at European level of industrial safety regulations relating to jobs in which new technologies were used. Standardization of hardware was not enough. He also complained that virtually no importance had been attached to the problem of the social compatibility of the new technologies in initial and continuing training. European initiatives might, for example, be directed at the conclusion of an agreement like the one the trade unions had reached with the national school authority in Austria. This would ensure that 5 % of instruction on new technologies was devoted to their social consequences.

Paul GLASER

Stony path

The panel and audience agreed that there is a need for closer European cooperation. However, considerable obstacles will first have to be overcome in the various areas discussed.

■ If the internal European market is to be opened up to 'television without frontiers' and all the various technical products, the question of quality standards arises. What requirements should be imposed by the EC to make this possible? The authorities in the Member States have a responsibility for both the media and vocational training (vocational training acts, protection of young people, regulations on advertising, etc.). How can it be ensured that society retains this influence when the market is opened up? How can it be ensured that certain interests which deserve protection are in fact protected? There are no authorities at European level to do this. The trade-union representative therefore believed there was a danger that public responsibility for the control of the media and vocational training would fall victim to commercialization. This led him to call for a Community directive to guarantee the protection of consumers and users in this area (restriction of televison advertising time, quality standards for products marketed throughout the Community).

The Community-wide marketing of telecommunication products faced another problem. The various Member States had their legislation on the responsibilities of the post office and telecommunications sector. How, for example, was the French Minitel system to be marketed in the Federal Republic if the Federal Post Office had a monopoly on the cables?

■ Transfrontier exchanges of initial and continuing training with and through new technologies are nowhere near intensive enough. If current initiatives are to be developed to the full, it is not enough to know what is happening elsewhere. A precise and comprehensive knowledge of the concepts and of the media and programmes used is needed. (Brief summaries are not enough.) CEDEFOP should act as a platform in this respect. In future it should be so equipped that the practitioners in vocational training can obtain all the information they need on educational software in use elsewhere.

A pragmatic proposal in this context is that, as in the USA, an independent institute should be established to examine educational software and evaluate it by reference to specific quality criteria. Its findings should be published.

■ A further, serious obstacle to the implementation of such projects is the fact that many firms write programmes solely for their own needs and keep their cards very close to their chests, i.e. they are not prepared to reveal their programmes.

■ The Commission feels that at present the Community citizen's freedom to choose a job or training place is restricted by the considerable disparities between quality standards, particularly in technological training. It is doing all it can to overcome this situation. If promotion of vocational training is to improve the economy's prospects, it must satisfy the same standards throughout the Community and be equally accessible to everyone everywhere. There is a long way to go before this is achieved.

Teaching, media choice and cost-effectiveness of alternative delivery systems

Developments in vocational training and audio-visual media

Vocational training is undergoing radical change. For the last 50 years, there have been three main methods of vocational training: on-the-job 'apprenticeship' (essentially learning as you go); State-organized classroom teaching (either as day-release or evening classes); and company-organized, in-house training (seminars/courses). These three methods are all primarily based on personal contact between teacher and taught, and are hence time and place dependent. They are all also costly. As well as the cost of the teaching, there is the loss of productivity while the learner is away from the job, and in the case of in-company training, there are also often high travel and accommodation costs. Such methods are also inflexible. They do not easily adapt to rapid change in either content or methods.

In the last 15 years, though, we have seen the large-scale and effective introduction of open learning and distance teaching methods, initially at the higher education level, but now rapidly spreading to vocational training. There are several reasons for this. First is the changing nature of work. Because of rapid developments in technology, the idea of being trained as a youth for the same job for life — as, for example, through the apprenticeship system — is becoming less and less tenable. Most people are likely to change careers at least two or three times. Within a particular job, the need for continuing training is rapidly increasing. Job mobility is increasing, especially across European frontiers. An employee of a large company in Europe can increasingly expect to move around Europe, or at least within his or her own country; this makes the provision of continuing education difficult through traditional means, if at one time you are in Frankfurt, a year later in Toulouse, and the next back in the United Kingdom. Lastly, because training is costly, efforts are being made to find more cost-effective ways to train. Open learning centres, where employees can 'drop-in' for training during breaks, or after work, or during slack periods at work, or distance learning, where employees can learn either at home, or at their desk or workplace, both provide greater flexibility and lower costs.

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MEDIA CHOICE

1.
More technology =
more difficult to choose

2.
Need a systematic 'strategy' for choice

3.
Main criteria for choice:
— access or distribution
— costs
— presentational features
— learner control
— organizational issues

4.
Implications for training

During the same period, we have seen a rapid increase in the technologies available to trainers. Face-to-face tuition and textbooks have until recently been the main media used for vocational training. Although radio broadcasting has been used for education for over 60 years, and television for over 30 years, its use for vocational training has not received high priority from European broadcasting organizations (although the Open College in the United Kingdom is a recent reversal of this trend). In the last few years, though, to these more 'traditional' media for education have been added audio-cassettes, video-cassettes, cable TV, satellite TV, pre-programmed computer-based learning, computer-based communications (electronic mail, computer conferencing, access to remote data-bases) and interactive video-discs. We are seeing increasing use of these technologies in vocational training, mainly for open and distance learning, although they can be used to supplement more traditional face-to-face teaching as well.

This increase in available technologies has led to the problem of choice: what media should be used for vocational training? Unfortunately, two scenarios are common. The first is what I call 'sympathetic anarchy': an organization leaves it to individual, enthusiastic trainers to use whatever media they can lay their hands on. This usually results in cupboards full of unused equipment, as the individual enthusiast runs out of either money or support within the system. The other I call 'monomedia mania': a company decides to invest heavily in a single technology for all training throughout the company. Thus a bank may have inter-active video-discs in every branch; another bank, with similar training requirements, will have computer-based learning in every branch, while another will have video-cassettes in every branch. (Any resemblance between this scenario and the present situation in United Kingdom clearing banks is purely coincidental). 'Monomedia mania' is usually driven by the decision to go for the latest or most sophisticated technology. There is usually no fear of the technology being underused, because of the high capital investment; whether it is cost effective is another matter.

What is really needed is not so much information about the costs and benefits of individual media for vocational training, as a strategy for decision-making in this area.

Procedures for decision-making

In deciding on appropriate audio-visual media for vocational training, context is all-important. Obviously, the needs and resources of small companies are different from those of large companies. A large manufacturing company's training needs, such as that of a car manufacturer, will be different from those of a large service industry (such as banking), both in terms of content and delivery of training.

Procedures for decision-making

1.
Strategic decisions:
which media to invest in

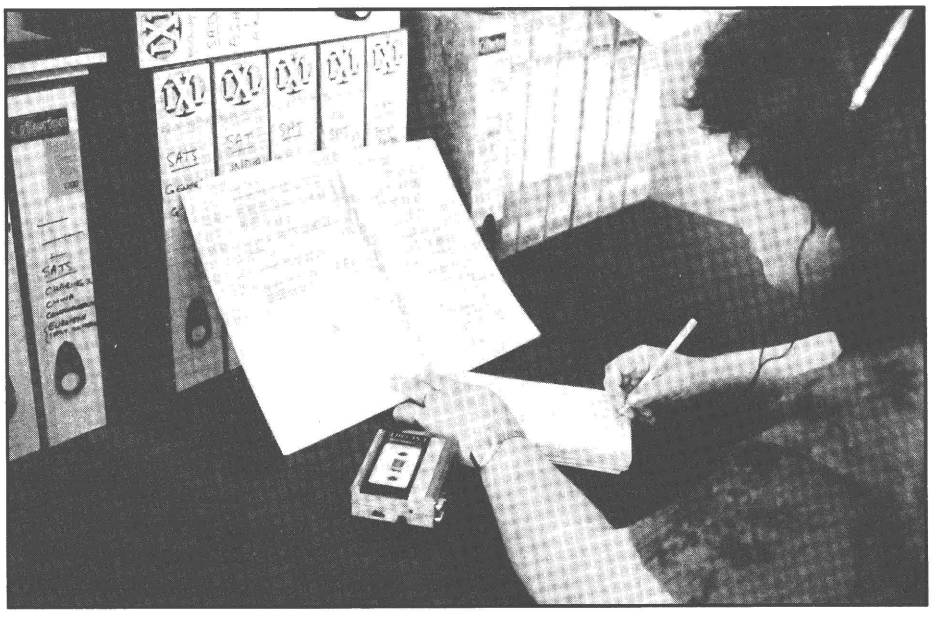
2.
Tactical decisions:
how best to use available media

3.
Decisions are dependent on context:
general rules risky

4.
Need for set of criteria,
for both levels of decision

This means that general statements, like 'video-cassettes are better than satellite TV', are not helpful; it will all depend on the circumstance. Furthermore, we shall see that in educational and cost terms, there is no 'super-medium'; different media have different strengths and weaknesses. This means then that a combination of media is usually the most appropriate decision, although the balance between media will vary from context to context. There are also two quite different levels of decision-making. The first is the decision to set up a system of training based on a combination of media. This will involve heavy capital investment. The second level is how best to use the media once they are available. Again, the importance of the level of decision will vary, according to company needs. Small companies for instance usually have to use whatever materials are created elsewhere — they will operate mainly at the second level; for large companies, or public sector institutions such as the Open College in the United Kingdom, the initial investment decision is crucial.

What is needed then to answer the question of media choice is a set of procedures, or a check-list of questions that need to be answered, irrespective of the type of company or level of trainer. We shall see that there are several different factors to take into account, which cannot be related to one another quantitatively. Thus in the end, an *intuitive* decision has to be made, but based on a careful analysis of the situation. To simplify the task, I suggest a 'cascade' model, where those criteria that are 'stronger' than others are analysed first, but decisions may still be modified when later criteria are considered.



Criteria for decision-making

☐ Access

Access is, in my view, the most important criterion. Basically, where and when will the trainer learn? At home; at his or her work-station; at a local training centre; or at a central training centre? To some extent, this decision will depend on what technology is already available for other purposes. For instance, if every employee to be trained already has access to their own computer terminal and screen for work purposes, then this can be used also for training purposes. If training though is to be home-based, account must be made of the limited technology available in homes for every potential trainee.

Access

Where will trainees learn?

— home: 100% now

- **print**
- **audio-cassettes**
- **telephone**
- **broadcasting (TV/radio)**

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by 1990: video-cassettes

— work desk or bench: CBL

— local training centre: satellite TV; video-discs

— central training centre: all

Table 1: Home access to technology (Western Europe)

	Now	1996
Print (via mail)	100%	100%
Terrestrial broadcasts (radio and TV)	100%	?
Audio-cassettes	90-99%	99%
Telephone	50-90%	70-99%
Cable TV	10-80%	20-80%
Video-cassettes	30-60%	50-99%
Viewdata	1-40%	5-90%
Home computer	1-40%	10-70%
Compact disc	5-35%	50-90%
Satellite TV	0-5%	5-63%
Video disc player	0-1%	5-35%

As indicated in Table 1, home-based learning will be limited in most European countries to relatively few technologies: print, terrestrial broadcasting (but not for European-wide training), audio- cassettes, and possibly the telephone in some European countries. Secondly, the position is rapidly changing for some technologies; for instance, we anticipate that 80% of Open University students will have home video-cassette players by 1990, and probably nearly all homes by 1996; compact disc players are also expected to reach high penetration in some EEC countries by 1996.

However, there will be difficulties in home-based access for several other technologies. Neither satellite TV reception nor home computing is expected to be in more than 65% of homes in any European country by 1996. This could mean that for some home-based vocational training target groups (particularly the unemployed and the less educated), these technologies will still be inappropriate for home learning. It also seems unlikely that video-discs will be a serious proposition for home-based learning in the near future. Lastly, there are very large national variations, particularly regarding cable TV and viewdata (i.e. telephone-based teletext services).

On the other hand, training located at the work-bench or in local centres will be less restricted. For instance, at a reception or work-station cost of between UKL 400 and UKL 1 000, satellite TV and computer-based learning become realistic propositions for individuals at their work-place. Even video-discs become viable for local centres, where they can be shared by several users, or in businesses where they are likely to have another function as well (such as marketing holidays in travel agents).

We can see then that likely access, and in particular the location of study, is a crucial factor in media selection for vocational training.

Costs

1.
Recurrent (production) costs for media greater than capital (equipment) costs

2.
Local equipment costs greater than central equipment costs

3.
Media vary in both fixed and variable costs

4.
The more trainees per course, the greater the cost-effectiveness of most media

5.
Costs of alternatives to media use must be considered (including loss of production)

6.
Audio-cassettes are particularly cost-effective

☐ Costs

A cost analysis is an essential step in any decision to base training on audio-visual media. I have been surprised at how few cost analyses — of any kind — have been done in advance of policy decisions regarding audio-visual media selection for training, and unfortunately, when they have been done, they have tended to concentrate on the least significant of costs, namely capital investment at the centre.

We can make some general statements about costs. First, it is important to distinguish between capital and recurrent expenditure, and central (or production) and local (or delivery) capital costs. Technologies such as television and computing do require high initial capital expenditure — purchase of a main-frame computer or television studio and equipment; terminals or reception equipment. One problem with capital costs is the rapid obsolescence of equipment, particularly in computing: three to five years may be an appropriate replacement time for a lot of equipment.

Recurrent costs are those that have to be found each year to run the system. This would include the staff required to run the capital equipment (e.g. TV production staff), the money spent on production or purchase of training materials, and the cost of delivering it. Lastly, the balance between capital and recurrent costs can vary considerably between media, and even within a medium, depending on whether services are bought in or produced in-house. Buying in television production for instance reduces capital costs but could increase recurrent costs.

Even more important though is the difference between fixed and variable costs. The cost of a television production may be considered fixed, because it will be the same whether one or 1 000 trainees view the programme; face-to-face lecturing costs though are not fixed; they increase in proportion to the number of trainees — the more trainees, the more lecturers required. Audio-visual media differ considerably in their fixed costs of production, in roughly the following ratios for the same amount of teaching material (see Table 2).

Audio-visual media also differ considerably in their variable costs for delivery. The variable cost for delivering a broadcast television programme is zero; it costs the same to transmit whether watched by one or one million viewers; video-cassettes on the other hand vary according to the number of delivery points. The cut-off point for Open University television distribution is 350 students per course; above that number it is cheaper to broadcast; below that number it is cheaper to send the students a video-cassette, provided it is returned at the end of a course and re-issued. With audio distribution the cut-off point is approximately 1 000 students: above that number, radio is cheaper; below that number, it is cheaper to send students audio-cassettes (which they keep).

Audio-cassette production and distribution is very cheap. Delivery costs of one hour of audio material is less than UKL 0.5 per student, including copying, the cost of the cassette, and postage. Variable costs for face-to-face tuition are very high, although the fixed costs are generally low. These cut-off points between broadcast and cassette distribution are specific to the Open University situation, since they relate to the costs charged by the BBC for national transmission, and delivery to individual students' homes.

Table 2: Fixed production costs (including overheads) for one hour of training material

Audio-cassette/radio/teleconference/face-to-face	1 unit
Televised lecture	2-5 units
Print	2-10 units
'High-quality' TV programme	20-50 units
Pre-programmed computer-based learning	20-50 units
Computer-controlled video-disc (from scratch)	5-100 units

However, a number of general points can be made about the balance of costs for audio-visual media.

■ The cost of putting equipment into local centres or work-stations can far exceed central capital costs (e.g. purchase of a production facility) in certain circumstances (e.g. for organizations with multiple training points).

■ The major cost of audio-visual teaching is in production and hence recurrent, rather than capital. For instance, the yearly recurrent cost often exceeds the total start-up capital cost. In general, the recurrent costs of producing good quality audio-visual materials tend to be underestimated.

■ Audio-visual media vary considerably in their fixed costs. Audio and print are low-cost; good quality television and computer-based learning are high cost.

■ The cost advantage of using audio-visual media for training will depend to some extent on the cost of alternative methods to a company. For instance, if a plant has to be shut down for training, it may still be worth having high unit costs for training through audio-visual methods, if the plant can be kept running.

■ Since production is the main cost, and hence fixed for any course, fixed costs usually far exceed variable costs. This means that the economies of scale apply: the more students, the more cost-effective media become. To determine whether or not to move to open or distance learning, it is necessary to know the unit cost of training by conventional methods. The actual number of students where audio-visual teaching becomes more economical will depend on the unit costs of conventional training. As a rule of thumb, for high fixed cost media such as good quality television and computer-based learning, in-house or commissioned production is uneconomical (i.e. has higher unit costs than conventional training) unless each course averages 500 students or more a year (or 3 000 to 5 000 in total), or costs are recovered through sales of programmes or hiring out production facilities. For audio plus print, the figures can be reduced by about one tenth. For computer-controlled video-disc production, the figure is between 2 000 to 5 000 a year, or 20 000 to 40 000 overall. These figures will reduce if savings can be made from: (a) less time away from work; (b) lower travel and subsistence costs for training; (c) increased productivity as a result of using audio-visual media, or if conventional training costs are high. In-house production is uneconomical unless a total of at least 50 hours a year of instruction is produced within that medium each year, in order to maximize fixed costs.

■ Broadcast distribution, even at marginal cost rates, is uneconomical for national distribution with less than 350 students per course for television, or less than 1 000 students per course for audio.

■ In general, it is far more economical to buy in material, or record material off-air, if copyright can be negotiated, than to produce materials oneself. However, it is often difficult (but not impossible) to find suitable material.

■ Audio-cassettes are a particularly economical medium; even audio-cassettes plus print is usually a cheaper combination than the cheapest form of video or computer-based learning.

☐ Presentational characteristics of audio-visual media

Many might feel that teaching considerations should be the first criterion to be considered. If the medium is not effective, then no matter how cheap, or how convenient it may be for access, it should not be used. However, it is much easier to discriminate between media on the basis of access or cost, than it is on teaching effectiveness. Basically, there is a lack of sound theory of media selection based on pedagogic criteria. This is partly because of differences amongst educators about the best way to teach, and partly because media selection has not until recently been a major problem facing educators. Consequently most teachers and trainers have not bothered to use audio-visual media to any significant extent; those that have used media have acted purely on intuition, and influenced considerably by what is conveniently available. There is another reason. Media are flexible. Each medium can be used in a wide variety of ways. Consequently, differences within a medium (for instance, between two television programmes, one a televised lecture and the other a documentary) may be greater than between media (for instance, between a face-to-face lecture and a lecture on a radio programme).

Nevertheless, we are beginning to identify intrinsic differences between media which have implications for teaching and learning, and which can guide us in media selection. We have already looked at two (access or delivery; and costs) and we shall shortly look at a third (control characteristics). In this section, though, I want to examine the relationship between the pre-

Presentational characteristics

1.
Concrete v. abstract

2.
Learning style: what skills do you wish to develop?

3.
Print: good for comprehension, abstract ideas, arguments

4.
Computers: good for rule-based knowledge (but weak on concrete presentation)

5.
TV: good for interpretation; ambiguous situations; concrete, procedural skills; inter-personal skills

Table 3: Differences in symbol systems between media

Lecture	Audio	Print	Computer	Television
Voice	Voice	No	No	Voice
Written language	No	Written language	Written language	Written language
Colour	No	?	?	Colour
Still picture	No	Still picture	Still picture	Still picture
No	No	No	Animation	Animation
?	Events	Events	No	Events
No	No	No	No	Full movement

? = usually at higher cost, or only occasionally, or with difficulty.

sentational characteristics of media and teaching strategies.

Media differ in the extent to which they can represent different kinds of information. Table 3 indicates some differences. What this means in teaching terms is that some media are better than others for certain kinds of representation of particular significance to teaching. In particular, we can see that media differ in their ability to handle concrete or abstract knowledge.

Abstract knowledge is handled primarily through language. We can see that all media can handle language, either in written or spoken form. However, media vary in their ability to handle concrete knowledge. A lecturer may be able to demonstrate an experiment, and both audio and print can report or describe events. None but television though can fully represent events that cannot be brought into the classroom or laboratory, and only television can provide full symbolic representation of events or movement. Television in particular is very rich symbolically, able to handle all forms of representation of knowledge, except direct experience.

This has several consequences for teaching. First, most kinds of abstract knowledge can be handled by any medium, but television in particular, and to some extent print and computers, can provide concrete examples. Thus television can demonstrate processes or procedures, 'model' or construct concrete examples of abstract ideas, demonstrate interpersonal communication, dramatize or reconstruct events through documentary-style production. These representational possibilities are particularly important for non-academic learners, who often require concrete examples or demonstration rather than abstract theory.

However, this form of television is much more expensive to produce than the use of television for relaying lectures. However, using television to relay lectures fails to exploit the unique presentational characteristics of television; indeed, audio plus printed notes is equal symbolically to a televised lecture and is more likely to be effective, for reasons we shall see shortly.

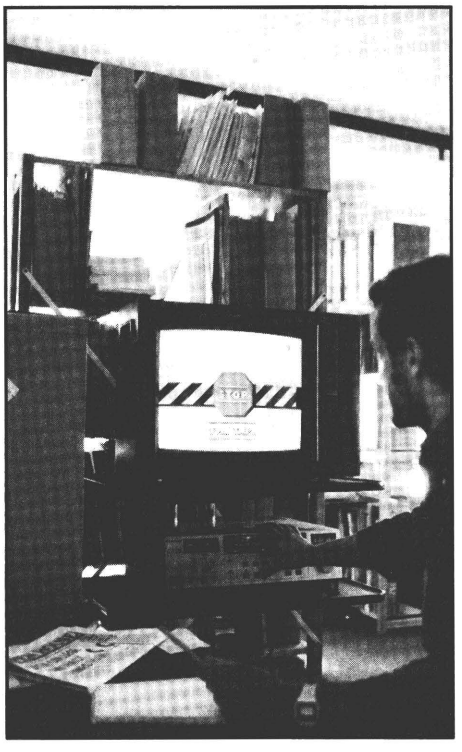
Research has also indicated that while abstract ideas or general principles can be represented equally well through any medium, media differ in the extent to which they can help develop different skills. Part of this relates to the control characteristics of media (see below) and part to the representational features. For instance, computers are excellent for presenting and testing rule-based procedures, or areas of abstract knowledge where there are clearly correct answers. Television on the other hand, because of its richness of symbolic representation, and hence the need for interpretation, is better at handling ambiguous situations, where a variety of possible learner responses are equally acceptable. This is particularly valuable for professional up-dating and training, where trainees already have a good knowledge base, but need to adapt to changing situations. Also, television is valuable for mechanical or procedure skills training, where it is important to see relationship between parts, and sequencing of activities, for inter-personal skills training, and for changing attitudes, through the use of dramatization or documentaries with which the trainee can clearly identify.

These differences between media indicate the importance of trainers identifying clearly not only the content of a course, but what kinds of learning (comprehension, analysis, application of principles to actual cases, problem-solving, inter-personal skills, mechanical skills, attitude change, etc.) and where possible matching these to media selection and use.

☐ Control characteristics of audio-visual media

Another important criterion influencing choice of media is the control over the medium available to the learner. For instance, broadcasting (terrestrial, cable or satellite) is an ephemeral medium. The value of cassettes or discs lies not just in their ability to allow students to view or listen to audio-visual material at more convenient times. They also enable learning from television and audio to be much more effective. Indeed, the cassette is to the broadcast what the book is to the lecture. Table 4 below compares the control characteristics of broadcasts and cassettes.

Research has indicated that learning from ephemeral media, like lectures or broadcasts, is much more difficult than learning from permanent material, like books, cassettes or discs. Furthermore, there are design implications, once audio-visual material is available in permanent form. Television material for use on cassette for instance does not have to resemble the continuous, lengthy broadcast format. Video-cassettes can contain short, unlinked sequences, with activities following each sequence, and feedback provided on the activity, either on the cassette itself, or in notes. Video-cassettes in particular lend themselves to group use, because of the need for interpretation and discussion of video examples. This can increase the activity and participation of the learner.



Interactivity — the ability for the learner to respond in some way to the teaching material, and obtain comment or feedback on the response — considerably increases learning effectiveness. This is at its strongest in computer-based learning, where learners can be tested, corrected, or given remedial activities by the computer. The attraction of computer-controlled video-discs

Table 4: Broadcasts v. cassettes

Broadcast	Cassette
Fixed time to view/listen	Available when needed
Ephemeral/once only	Repetition/search/mastery
Difficult to reflect	Analysis/relating/reflection
One speed	Individually paced
Integration more difficult	Integration easier

Control characteristics

Broadcast v. recorded TV:

- **Broadcast**
- **Fixed time to view**
- **Ephemeral/once only**
- **Difficult to reflect**
- **One speed**
- **Integration more difficult**

Cassette

- **Available when needed**
- **Repetition/search/mastery**
- **Analysis/relating/reflection**
- **Individually paced**
- **Integration easier**

Implications for design

Importance of interactivity:

- **computers strong**
- **cassettes medium**
- **broadcasts weak**

is that they combine the strong interactivity of computers with the powerful representational qualities of television. However, we have seen that this is an extremely expensive medium. Audio and video-cassettes can be designed to increase learner interaction, and do allow for more open-ended and interpretative responses than computer-controlled learning.

Organizational issues

1. **The existing technological structure within the company**
2. **Public image: high-tech v. low-tech**
3. **Existing training department**
4. **Champions for change: good and bad!**

☐ Organizational issues

Lastly, I want to say something briefly about organizational issues: the policies and structures within a training organization that can support or hinder the use of audio-visual media for training.

Perhaps the most important is the technological structure that already exists within an organization for other purposes: internal communication, transfer of funds, public relations. Thus if an organization with multiple outlets already has a computer network in place, and technical staff to develop and maintain that network, the introduction of computer-based learning or computer conferencing becomes that much easier and more realistic. Training then becomes a marginal cost on an already established system.

Secondly, there is the public image of a company. We have seen that audio-cassettes combined with print materials can be a very low-cost but highly effective training medium. But the training manager is not going to get noticed by his board so much for introducing that as he might for bringing in computer-controlled video-discs: they are much more sexy, and it may be easier for him to 'sell' video-discs to the board, at much higher costs, than the worthy but dull audio-cassette and print. Furthermore, the staff to be trained may feel that their company is being left behind by competitors who have 'high-tech' training provisions.

The third factor is the existing organization of the training department. If training has traditionally been based on face-to-face instruction, often located in pleasant surroundings, and with a generous hospitality budget, it is going to be difficult to persuade the training department itself on the value of open learning or distance training methods. It will mean transferring, for instance, part of the training budget away from teaching staff into operational departments, such as computing or audio-visual production. Unless this is done, though, it will be hard to justify the use of audio-visual media on cost grounds. There will also be a major requirement to train the trainers in the selection and use of audio-visual media.

Lastly, innovation in this area depends essentially on 'champions for change' at a high level: a Chairman or Board member who is willing to fight for the introduction of new media and/or new training methods. The reverse is also true: inappropriate investment or choice of media often results from ill-informed champions of a particular technology. Board Chairmen usually do not have the time to master the knowledge required to make a sensible choice of media for training. The role of external consultants then becomes important; unfortunately, far too many consultancies are not independent, but wedded to a particular technology.

We have seen that there are several factors to be taken into consideration when deciding on the potential use of audio-visual media for vocational training: access, and where learners are to study; costs, particularly production costs, related to numbers of trainees; teaching requirements, in terms of skills and the kind of training required; the control characteristics of the media, and the extent to which they encourage active learning; and the organizational framework in which audio-visual media will be introduced for training purposes.

Designing a training system using audio-visual media

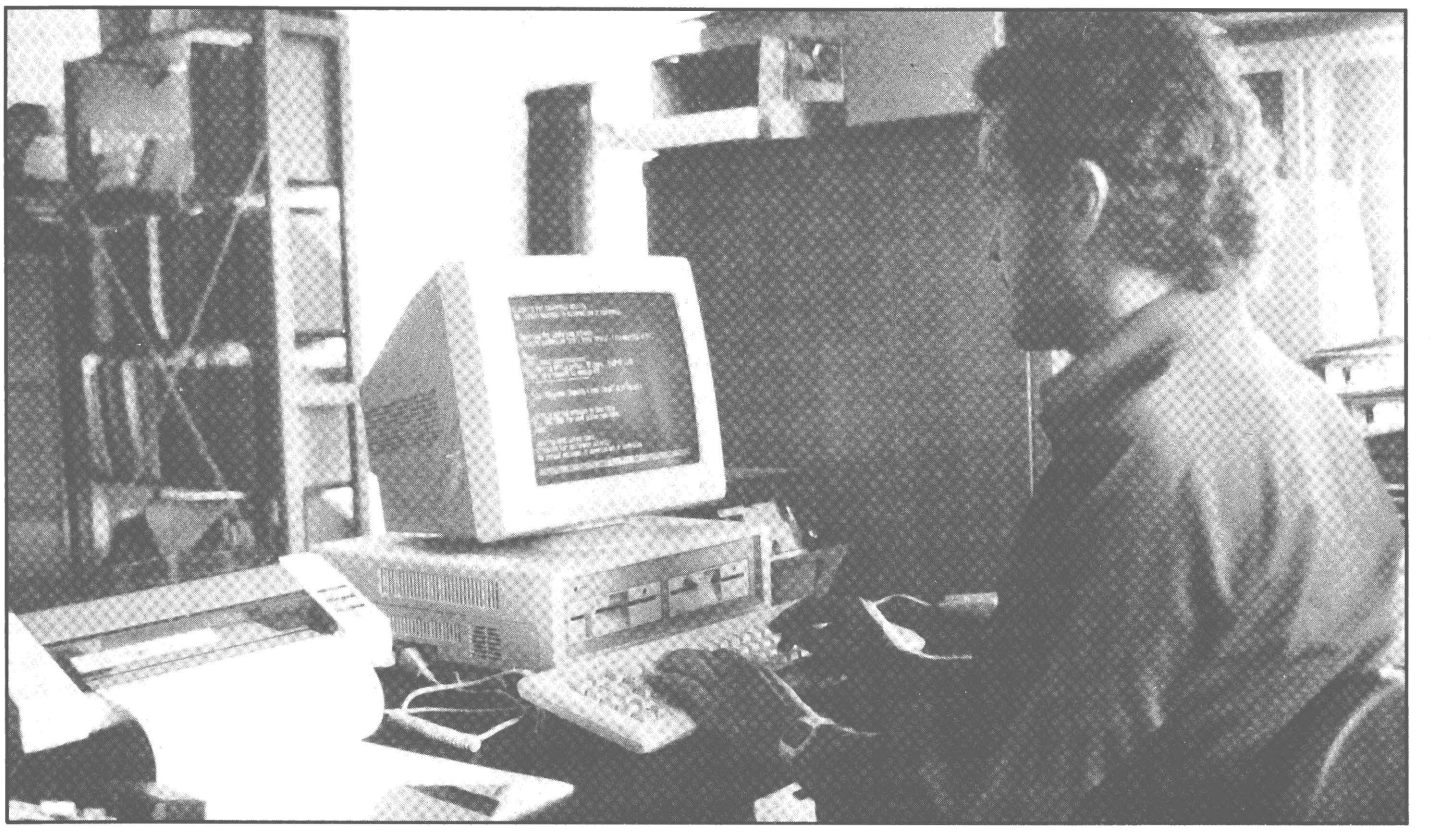
Audio-visual media can be used effectively to support traditional face-to-face vocational training. In such circumstances, emphasis will be given to the presentational characteristics of media, and to using bought-in material, as appropriate. While there is tremendous scope for extending this use of media in vocational training, it will inevitably be an 'add-on' cost to conventional vocational training, although it may also increase training effectiveness.

The introduction though of open and distance learning for vocational training represents a far greater challenge, but also offers the potential for not only widening the scope of vocational training, but could also, in appropriate circumstances, lead to significant savings in costs and/or increased effectiveness.

It should be clear by now though that vocational training will in most circumstances

Implications for training

1. **Need for a limited mix of media**
2. **Scepticism about some technologies (e.g. computer-controlled video-discs; televised lectures; satellite TV) — valuable only in special circumstances**
3. **Need to re-organize training to obtain cost-benefits of using media**



require a mix of media. Some of the more powerful teaching media, like computer-controlled video-discs, are extremely expensive; some of the low-cost technologies, such as televised lectures, suffer from a lack of learning effectiveness. No single medium can tackle the range of learning requirements and teaching approaches needed in the field of vocational training. On the other hand, there has to be some restriction on the range of media that can be used, if only on cost grounds. It is important then to concentrate on a limited range of two or three 'core' media, perhaps supported by one or two other support media.

We have seen that audio-cassettes plus print is an extremely cost-effective media combination, which could be supplemented by non-broadcast video, or carefully selected recordings of appropriate broadcasts. It is also likely that there will need to be some element of face-to-face contact, mainly in the form of group work, perhaps discussing material. Extensive use of high quality video or computer-based learning could only be justified if there are large numbers of people to be trained, or if alternative training methods are extremely costly.

You will see that I am therefore sceptical about the value for vocational training of some of the newer applications of technology. Computer-based video-discs are extremely expensive, and can be justified only in very special training circumstances. I have considerable reservations about the introduction of televised lectures (tutored video instruction) from the USA as a form of vocational training. While cheap compared with high-quality television, it fails to exploit the presentational characteristics of television, and is neither as cheap nor as effective as audio plus print. Similarly, the main advantage of satellite TV is the potential to expand television coverage from a national to a European basis, and to increase channel availability for training purposes. It has yet to demonstrate though that it can match video-cassette distribution for costs (even on a European-wide basis), or for educational effectiveness.

For medium-sized companies then wishing to develop their own training material, audio plus print, possibly supplemented by some bought-in video and face-to-face teaching, could enable the introduction of open or distance training. Large companies, with either expensive training requirements, or very large numbers to train, could consider print, supported extensively by audio and high quality video, with additional opportunities for group work. For small or many medium-sized companies, open and distance training will require 'off-the-shelf' provision of audio-visual materials, provided either by public bodies, such as the Open College in the United Kingdom, or possibly by large commercial training companies. The main restriction here will be copyright. What would be valuable for many companies would be secondary use, i.e. the recording of broadcast material which can be edited and reused for training purposes. This is not possible currently under the copyright law in the majority of European countries.

Audio-visual media can bring many benefits to vocational training. It is not a cheap option though, and needs to be used with care and skill.

Canal Emploi Télévision:

10 years' experience (and experiments) with educational television

The genesis of an educational television channel: 1977-87 — the first 10 years

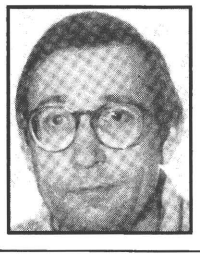
This year we celebrate the 10th birthday of Canal Emploi Télévision: the Liège region in Belgium has had its own educational television since 1977. It is a *thematic* channel, focusing on issues linked with economic recession: employment and unemployment, social change and continuing training.

The initiators of the project were the training institutes of the two leading Belgian trade unions,[1] joined by social science teachers at the University of Liège who were concerned about the spread of recession and rising unemployment.

The opportunity arose when, in 1976, the authorities in Belgium — the country with the highest proportion of cable-TV users in the world[2] — launched experiments in local television modelled on experience in Quebec. The promoters of Canal Emploi Télévision decided to join in with those experiments.[3]

The project itself was very much based on voluntary effort:

■ taking as its priority target group 'the unemployed in the region of Liège', the institution defined itself as an instrument for an overall unemployment-centred plan, mobilizing social forces, informing public opinion and offering continuing education, now that unemployment had disrupted the settled order of the consumer society and ushered in the economic crisis of the 1970s;[4]



René Begon

Journalist — producer with Canal Emploi Télévision

■ television is regarded as contributing towards this ambitious project in that it serves as the interface with the general public, part of an educational strategy that also includes the introduction by Canal Emploi's 'training' sector of long-term courses for the unemployed.

In this strategy, the role of television is to arouse awareness and promote educational efforts. The purpose of its 75-minute weekly *Magazine* is to make use of the impact of televison to break through the isolation and apathy of people suffering from unemployment, informing them as to their rights, continuing and vocational training facilities and the opportunities they afford, as well as the regional socio-economic context.

With a 17.6 % unemployment rate in 1977, which has since risen to 23.5 %,[5] the region of Liège seemed to have been struck by disasters. All the more reason, according to the project promoters, to highlight positive experience, social innovation and creative individuals rather than concentrating exclusively on the problems.

This is one *raison d'être* for the Canal Emploi Télévision project, however minor it may seem by comparison with the scale of human and social dramas through which we are living today.

A little bit of history

Canal Emploi started up in an atmosphere of militancy. The TV crews were in the thick of social conflict, reporting on strikes and factory sit-ins for the *Magazine*.

The *Magazine* soon started to include special features and services as well, such as announcing job vacancies and providing legal information.

In 1979, Canal Emploi acquired a training centre which, until 1984-85, set up courses on 'brushing up your education', followed by literacy courses, for unemployed people with a low standard of school education who were excluded from the traditional mainstream of vocational training.

Today, this sector is moving towards more 'targeted' training, including training in secretarial skills, languages, office automation and micro-computing.

In 1981, the decision was taken to create a structural link between the two sectors of Canal Emploi by setting up a distance training agency called 'Télé-formation', essentially for the provision of continuing training for people who had completed Canal Emploi's preliminary training cycle.

Based on cable-TV programmes, seminars and personal study, the purpose of this experiment — concentrating exclusively on socio-economic subjects — was to give unemployed people the means of analysing the crisis. Understandably in such an experimental context, there were a few weaknesses in this teaching resource.

For Canal Emploi Télévision, 1984 was a year for a review and for decisions. It was an institution that had come into being as a result of economic crisis, and its development had consistently been somewhat precarious, given the budget austerity of the 1970s and 1980s.

Canal Emploi's funding was precarious, as was the status of most of its staff,[6] but at the same time it needed substantial financial and material resources as well as highly skilled operators — a paradox with which the project has had to contend right from the start.

In the light of seven years' experience with the *Magazine* and two years' experience of distance training, it had become apparent that human, material and financial resources were too limited to maintain two separate teams. A solution for the development of Canal Emploi had to be found that would harmoniously integrate in a single

team the two facets which made it so unique: television and training.

This led to the formulation in early 1985 of a new 'strategy for educational TV', the spirit of which is described below.

Components of Canal Emploi's TV educational strategy

Canal Emploi Télévision's resources are modest. Its educational vocation has in a sense developed clandestinely.[7] Its products are relatively expensive but of high quality. It is hard to fund them and to recoup their cost in a purely local setting. It is not all a bed of roses.

Even so, the Canal Emploi team firmly believes in the originality and social usefulness of the product, a belief reinforced by ever closer cooperation with the educational community in the region.

It is the aim of Canal Emploi today to be a television channel directed towards social innovation, continuing training and, of course, employment, drawing on accumulated experience and constantly updating its principles and its approach.

What has been learned through experience

Over these experimental years, lessons have been learned. In our opinion, we must:

■ continue with the thematic-targeting of programmes but adopt a more flexible view of the target audience.[8] The starting point from now on will be the assumption — confirmed by an audience survey — that there is a strong demand in the region for information on employment and training;

■ reinforce the educational side of the project;

■ rather than using closed television methods, try to open out to the social fabric within the region;

■ make good television, with due regard for all the visual, aesthetic and technical considerations that good television entails;

■ allow for the fact that, in the short term, the institutional, political and financial conditions of setting up a distance training network in the French-speaking community have not been satisfied and that only in the longer term might Canal Emploi be incorporated into such a system;

■ in the short term, promote one-off experiments in distance training, in cooperation with training institutions in the region.

The principles

For Canal Emploi's broadcasting team, education should be regarded as work entailing horizontal research rather than an activity like any other; the use of television should be a specific feature of that research.

Canal Emploi's broadcasting sector has decided, at least in the short term, to discard the purely 'instrumental' concept which — to exaggerate grossly — regards television and school as interchangeable learning agencies.

On the contrary, the basic idea is that — once the decision has been made to use the medium of television in an educational project — the promoters' main concern must be to shape programmes according to the codes and means of expression specific to television. This being so, educational television is primarily the business of TV professionals rather than educationalists, although provision must, of course, be made for collaboration between them.

In other words, educational television as we understand it is not primarily a teaching activity as such but expressive, creative work in its own right, which must earn the acceptance and loyalty of an audience. Since our job is to make television, not to provide distance training proper, we do not have a captive pre-packaged audience, but it is our responsibility to try to captivate it.

The educational use of television is, however, dependent on the existence of a specific concern for education, particularly adult education. This is why it is important in educational strategy to create scope for distance training experiments.

In the same way, we feel it is essential to view this type of experimental work on education as a project combining research and action, to including setting up a procedure for research on training, linked with production work.

Educational work

The main tenets for Canal Emploi Télévision in its educational work are the following:

1. Television must be receptive to the socio-educational environment

Educational television interacts with its environment. It is a link, a mediator, between the latent demand for education and training among the general public and the education and training offered by specialist bodies in the fields of social advancement, lifelong training and public information. This is the reason why Canal Emploi Télévision attaches so much importance in its educational strategy to working with the network of adult education associations, such as the Service d'information sur les études et les professions (SIEP — Studies and careers information service), Intercommunale liégeoise de santé mentale (AIGS —

Liège inter-commune association for mental health), Office national de l'emploi (ONEm — The national employment board) and Centre d'initiatives locales pour l'emploi (ILE — Local employment schemes centre).

2. Television must promote public awareness

Before education even begins, and in conjunction with the effort to educate and to inform, Canal Emploi Télévision's educational strategy must incorporate another facet: working towards a qualitative improvement in the potential demand for education. It must encourage the public to think about education and acquire (or regain) motivation, by means of television broadcasts at clearly defined levels of educational intervention. More particularly, there must be an effort to modify opinions, attitudes and behaviour patterns rather than concentrating on the communication of knowledge alone. In short, the stress should be on creating in-depth awareness by providing television of a professional standard.

3. Television strategy must be oblique

Another aspect of the strategy for educational television is that it should be oblique. Right from the planning stage, it must be visualized in educational terms. When it comes to putting the educational goals into practical shape, purely televisual resources of expression must be used to the full. The errors committed in former experiments with school television should not be repeated, for example by superimposing what may be disagreeable associations of schooldays (a dictatorial manner, a hard-and-fast curriculum, etc.) on the recipient's experience of television and all its pleasant associations (relaxation and leisure, freedom of choice).

In conclusion

Today, it is Canal Emploi's resolve to develop an effective regional training tool by placing television at the service of social innovation and training.

Early in 1987, the Canal Emploi team mapped out a guideline for programmes in consultation with a joint planning committee made up of representatives of the Liège educational community. It sparked off new forms of synergy, whose development will ensure that Canal Emploi programmes come closer to meeting training needs in the region.

A catalogue of productions will promote the programmes, which have a growing distribution in the region, in the French-speaking community in Belgium and also in French-speaking countries outside Belgium.

After 10 years of operation, the institutional status of Canal Emploi is still precarious. Up to now the project has been funded by the French-speaking community in Belgium, the Ministry of Education, the Ministry of Employment and, in the case of certain training projects, the European Social Fund.

It is only logical that Canal Emploi should be recognized as one of the local television stations, unless a new statute for educational television is introduced. Such recognition would mean that the French-speaking community should contribute towards part of the staffing costs, while the institution would have to find the balance of salaries and investment in equipment and production costs. With a staff of 15, the global television budget amounts to BFR 25 million.

At present we are operating under a joint funding system, a combination of public grants and our own resources, mainly derived from the private sector through sponsorship and the sale of advertising space. The method of financing will undoubtedly affect the future of the project.

Yet another challenge for Canal Emploi!

[1] For the Fédération générale du travail de Belgique (FGTB), the Fondation André Renard (FAR); for the Confédération des syndicats chrétiens (CSC), the Institut supérieur de culture ouvrière (ISCO).

[2] The area covered by Canal Emploi Télévision — Liège and its inner and outer suburbs — numbers 150 000 cable-TV users, a potential audience of 450 000 people (90 % of Belgian households are linked to cable television).

[3] Ten years later, these 'experiments' are gaining official recognition now that the authorities have enacted a decree on the 'broadcasting landscape' in Belgium's French-speaking community (12 July 1987).

[4] Unemployment is particularly high in Wallonia (southern Belgium), where the effects of recession have come on top of a long-term crisis in the industrial fabric. It is an area where heavy industry (steel) has predominated, the type of industry that is now becoming obsolescent. Today, the redevelopment of the Walloon steel area is still the fundamental economic and social problem in the region, as it is or has been in many similar areas throughout Europe.

[5] Rate of unemployment expressed as a percentage of the number of people with unemployment insurance. *Source:* monthly release from ONEM (Office national de l'emploi), July 1987, pp. 8-9. As a comparison, the unemployment rate in Belgium as a whole is 16 %, according to the same source (14.2 % in the Flemish region, 22.5 % in the Walloon region, 18.5 % in the Brussels region).

[6] From 1977 to 1986, most of the staff were employed with special temporary status under a scheme for finding work for the unemployed which had been set up by the Ministry of Employment and Labour.

[7] Up to the present, Canal Emploi Télévision is regarded purely as local television. There is no special charter for educational television. All that exists is provision in a recent decree for recognizing and subsidizing (among other factors) agencies engaged in 'distance continuing training' (see debate in the Council for the French community, July 1987).

[8] See *L'audience des télévisions locales et communautaires de la Communauté française de Belgique* ('The audience for local and community television stations in the French community in Belgium'), RTBF Survey Department, p. 6.

By:

CEDEFOP

Communautés européennes
Organisation internationale
Martina Ní Cheallaigh
Bibliothécaire
CEDEFOP

Audio-visual technology and vocational training in Europe: **A dual challenge,** Berlin, 3-4 September 1987.
European Centre for the Development of Vocational Training (CEDEFOP)
Berlin: unpublished, 1987, various pagination.
Languages: DE, EN, FR

Audio-visual aids. Educational innovations. Training systems. Teaching methods. Educational television. Telecommunications industry. Educational technology. Innovations. Conference reports. EEC countries.

Some of the contributions to the conference are published in this bulletin. The following is a list of papers delivered by participants from Member States and European Organizations:
Teaching, media choice and cost effectiveness of alternative delivery systems;
Training measures using flexible training in Ireland;
Training and Btx (videotex) — Federal Republic of Germany;
Vocational training modules in multimedia projects for adults — the Netherlands;
Canal emploi television: 10 years' experience (and experiments with educational television) — Belgium;
Audio-visual aids in vocational training: The experience of the last 20 years — European Institute for the Media;
From slide projector to interactive video...in-firm vocational training in the Federal Republic of Germany;
Minitel in France: Uses in vocational training;
Satellite and continuing training: The example of Telecom 1 in France.

Copies of all papers are available from CEDEFOP. A summary of the conference produced by the organizer, Norbert Wollschläger, is published in *CEDEFOP Flash,* No 5/87.

Valette, M-F.: **Bibliographie annotée sur les implications de l'introduction de nouvelles technologies sur la formation professionnelle.**
International Labour Office (ILO). Geneva, 1986, 53 p.
(Politique de Formation; Document de Travail, No 11)

Bibliographies. Technology. Technological change. Vocational training. Occupational qualification. Skills. Training content.

The bibliography in its present state is regarded as a working document. It is divided under three headings: the repercussions of introducing new technologies on work content and work organization; the influence of technological change on qualifications and skills; the implications of the introduction of new technology on the content of training and educational programmes and their application methods. The majority of the references included here are taken from Labordoc, the ILO's bibliographical data base.

CAL for Europe: **EC conference on the development of educational software.**
25-28 May 1986, Twente University of Technology, the Netherlands Enschede, May, 1986, unpaged.
Educational technology. Research and development. European Communities. International cooperation. Computer-assisted instruction. Conference reports.

A conference organized by the Dutch Ministry of Education and Science, the Centre for Education and Information Technology, the Twente University and the Department of Education in collaboration with the Commission of the European Communities. It examined the problems and developments in computer-assisted learning, including: progress in the introduction of new information technologies in education, organization of the production and diffusion of educational software, evaluation of the technical and pedagogical quality of educational software, and future cooperation among Member States in this area. The main points of the conference are also summarized in *Eurydice News* No 2, November 1986.

Sommer, W.: **Neue Medien in der Aus- und Weiterbildung.** Eine Untersuchung über die Einsatzmöglichkeiten von Medien- und Telekommunikationssystem in der Aus- und Weiterbildung unter besonderer Berücksichtigung der Situation in den USA.
Berlin: Erich Schmidt Verlag, 1987, 323 p.
(Ausbildung, Fortbildung, Personalentwicklung; Bd. 26)
ISBN 3-503-02668-1

Training. Further training. Retraining. Workers. Older workers. Higher education. School-enterprise relationship. Distance study. Audio-visual aids. Telecommunications industry technology. Educational radio. Educational television. USA. Japan. Models. Federal Republic of Germany.

The book is the result of information gathered and observations made by the author during a study visit to the United States at the end of 1985. She looks at the state of education, developments in population and work-force trends and the situation at work where workers frequently need to adapt their skills, specialize or retrain to keep up with the rate of technological change in their job. New media and telecommunications systems are being used extensively by higher education institutions to meet training needs. The cooperation between 'high schools' and industry in this area are described. Details are given on a wide selection of functioning programmes using television networks, cable systems, satellite, video and broadcasting; these are mostly in the USA but they also include two 'high schools' and an open university in Japan. The author draws some conclusions about the value of such systems and recommends certain features which would be suitable for adoption by the Federal Republic of Germany.

New information technologies: **A challenge for education. Centre for Educational Research and Innovation (CERI).** Paris: OECD, 1986, 121 p.; bibliography.

Languages: EN, FR
ISBN 92-64-12824-7 (EN)

Information technology. Learning. Educational systems. Educational policy. Teachers. Curriculum. Budget. Innovations. Forecasting. Reports. OECD countries.

New information technologies are already penetrating the educational sector, inspired by objectives, policies and implementation strategies which vary considerably between countries. This report provides a first evaluation of current trends and examines the impact of developing technologies on learning and education systems. (extract)

Proposal for a Council regulation on a Community action in the field of learning technology. Delta (Developing European learning through technological advance): Pilot phase.
Commission of the European Communities
Luxembourg: Office for Official Publications of the European Communities, 1987, 27 p. + annexes
(COM(87) 353 final)
Languages: DA, DE, ES, EN, FR, GR, IT, NL, PT
ISSN 0254-1475 (EN)
Learning. Educational technology. Telecommunications industry. Students. Trainers. Teachers. Adults. Learning methods. Systems analysis. Secondary education. Primary education. Higher education. Training within industry. Innovations. EC Regulation.
The proposed action is designed to stimulate incremental research and development which will enable new technologies to be incorporated into tools and infrastructure supporting advanced learning, in particular open and distance learning, in the Community. The scope and objectives of the pilot phase of Delta are set out in an annex. They include: the development of a 'Learning system reference model' both to support the work of planning and design and to help in the management of the system; collaboration of information technology and technology industry, including publishers and academia in the design of systems and equipment to support Community-wide open learning; testing and evaluation of communications and SOFT (Satellite-based open facility for testing); making equipment and services available at a favourable price. The main target areas of the action are professional training within industry, commerce and academia; general adult users such as university students, further education and adults as individual learners; and, thirdly, the formal educational sector at the primary and secondary levels.

Recent progress made in introducing new information technologies into education
Directorate-General for Employment, Social Affairs and Education — Commission of the European Communities, *Social Europe* (Luxembourg), Supplement No 4, 1986, 42 p.
Languages: DE, EN, FR
ISBN 92-825-6555-6 (EN)
Information technology. Education. Innovations. Educational technology. Computer applications. Primary schools. Secondary schools. Young people: 16-18 years old. EC Resolutions. Conference reports. EEC countries.

A report of three meetings held in accordance with the terms of the EC Resolution (19 September 1983) on new information technologies (NIT) in education. Summer University on NIT and primary school education, Liège 1985; Youth and New Technology Week, Turin, 8-13 July 1985; European seminar sponsored by the Federal Republic of Germany in conjunction with the Commission of the EC on the introduction of NIT at secondary school level.
Eurydice — The education information network in the European Community places special importance on the question of NIT throughout its work. The European Unit has an extensive collection of bibliographical references on this topic from which it answers queries for researchers and practitioners in the field of education. The address is: Eurydice — The European Unit, rue Archimède, Bte. 17, 1040 Bruxelles.

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By:
Office National de l'Emploi
Centre intercommunautaire de documentation pour la formation professionnelle
ONEM-CIDOC Boulevard de l'Empereur, 11
B-1000 Bruxelles-tél: (02) 513 91 20 ext. 1001
CIDOC
ICODOC

Selective bibliography

Audrey, D.: **'Défi, méthodologie, réalité . . . l'enseignement assisté par ordinateur'**
In: *Fabrimétal,* 3, 1987, pp. 46-47, Rue des Drapiers 21, B-1050 Brussels.
Computer-assisted instruction. Modular training. Metalworking industry. Wallonia. Belgium.

In this article the author reviews two specific applications of CAI (computer-assisted instruction) in two metalworking factories in Wallonia. The first is the use of CAI to train operators in the use of an NC machine at Fabrication nationale in Herstal, the second is instruction in computerized fault location at the Caterpillar factory in Gosselies. The initiators of this type of modular training discuss in depth the aims, methods and evaluation of the learning processes.

Godin, P.: **Apprentissage des langues étrangères assisté par (micro-) ordinateur: contraintes et perspectives**
In: *Humanités chrétiennes,* No 3, March-May 1987, pp. 234-236,
Rue Guimard 1, B-1040 Brussels.

Computer-assisted instruction. Foreign-language teaching. Microcomputers. Pedagogics. Belgium.

In this article, the author summarizes the latest teaching aids based on the use of the microcomputer for foreign-language learning. The benefits include the personalization of learning and greater independence for the learner, who can work at his own pace through programs on language and grammar revision exercises. The main benefit of these 'tutorial' programs is the acquisition of 'passive understanding' knowledge through listening and reading. The author touches on problems inherent in the computerization of programs and considers the choice of advanced programming languages.

Heene, J., Verhaege, J. P., Orban, M., *et al.:* **Nieuwe informatietechnologieën en onderwijs**
Ghent, Seminarie en laboratorium voor didactiek, Ghent State University (RUG), 1986, various pagination, H. Dunantlaan 2, B-9000 Ghent.
Educational technology. Computer-assisted instruction. Primary education. Special education. Secondary education. Vocational training. Teacher training. Directories. Belgium.
This survey of innovative projects concerned with new information technologies in Belgian education was compiled in the framework of the Network I activities of the FAST (TET 3) project of the European Community. An outline of the educational background in Belgium is followed by a number of project descriptions selected on the basis of these criteria: the extent to which the project illustrates the educational value added which can be achieved through the use of the new information technologies in education; the originality of the project; and the extent to which the project reflects more general trends in the region or educational level or sector in question.

Jadoul, Yves: **Un flamand dans le téléviseur**
In: *Le Vif,* 8, 1985, pp. 92-96, Place de Jamblinne de Meux 10, B-1040 Brussels.
Distance study. Foreign-language teaching. Dutch language. Adults. Wallonia. Brussels region. Belgium.
The article is on recent cooperation between the Office national de l'emploi and Radio télévision belge regarding the provision of adult education. With the financial backing of the French community authorities, they have co-produced a TV course in Dutch for French-speakers. The new distance training course draws on the latest theories on communication and audio-visual structural/global methods and is designed mainly to give fresh-starters active oral practice in everyday spoken Dutch. The course was amply justified by the steady growth in the demand for Dutch language courses, whose provision would have been very costly. An original feature of the method is that it entails follow-up and conversation coaching by local tutors, working with groups of people who have followed the TV course.

Lowyck, Joost: **De computer als werktuig voor taalleren in de volwassenvorming**
In: *Vorming Vlaanderen,* 12, 1986, pp. 75-83.
ISSN: 0773-6151.
Language teaching. Written expression. Computer-assisted instruction. Experimental learning. Flanders. Belgium.
The computer is spotlighted as a tool for language-learning in adult education. The author sees an advantage in the fact that great attention can be devoted to written language and the words that are chosen. Since participants can write in a group, writing becomes a social activity: this increases motivation, reduces the fear of writing and enables participants to help one another in finding better ways of expressing themselves. However, he warns against using the computer in ways that cut the individual off from social contacts and first-hand experiences.

Lowyck, J., Decoo, W., De Gelder, E.: **Functionele informatica in BSO en het ontwikkelen van basisvaardigheden in lezen en schrijven**
In: *Informatie Vernieuwing Onderwijs,* 1, 1987, pp. 32-39, Werkgroep Informatie Vernieuwing Onderwijs (WIVO), Redactiesecretariaat IVO, VIIde Olympiadelaan 25, B-2020 Antwerp.

Computer-assisted instruction. Language teaching. Reading instruction. Writing instruction. Dutch language. French language. Vocational education. Lower secondary education. Psychology of learning. Pedagogics. Educational research. Flanders. Brussels region. Belgium.

This article is concerned with the use of computers in vocational secondary education and the development of reading and writing skills. The importance of creating an appropriate computer-based learning environment is demonstrated by reference to research. Finally, suggestions are made for the further development of research into: the computer-based learning environment; didactic, psychological and technical criteria; social cooperation and language-directed interaction; slow learners; program design. All this work must take place in relation to two languages, Dutch and French.

Palings, W., Snick, A., Jansen, G.: **Computerrondersteund onderwijs en niet-schoolse beroepsvorming: een verkennend en beschrijvend onderzoek in het bedrijfsleven**
Antwerp, Sociaal-economische Raad van Vlaanderen (SERV), Stichting Technologie Vlaanderen (STV), 1986, 131 pp., Antwerp Tower, De Keyserlei 5, bus 15, B-2018 Antwerp.
Computer-assisted instruction. In-plant training. Motor vehicle industry. Banks. Skills. Surveys. Flanders. Belgium.
The researchers focus on the question of the use of the computer in on-the-job education and training, attempting to assess the extent of the introduction of computer-based learning and its effects in industry. A survey of workers in a vehicle assembly plant and a financial institution reveals the drawbacks and advantages of computer-assisted instruction. This first exploratory and descriptive study of this subject in Belgium devotes attention to various processes of change, covering the history of the phenomenon, the reasons behind the introduction of computer-assisted instruction, its integration into training schemes, practical organization, evaluation by employees and prospects for the future.

Peraya, D.: **Pédagogie de l'audio-visuel. Mythes et tendances actuelles**
In: *Bulletin belge de psychologie et de pédagogie,* Volume 146, 1984, No 185-186, pp. 19-32.
ISSN 0035-0826

Pedagogics. Audio-visual aids. Learning strategy. Training systems. Teaching techniques. Belgium.
The article describes the history of audio-visual teaching and the stages from the 1960s to our own time.
Following a phase of uncritical acceptance of all the various audio-visual aids, according to the author a more strictly taxonomic view is being taken today, with the stress once again on behavioural and learning targets. Audio-visual aids are now used to trigger off learning that is geared to the learner's intellectual abilities and helps him to perform new tasks, as an integral part of a global learning strategy.

Tomsin, M.: **'Hallen van Kortrijk CAD/CAM 86 reeds in voorbereiding'**
In: *CAD/CAM Spring edition,* 4, 1986, pp. 10-11, Belgotronic, Avenue du Saphir 3, B-1420 Braine l'Alleud.
The author considers the audio-visual sessions, known as software theatre, which are increasingly being used at CAD/CAM exhibitions to give visitors a rapid but thorough introduction to the subject and to enable them to get the most out of their visits to individual stands. The illustrative method of software theatre (designed by the management team of the Hallen Exhibition Centre at Kortrijk) aims at removing the apprehensions of potential users through a process of demystification. The article contains information on this method, on an instance of its use by a member of the vocational training staff of the National Manpower Service (RVA) and on the views of its users on both the giving and the receiving end.

List of useful addresses

Centre laïc alternatif pour la valorisation de l'informatique dans l'enseignement et la recherche (Clavier)
Rue du Méridien 17,
B-1030 Brussels

Informabus
Rue des Fortifications 20
B-1060 Brussels

Limburgs Centrum voor Moderne Leermiddelen (LOML)
Universitaire Campus
B-3610 Diepenbeek

Ministère de la Communauté française, Enseignement à distance
Cité administrative de l'État
Quartier Arcades F, 4th floor
B-1010 Brussels

Ministère de l'Education nationale, Réseau OSE (Ordinateur au service de l'éducation)
Boulevard Pachéco 34
B-1000 Brussels

Ministerie van Onderwijs, Commissie Onderwijs en Informatica
Koningsstraat 138
B-1000 Brussels

Ministerie van Onderwijs, Dienst didactische films en audiovisuele media
Handelskaai 7
B-1000 Brussels

Ministerie van de Vlaamse Gemeenschap, Mediabib
Gallaitstraat 78
B-1030 Brussels

It should be noted that almost all the university institutions are carrying out research in this field or are providing scientific support to pilot projects concerned with the development and implementation of didactical concepts.

DK

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SEL

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Olesen, K.; Moller, N. H.; Nipper, S.; *et al.:* **Datameter i den erhvervsrettede voksenundervisning**
Teknologistyrelsen. Århus tekniske Skoles Boghandel, 1985, 140 pp.
ISBN 87-981838-1-8
Computers. Computer-assisted instruction. Adult education. Continuing education. Continuing vocational training. Distance study. Reports. Denmark.

The background to the report was a request from the Technology Board (Teknologistyrelsen) for a survey to be made on the use of EDP for education. Part of the request was that the investigative work in connection with the report should elucidate the existing situation both internationally and in Denmark, that it should relate the various initiatives with one another and that this should include treatment of the relationship between the use of computers as a teaching aid and as a means of communication. The Technology Board emphasized especially the point that the report should deal with questions of teacher training and problems connected with the use of computers for education. The report therefore examines some facts concerning the use of computers and computer-based technology — in connection with education. Within adult vocational training, the report is more concerned with initiatives on the development and use of information technology than with work that is more of the nature of research.

Frøyland, Egil (ed.): **Datateknologi i yrkesutdanningen.** En nordisk artikkelsamling.
Nordic Council of Ministers. Secretariat for Nordic Cultural Cooperation. Copenhagen, 1985, 146 pp.
Technology. Computer science. Vocational training. Scandinavia.

At the beginning of the 1980s a study group was set up under the Nordic Council of Ministers, with the task of drawing up a three-year programme of cooperation on research and development. The study group arranged, among other things, a series of computer training seminars for teachers. The collection of articles is based upon these seminars. The main topics for the articles are: computer technology in vocational training, aims and methods of computer education, EDP now within vocational training in the Nordic countries and, lastly, pedagogic principles and political considerations.

Interim report for ECDU. Erhvervsuddannelsernes Center for Datamatstøttet Undervisning (ECDU). Copenhagen, 1986, 79 pp., ECDU, Telegrafvej 5, DK-2750 Ballerup.
Computer-assisted instruction. Vocational training. Pilot projects. Social partners. Reports. Denmark.
The Vocational Training Centre for Computer-assisted Instruction (ECDU) was established in 1984 by the social partners as a three-year project. The primary purpose of the Centre is to study how computer-assisted instruction can be best applied within vocational schools and firms. In the interim report an account is given of the activities which led to the establishment of ECDU, and of the activities and initiatives which need to be started in the second half of the project.

Informatik om fællesfag. Konference for lærere i fællesfag den 6.-7. maj 1985 i Fåborg

Ministry of Education, Directorate for Vocational Training. Højbro Plads 4, DK-1200 Copenhagen K. Copenhagen, 1985, 197 pp.

Computer science. Curriculum subjects. Vocational teachers. Conference reports. Denmark.

The purpose of the conference and of the conference reports is to help to enable teachers to decide how EDP-technology can be incorporated in their teaching, partly as a technical tool and partly as a teaching aid. The aim of the conference and reports is therefore, on the one hand, to give guidance on current possibilities for EDP technology within the various curriculum subjects and, on the other hand, to stimulate discussion, on a pedagogical and psychological basis, concerning the implications of using (or not using) computer technology as a teaching aid. In addition, a debate on the implications for teacher training is being arranged, partly for the training schemes and series of courses which confer qualification to teach curriculum subjects, and partly for further training courses.

Larsen, M. G., Rasmussen, T. M.: **Dataformidlet undervisning i industrien.** Århus: Jysk Teknologisk Forlag, 1987, 143 pp.
ISBN 87-87-430-150.

Computer-assisted instruction. In-plant training. Manuals. Denmark.

A project group at the Jutland Institute of Technology has been working since the end of 1984 on the use of computer-assisted instruction and simulation for training operatives in industry. The book is intended as a manual, the target group being production and training personnel in industry who are thinking of using, or have decided to use, computer-assisted instruction (DFU). The book describes how a project can be started, and examines various authorship systems and some pilot projects in industry. The authors conclude that for the present only relatively few enterprises and organizations are developing and using DFU as a natural part of personnel training. This form of instruction has become established especially within banking and insurance, the organizations of which are characterized by having a large training division, homogeneous staffs, many branches, wide geographical distribution, large staffs and, lastly, continual changes in the business basis, necessitating continuous staff training at all levels. Some of the above conditions should be fulfilled before large or medium-sized enterprises embark upon the production of DFU-materials, since computer-assisted instruction is not cheap. Investment in DFU-development should be justified by exploitation of a number of the advantages offered by the medium.

Ralking, H.C., Jensen, V.H., Tylen, T.: **Video som værktøj i uddannelse og undervisning.**

Copenhagen: Teknisk Forlag, 1986, 181 pp.
ISBN 87-571-0781-5.

Audio-visual aids. Audiovisual methods. Education and training. Denmark.

The target group for the publication is all who work with video in instruction at all levels, including personnel training. The publication discusses both technical and pedagogical problems connected with the production of video tape recordings. Lastly, the book contains practical examples of how the best results are achieved, from the educational and pedagogical standpoints.

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Ausbildungsmittel Gesamtverzeichnis 1987. Bundesinstitut für Berufsbildung (BIBB)
Berlin: Beuth, 1987, 101 pages
BIBB, Fehrbelliner Platz 3, 1000 Berlin 31
Tel. 030/8683 - 205 - 202

Training material. Audio-visual methods. Text books. In-plant training. Chemistry. Biology. Electronics. Engineering. Wood processing workers. Metal-workers. Business services. Public services. Retail trade. Information materials. Germany FR.

The register provides information on the training aids, including audio-visual media, issued by BIBB and marketed through Beuth Verlag (Burggrafenstr. 4-10, 1000 Berlin 30) in the following occupational areas:

- chemistry, physics, biology
- electrical engineering
- colour scheming and interior design
- wood processing
- metal-working
- business and administration, retail trade

The register begins with information on ordering, supply and payment conditions and how to obtain slide shows with commentary, Super 8 films, videocassettes and foreign-language versions.

Laur-Ernst, Ute, *et al.*: **Medienprojekte in der Berufsausbildung.** Planung, Forschung, Entwicklung, Implementationen dargestellt und diskutiert am Modellversuch Mehrmediensystem Elektrotechnik (MME-S)
Bundesinstitut für Berufsbildung (BIBB), Berlin/Bonn
1981, 274 pages (Schriften zur Berufsbildungsforschung, Vol. 61)
ISBN 3-410-91870-1

Audio-visual aids. Telecommunications industry. Electronics. Training initiatives. Planning of training. Pilot projects. Germany FR.

The improvement of the quality of vocational training is a long-term and always topical objective. New types of media and forms of teaching can help to achieve this goal. To this end, BIBB carried out an extensive pilot project together with educational practitioners in the 1970s, the principal data, findings and experience being summarized in this report. The procedures used in the project, its time-and-motion approach, the methods used to develop media, the cooperation with teachers and pupils, the implementation strategy adopted and the sociological findings on the determinants of learning are described and discussed, and conclusions are drawn. The difficulties encountered in the planning and implementation of a research and development project of this kind are indicated, as are the opportunities presented by cooperation with educational practitioners.

Eheim, Hans-Dieter; Fahle, Walter; Gerwin, Werner: **Medienentwicklung und Medienforschung in der betrieblichen Bildung** — Der Modellversuch MMM — Bundesinstitut für Berufsbildung (BIBB), Berlin/Bonn
1985, 339 pages (Modellversuche zur beruflichen Bildung, No 22)
ISBN 3-88555-254-X

Training research. Training methods. Pilot projects. Metal-working industry. Training material. Germany FR.

The BIBB carried out an extensive pilot project together with schools and firms in the metal-working sector. The findings and experience are presented in this report, which focuses on a description of the didactic bases, development and revision of media and of major sociological findings.
The research approach, methodological questions, problems encountered in cooperation between practitioners and researchers, opportunities for improving in-school and in-plant training with media, and strategies adopted for and problems connected with the introduction of new media and forms of teaching in vocational training are discussed. The description of these focal areas of the pilot project is followed by conclusions on the coordination of theory and practice through media.

Schepanski, Norbert: **Mikroelektronik und Facharbeiterqualifikation.** Grundlagen für eine Personalentwicklung bei Einführung neuer Technologien (thesis), Berlin, Erich Schmidt Verlag, 1986, 232 pages (Angewandte Innovationsforschung, Vol. 8)
ISBN 3 503 02690 1

Microelectronics. Occupational qualification. Innovations. Germany FR.
This thesis makes it clear that new technologies like microelectronics often come up against forms of personnel planning and training activities which firms have inherited from the past and that these two areas are not sufficiently prepared for such an 'influx' of innovation and training. In his closing comments the author reaches the conclusion that 'even where sufficient information relevant to training is available, its transformation into curricular categories for teaching is subject to methodological restrictions (obsolete occupational outlines)' in firms. The methodology developed against this background was put to the test in a nation-wide pilot project and is now being applied in over 800 firms.

Koch, Richard; Wilhelmi, Hans-H.: **Berufsbildung und neue Informationstechniken.** Probleme und Stand der staatlichen Aktivitäten in der Bundesrepublik Deutschland. Bericht an die Kommission der Europäischen Gemeinschaften, Federal Minister for Education and Science; Bundesinistut für Berufsbildung (BIBB), Berlin/Bonn 1986, 35 pages

BIBB, Fehrbelliner Platz 3, 1000 Berlin 31

Vocational training. Information technology. Occupational qualification. Germany FR.
Part 3 of the report considers the relationship between the national development of training determined by new information technologies and the European Community's programme of work in this field from the following angles among others:

- training needs in small and medium-sized enterprises
- integration of young people into employment
- retraining/integration of female workers

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Pfeiffer, A., Galval, J., Saez, F., *et al.*: **Informática y escuela.**
Fundación para el Desarrollo de la Función Social de las Comunicaciones (Fundesco), Madrid, 1985, 602 pp., ISBN 84-86094-09-7.

Computer science. Training of trainers. Computer-assisted instruction. Teaching methods. Audio-visual aids. Programmed instruction. Training experiments. Educational technology. France. United Kingdom. Latin America. Spain.

A selection of papers presented in the course of the study days devoted to computers in primary and secondary education which were organizied by the Ministry of Education and Science. The papers, which are concerned with the application of information technology in the educational field, provide a broad picture of the activities undertaken in this area in Spain and other countries.

Martinez Sanchez, F.: **Video interactivo y enseñanza.**

In: *Telos Cuadernos de Comunicación Tecnologia y Sociedad,* Madrid, No 8, 1986, pp. 57-67
ISSN 0213 084X.

Computer-assisted instruction. Teaching methods. Audio-visual methods. Teachers. Teaching aids. Educational technology.

After an introduction dealing with computer-assisted instruction this article on the relationships between the new technologies in teaching goes on to consider the 'interactive video'. The author brings out the problems of the new system as regards its various components, outlines various experiences of its use and the phases of its design and production and details the kinds of expert that are needed and the involvement of the teacher. The implications for teaching methodology are then described, showing the system's scope, limitations and advantages in particular regards as compared with other approaches. Finally, the author considers the role of the teachers and their preparation for the new system.

Albero Andres, M.: **La Televisión Didáctica.**
Barcelona, Ed. Mitre, 1984, 157 pp., ISBN 84-86153-38-7.

Educational television. Educational technology. Audio-visual aids. Learning methods. Teaching techniques. Curriculum. EEC countries. Developing countries. USA. Spain.

An introduction to the world of educational television, for both interested educationists and (future) specialists in information technology. Having outlined the purpose and functioning of this type of television the author goes on to describe what has been tried and achieved in a number of countries (with various social and economic circumstances and achieving various goals), focusing on Spain, and concludes with a series of observations on the medium in question.

Pigeat, H.: **La Televisión por cable empieza mañana.**
Madrid, Ed. Tecnos SA, 1985, 148 pp., ISBN 84-309-1202-9.

Television. Technological change. Information technology. Audio-visual aids. Telecommunications industry. Educational television. USA. France. Canada. Europe. Japan.

This comprehensive study of cable television (covering its technical, cultural, sociological, economic and legal aspects) shows both what has already been done in a number of countries where cable television is at different stages of development and what could be achieved in the fairly near future. Having established the links with the various information technologies and traditional television (with its performance limitations) the author outlines the new dimensions of the system and the different view of the audience and brings out the benefits to educational television and culture in general.

Marin Ibañez, R.: **El Proyecto Telecan: La Teleeducación en las Islas Canarias**
Facultat Lletres, Dep. Ciencies Educació, Universidad Autónoma de Barcelona; *Educar, Revista de la Secció de Ciencies de l'Educación,* Barcelona, No 1, 1982, pp. 71-86.

Language teaching. Distance study. Audio-visual aids. Course design. Educational radio. Spain.

The article deals with two distance learning projects concerned with languages in the Canary Islands, one which has already been carried out and another which is still at the planning stage. In respect of the first the author outlines the various phases of design and planning by a group of experts in the different areas concerned (course development, communications media, press and radio and final evaluation). This part ends with suggestions for improvements in future courses. The author then describes the elements of a plan for teaching foreign languages in primary schools making use of the telephone system, covering its goals, target groups, coordination with school activities and teacher preparation.

Fontan Montesinos, M. T.: **La radio como instrumento de educación:** aproximación a una categorización de los programas radiofónicos educativos

In: *Bordon revista de orientación pedagógica,* Madrid, No 263, Vol. XXXVIII, 1986, ISSN 0210 5934.

Educational radio. Distance study. Educational aids. Teaching. Learning. Mass media. Trainer-trainee relationships. Adult education.

Analysis of the various roles which radio can play as an educational tool. The author begins by describing the different levels of formative effect in relation to the goals, functions, methodology and forms of radio broadcasts, going on to consider the various ways in which radio can be used as a teaching medium in the narrow sense, both on its own and in combination with other media.

Bartolomé Pina, A. R.: **Implicaciones didácticas de la utilización:** de Mandos audiovisuales con el lenguaje: que les es propio
In: *Bordon revista de orientación pedagógica,* Sociedad Española de Pedagogia, Madrid, No 263, Vol. XXXVIII, 1986, pp. 422-428, ISSN 0210 5934.

Audio-visual aids. Language. Teaching methods. Communication. Evaluation. Teaching aids.

Observations on the use of audio-visual media for teaching purposes. The author examines various positions regarding the use of these media, making a case for a thorough knowledge of the language of audio-visual media, and indicates approaches considered to be mistaken. Attention is then focused on the implications for audio-visual media in education and a brief outline is given, with an example, of the language to be used.

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Audio-visual technologies and vocational training

Bibliography

Corset, Pierre: **'Vidéocommunication et formation professionnelle'.** *Actualité de la formation professionnelle,* No 83, July-August 1986, pp. 67-69, ISSN 0397-331X

Educational television. Distance study. Pedagogics. Training supply. France.

Presents the findings of a survey based on the city of Marseilles, in formulating a policy for the use of a TV cable network for training. Local television networks are called on to meet the pressing demand for training brought about by technological change, which increases productivity and broadens the fields of training.

Voglimacci, Catherine: 'Vidéocommunication: une approche nouvelle de la communication et de la formation professionelle'

IDATE Bulletin, No 23, May 1986, pp. 71-88, IDATE (Institut de l'audiovisuel et des télécommunications en Europe), Bureau du Polygone, F-34000 Montpellier.

Audio-visual aids. Distance study. Pedagogics. Training experience. France.

An analysis of an experiment in video communication within the telecommunications authority. Basic principles underlying the system. The results in the field of internal communications. A description of an experiment in distance training (adapting the course module, the conduct of sessions).

Fontanel, Michel: 'Enseignement assisté par ordinateur et formation professionnelle (3): expériences chiffrées et données concrètes'. *Études et expérimentation,* No 17, January-February 1986, pp. 25-32, ADEP, Mont d'Est, Le Central 430, BP 101, F-93194 Noisy-le-Grand.

Computer-assisted instruction. Pedagogics. Cost of training. Large enterprises. France.

In many cases CAI leads to a gain in teaching 'productivity', as proved by an analysis of experiments conducted in large enterprises. This gain is also evidenced by a study of the cost factors for one hour's CAI compared with traditional instruction. The government has a role in ensuring that wider use is made of CAI: there are a number of documents along these lines, but they have not been adequately explored.

Echinard, Mireille: 'Les nouvelles technologies de communication et leur rapport à l'enseignement'

Formation développement, No 73, July-September 1985, pp. 71-86, ADEP, Mont d'Est, Le Central 430, BP 101, F-93194 Noisy-le-Grand.

Information technology. Access to education. Learning process. Pedagogics. Self-instruction. Individual training. France.
The advent of the electronic age forces us to look at education and its relationship with knowledge in an entirely new light. The educational situation can be shared out among several places of training and then brought together again through the new communication techniques. Support for access to sources of knowledge plus a fresh concept of learning time promote the development of personalized, independent learning.

'Le câble: avenir de la télévision éducative?'
Direct, No 5 (new series), 1985, pp. 11-28, ACCT (Agence de coopération culturelle et technique), 13 t, Quai André Citroën, F-75015 Paris.
Educational television. Distance study. Pedagogics. Training supply. USA. Belgium. France.
A summary of various studies on current communication practices, a review of experience with the first cable networks, the potential of cable television for educational services. Among those saying they intend to subscribe to cable television, 32% would opt for a channel devoted to education and continuing training. Description of an experiment in Isle d'Abeau. A report on foreign experiments in cable-relay educational television (USA and Belgium).

Perrier, François: 'Dites-le avec des images' — *Usine Nouvelle — Tertiel,* supplement to No 40, 4 October 1984, pp. 65-69, Groupe Usine Nouvelle, 23, rue Laugier, F-75017 Paris.
Audio-visual aids. Computer science. Self-instruction. France.
Future self-instruction stations will come about by combining broadcasting with the computer. Hardware available from manufacturers, plans and achievements.

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In recent years there have been major increases in the use of audio-visual technologies in training. Almost all trainers use audio-visual aids, such as slides, overhead projectors and films to assist and support their instruction. More sophisticated training delivery methods, which use audio-visual technologies to varying degrees include computer-based training (CBT), open learning and distance education/training. The technologies used in these areas vary from interactive video-disc material, to courseware and software for computer-based training, and audio-cassette materials.

AnCO, the major provider of vocational training in Ireland aims to provide at least 30% of training using technology-based delivery methods by 1991. To achieve this objective, resources have been allocated to research and develop new technological methods of training delivery. Projects already carried out include:

interactive video-disc projects on welding, computer literacy, and new electronic technologies;

CBT courses and demonstration discs on robotics, hydraulics, costing and finance, letter and report writing;

open learning packages on finance for the non-financial manager; marketing management — a service to small businesses.

Ricketts, S.: **Computer-assisted training — Some psychological and educational criteria for its application in AnCO.**
AnCO — The Industrial Training Authority, 1982.
Computer-assisted instruction. Training. Teaching methods. Ireland.

This report is the result of an interactive search and discussion with interested parties, with a view to discovering the potential of the computer as a medium for training in AnCO. The particular focus is on the psychological and educational questions that should be asked about computer-assisted learning programmes in general and their use on certain courses.

Denny, T.: **Changing skill patterns: A discussion paper on the training implications of new technology.**
AnCO — The Industrial Training Authority, 1982.
Technology. Technological change. Training. Ireland.

The increased pace of technology change in society will require a rapid and effective response in training activities both technical and psychological. This paper deals primarily with the psychological aspects. It is proposed that whichever scenario of working life is realized, people will require skills to enable them to cope effectively with change.

Meskill, P.: **The view from Ireland.** 2.: The productive use of subject matter experts in the development of CBT courseware. Interactive learning international, 2 (3) 1986, p. 8 (3 pages)
ISSN 0748-5743

Computer-assisted instruction. Course design.
Assesses the value of the input of a subject expert in the creation of computer-based courseware. Runs through the advantages and disadvantages of involving the expert, then lists the process of developing and designing the courses from specifying the target audience to the final verification.

Meeting today's training challenges. AnCO Computer-based training programmes. Dublin, AnCO, 1985, 36 p.	*Computer-assisted instruction. Training courses. Training material. Teaching methods. Welders. Visual learning.*	*Robotics. Financing. Educational innovations. Ireland.*
McDonagh, P.: **The view from Ireland.** 1: CBT; The inevitable growth. Interactive learning international, 2 (3) 1986, p. 6 (2 pages) ISSN 0748-5743	*Computer-assisted instruction. Educational technology.* Outlines the development of computer-based training and the limits which have affected its growth.	
Watts, Niall: **The instructional advantages of the computer.** In: *IITD News,* July 1985, p. 16-17.	Irish Institute of Training and Development, 59 Lansdowne Road, Dublin 4. *Training. Education and training.*	*Computer-assisted instruction. Computers. Learning. Learning methods. Course design. Curriculum. Ireland.*

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New media and education

Information technology is developing at a rapid rate. In a changing society education has the key job of, on the one hand, familiarizing the public with the new technologies and, on the other, producing 'human capital' for the wealth-creating sector and to improve the functioning of public services. Many more people need to be trained at various levels for jobs concerned with computers and their applications. Technological changes make heavy demands on education.

Two problems arise in education as a result of these developments: research into and the application of information technology do not get properly underway until the changes have long been introduced in industry, while a lack of information on new job profiles and industry's needs means that the education system is not properly geared to current practice in the world of work.

In 1984 the Dutch Government launched a plan (INSP) to promote the introduction and development of information technology on a broad front, through information, education and research and in the market sector. The education system has a major role under the plan, and measures have been taken to facilitate the introduction and productive use of new hardware in various types and levels of education. Great progress has been made on the rapid introduction of computers.

An area in which technological development is of great importance in education is that of the new media for the storage, transmission and processing of information in the form of pictures, sound or words, among them viewdata systems, two-way cables and video-discs. Computers often form an essential part of such systems. It is not as yet clear what applications may be found for the new media in education.

Research into the new media and information technology in education which has been carried out on behalf of the Ministry of Education and Science by the European Institute of Education and Social Policy indicates that the introduction of new media represents a major step in the direction of educational innovation, and in January 1987 the Ministry inaugurated a programme of research into their potential role in resolving both quantitative and qualitative problems in education. As well as looking into the significance of the new media in the different types of education, the research will examine their possible impact on the role of the teacher and on initial and in-service teacher training.

While the official programme is still at its initial stage experiments are already underway in different parts of the country involving the use of the new media. These include distance learning using two-way cable systems and the use of interactive video-discs.

Government policy on educational innovation gives high priority to collaboration between education and industry, and various measures are being taken, among them research and demonstration projects, to encourage such cooperation and ensure it functions to best effect.

Een aantal aanbevelingen ter stimulering van onderwijs, onderzoek en marktsektor met betrekking to telematica
(Rapport van de) Werkgroep telematica. Zoetermeer, Ministry of Education and Science, 1987, XXVI, 89 pp.
Communications industry. Telecommunications industry. Computer science. Educational research. Educational needs. Government policy. Market. Research reports. The Netherlands.
Policy recommendations aimed at stimulating education, research and the market sector in the area of telecommunications, microelectronics and information technology, based on a survey of the current state of affairs and problems in this area. The recommendations relate, among other things, to the establishment of an educational centre and a research coordination centre and measures concerned with applications of these new combined technologies.

Cerych, L., Jallade, J.-P.: **The coming technological revolution in education: a report on the potentials and limitations of new media and information technologies in education**

Paris, European Institute of Education and Social Policy, March 1986, VIII, 143 pp. Language: EN.

Government policy. Educational policy. Educational research. Information technology. Curriculum. Audio-visual methods. Educational levels. Distance study. Training personnel. Research reports. The Netherlands.
A report on a study of the influence of new media and information technologies on education, carried out at the request of the Ministry of Education and Science. Arguments for the introduction of new media; description of shifts in the curriculum and in the role of the teacher; consequences of the application of new media for the different types of education. Cost and funding of new media and information technologies.

Timman, T. E., Hemkens, L.S.J.M., Moonen, J. (eds): **Informatietechnologie en onderwijs,** special issue of *Informatie en Informatiebeleid,* Vol. 4, 1986, No 4, pp. 19-62.
Government policy. Education. Information technology. Educational innovations. Curriculum development. Computer-assisted instruction. Secondary education. Computer science. The Netherlands.
A special issue devoted to information technology and education, focusing on secondary education. Description of national policies in England and Wales, Scotland, France, Canada, Japan and the Federal Republic of Germany. The Dutch Government's plan for the promotion of information technology, launched in 1984, is considered from various viewpoints. In a survey of information technology in secondary schools, the scale of curriculum development and the role of teachers and policy-makers, stress is laid on the gap between vocational education and current practice in industry. Attention is also devoted to the potential contribution of, and problems faced by, the publishers of educational software and to the development of computer-assisted instruction and the role of the 1984 promotion plan in this connection. A list of books and journals concerned with computers and education is included.

Kok, W.: **De sociale aspekten van de invoering van nieuwe technologiëen en voorstellen om de sociale dialoog te verdiepen**

Report to J. Delors, President of the Commission of the European Communities, Amsterdam, Federation of Netherlands Trade Unions FNV, 1986, II, 30, X pp.
Information technology. Technological change. Social aspects. Education and training. Educational reform. EEC countries.
Report recommending ways in which the EC can promote and accelerate processes of technological and economic renewal while at the same time taking due account of social and employment aspects. The report deals among other things with possible improvements in education and training and with improved collaboration between the universities and industry.

Nieuwe media in het onderwijs
In: *Uitleg,* Vol. 2, 1986, No 75 (special issue), pp. 1-16.

Educational policy. Educational development. Educational research. Computer science. Computer-assisted instruction. Audio-visual methods. Audio-visual aids. Telecommunications industry. The Netherlands.

Special issue devoted to the new media in education, on the occasion of the publication of a draft statement by the Minister for Education and Science on future policy in connection with the consequences which the application of information technology, audio-visual media and telecommunications may have for education and of the report 'New media and information technology: the coming revolution in education'. The latter was compiled by experts at the European Institute of Education and Social Policy at the request of the Minister for Education and Science. An interview with the Minister on limited-scale projects designed to gather information on possible applications of new media. Summaries of the draft statement and report.

Saveyn, J.: **Mediadidactiek.**
In: *Persoon en Gemeenschap,* Vol. 39, 1987-87, No 2, pp. 54-71.
Educational technology. Educational research. Teaching methods. Audio-visual methods. Audio-visual aids. The Netherlands.
Review of communications media and teaching methodology, study of the best ways of using the various media in teaching and learning processes as an area of study in its own right.

Breimer, H. J., van Hees, E. J. W. M. (eds): **Technologie in het onderwijs**
Lisse, Swets & Zeitlinger, 1985, 172 pp (Contributions to educational research days 1984, 2.), ISBN 90-265-0572-8.

Educational technology. Educational research. Information technology. Computer science. Audio-visual methods. Audio-visual aids. Computer-assisted instruction. The Netherlands.

In this collection the topics 'education and information technology' and 'media and educational innovation' are treated against the background of the development of an educational technology. The introductory contribution includes, among other things, a terminology of educational technology. The stages in the development of the use of computers and audio-visual media in education are then covered. Despite differences in the development of applications it emerges that the two technologies are converging as media of education and information, thus permitting in the near future the development of a common educational technology.

Scholtes, E. (ed).: **Waar staat de computer in het onderwijs? Een zakelijke analyse met het oog op de toekomst in het kader van de OSTAP operatie**
Zoetermeer, Ministry of Education and Science, 1986, VI, 36 pp.

Government policy. Educational policy. Information technology. Computer science. Education. Pilot projects. The Netherlands.
Reports by civil servants on the place of the computer in education in the framework of the government's plan for the promotion of information technology which was launched in 1984. Outline of the measures proposed in the education section of the plan. Review of past projects undertaken as part of the plan. Reiteration of original plan goals. Description of the current position in the various types of education and problem areas. Relevant data on other countries' experience regarding information technology in education. Projection of the situation in 1990 and subsequent years. Consequences for the promotion of information technology after 1988 when the plan is terminated. Principal conclusions regarding future activities.

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Nunes, Maria Clara Ramos: **Os meios audiovisuais na formação; la parte, aspectos pedágogicos**
Lisbon, LNETI (Laboratorio Nacional de Engenharia e Technologia Industrial) — Centro de formação técnica, Azinhaga das Lameiras, Estrada do Paco do Lumiar, P-1699 Lisbon, 1986, 66 pp.

Audio-visual methods. Technological change. Teaching methods. Educational technology. Portugal.

This is a fairly comprehensive study which attempts to analyse some of the problems encountered in audio-visual teaching methods and technical details of the different types of equipment currently in use. In the last 20 years there has been continual development of audio-visual equipment, although when introduced the latest equipment has not always been accompanied by any indication of its application in teaching. The modern trainer, aware of its advantages, frequently makes use of audio-visual aids, but there is another group of trainers who, through lack of knowledge, adherence to routine or financial difficulties, very rarely make use of their potentialities. For them it is a new, more or less unknown world with the result that these aids are only occasionally used and then not fully exploited. There is also a third group which integrates these methods into traditional systems, often only for the sake of modernity, but ignores their possibilities and forgets that they are designed to improve the quality of training. Finally, the author deals with the true role of audio-visual aids in training, the types of system used and their fields of application as training aids.

Trindade, A. Rocha: **O video na formação**
Lisbon, Instituto Português de Ensino à Distância, Ministério da Educação, 1986.

Audio-visual methods. Visual learning. Technological change. Educational technology. Portugal.

Trainers responsible for training procedures who wish to use video as a regular teaching aid will have to decide whether to go to the trouble of producing their own material or restrict themselves to using that produced by others. The latter obviously avoids the very considerable initial costs of investment and maintenance of production equipment, not forgetting the already mentioned difficulty of recruiting and providing sufficient work for staff qualified for this type of work. Training objectives and the aspects to which priority is given are, however, very unlikely to be the same, even for enterprises with similar vocations or activities. Each video film used could therefore differ significantly from one we would like to use for some specific training activity. In this case, we often console ourselves and reason that the video used possibly has a technical and functional quality superior to one we might have produced with poorer resources or by less experienced staff.

Summarizing, video can make a major contribution to training, but it should normally not be used without the trainer or even without other aids which constitute what are usually known as multi-resource teaching blocks. Care should be taken to ensure that the production of video films is profitable in relation to training effectiveness, in so far as they achieve their objectives, are suitable for the trainees concerned and the final result is as planned.

Nunes, Clara Abrue: **Os novos métodos e meios na formação**
Lisbon, LNETI, 8 pp., 1986.
Audio-visual methods. Technological change. Educational technology. Portugal.

As a result of current developments in technology profound changes are taking place in training objectives, methods and resources. Those responsible for training, trainers and teachers must face up to the situation; they must make every effort to keep abreast of the constant developments in the world of education. We are now seeing training aids which are a combination of audio-visual methods and computing; two types of technology which were at one time separate are now being linked.
We are witnessing the overestimation of the individual student or trainee who trains himself without the assistance of a teacher or trainer; this will, however, encourage self-criticism and self-assessment of progress. The development during this decade of educational technology and the creation of multi-media systems which permit interactivity have resulted in transmitters and receivers becoming both speakers and creators at the same time. New educational aids are consequently becoming available: lectures using television, audio or video equipment, computers, or videotexts — interactive audio-visual systems, computer-assisted teaching. The author enumerates the advantages and disadvantages of these training methods and considers that the majority can become established in Portugal, thus facilitating not only the modernization of educational methods but, in particular, the development of profitable training.

Instituto do Emprego e Formação Profissional. Centro Nacional de Formação de Formadores.
Iniciação aos meios audiovisuais
Laboratório Laval: audiotutorado
Lisbon, IEFP, undated, IEFP, Laboratório Laval, Centro audiovisual, R. de Xabregas, 52, P-1900 Lisbon.
Audio-visual methods. Training courses. Portugal.
In the case of self-training using a tape recorder the trainer becomes the tutor who supervises the trainee's apprenticeship. Among the various types of one-to-one training systems, the use of a tape recorder has the advantage of reproducing as far as possible the relationship between tutor and student and it enables more students to be taught per trainer. The Laval University Education Technology Department had this in mind when it decided to use the method for the 'visual aid training course'. The cassette used is devoted principally to instructions, exercises and aids to learning. Other basic information for the course is to be found in the student's guide. Apart from the exercises in the guide, the student can also make visual and other observations and engage in role playing and other operations. Specially designed laboratories are used for this type of training.

Nunes, Maria Clara: **As novas tecnologias pedagógicas**
Lisbon, Centro de formação técnica, LNETI, Ministério da Indústria e Comércio, 10 pp., undated.
Technological change. Visual learning. Educational technology. Portugal.
Since its earliest days up to the present time there have been developments in the aids used for teaching. We have witnessed a complete change in pupil/teacher and trainer/trainee relationships, especially in respect of teaching methods. The introduction this decade of the use of computers and electronics has given rise to a complete revolution in the concept and use of existing teaching systems. Teaching is in a state of evolution — into a complex system of different resources integrated into one method. The concepts of self-training and interactive training have developed as a result of the technology used today. One of the fundamental aspects of present-day continual training involves assisted self-training, an interactive method. Interactive audio-visual systems consist of users engaging in dialogues with a stock of images and sounds by means of a microcomputer linked to an audio-visual teaching aid, i.e. a slide projector, film, tape recorder, video tape recorder, etc. This type of technology, like telecommunication, has not yet been developed to any extent in Portugal. There are still few computers in schools, although experiments are now being conducted in teaching and training.

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Coates, J.: **Practical training.** Liss: Nimrod Book Services, 1985, 168 pp.
ISBN 0-946474-31-1
Vocational training. Training administration. Planning of training. Audio-visual aids.
A textbook covering the basic techniques of training from planning and administering the training to the tools that can be used to make it more effective, for example, audio-visual aids.

Crocker, T.: **Have you got your slides taped?** Transition January 1987, p. 22 (2 pages)

Audio-visual. Audio-visual methods. Training programme. Teaching aids.
Some trainers seem to have forgotten the usefulness of tape-slide units, which were a popular medium two or three years ago, in favour of the video. However, tape-slide programmes are very versatile and it is easy to put together a programme which has illustrations, narration, sound effects and music geared to a specific audience. This article examines the strengths and weaknesses of tape-slide programmers, offering advice for anyone considering buying such equipment.

Eitington, J.E.: **The winning trainer** — Winning ways to involve people in learning. London: Gulf Publishing, 1984, 423 p.
ISBN 0-87201-657-9

Teaching methods. Group learning. Course design. Audio-visual methods. Case studies. Problem solving. Training evaluation.

Describes the various training methods available to trainers including group instruction, role-playing, games, self-discovery learning, problem solving, audio-visual aids, case study, lectures, and the evaluation of training through participation.

Hawes, M.: **Distance learning — getting started** — Journal of European Industrial Training, 11 (3) 1987, p. 21 (5 pages)
ISSN 0309-0590

Distance study. Training. Computers. Computer-assisted instruction.

The work of a project team set up to examine computer-based training and its application within British Gas is examined. The composition and training requirements of the team are discussed, followed by a brief examination of four pilot programmes designed by the team. Public response to the programmes is discussed and the costs of the exercise considered. Recommendations for a full-time distance learning unit for British Gas are proposed.

Hickey, M.: **A comprehensive CBT system for IBM mainframes: The rise of Phoenix,** Part 2: User roles and course design.

Interactive learning international, 2 (3) 1986, p. 17 (5 pages)
ISSN 0748-5743

Computer-assisted instruction. Course design.
Looks at the facilities on EASE and Phoenix authoring systems to design courses. The packages run on IBM mainframes. The article works through the various stages of course design and describes the different roles.

Hirschbuhl, J. J.: **Ingredients for effective CBT systems and products.** Interactive learning international, 3 (2), October 1986, p. 4 (3 pages)

ISSN 0784-5743
Computer-assisted instruction. Training content. Training material.
Discusses the requirements for good CBT (computer-based training) systems in terms of the staff and resources needed.

Kearsley, G.: **Training for tomorrow** — Distributed learning through computer and communications technology. Reading Ma.: Addison-Welsey, 1985, 121 pp.
ISBN 0-201-11652-9

Educational technology. Distance study. Computer-assisted instruction. Course design. Training administration.
Describes the possibilities which the new communication technologies have opened up for training. These technologies, which include interactive video, computer-based training, and teleconferencing systems make it possible for trainees to learn on their own and at their own pace. Examines the implication for training, and the design and administrative issues raised.

Romiszowski, A. J.: **Developing auto-instructional materials:** from programmed texts to CAL and interactive video. London: Kogan Page, 1986, 460 pp.
ISBN 0-89397-208-8
Summarizes and critically analyses the concept of individualizing instructional systems and considers the role of mediated auto-instruction. Deals in depth with three categories of material: print-based auto-instructional packages, computer-based packages and audio-visual packages.

Hearnden, K.; Van Ments, M.: **Effective use of games and simulation.** Society for advancement of games and simulation in education and training (SAGSET) Loughborough: SAGSET, 1985, 232 pp.
ISBN 0-9504682-3-1

Simulation training. Teaching methods. Learning strategy. Training effectiveness. Computer-assisted instruction.
A series of papers/events at the 1984 Conference of SAGSET. Discusses the effectiveness of teaching methods such as simulation, games, and business games in particular. There are several papers on the use of computers in this context.

Henry, G.: **Interactive activity.** Televisual, February 1985, p. 41 (3 pages)
ISSN 0264-9845
Audio-visual aids. Educational technology. Banking.
Describes the plans of Lloyds Bank to use interactive video in its training and the hardware they plan to use.
30 bright ideas, 'A guide to using the overhead projector'.
Wembley: Bell & Howell, 1984, 28 pp.
Training aids. Audio-visual aids. Slides. Audio-visual methods. Teaching methods.
Gives practical advice on subjects such as setting up projector and screen, the use of office copies and other techniques for making overhead projector transparencies. Also gives ideas for other useful applications of this training aid.

Network members were also invited to furnish bibliographical references to important recent publications in their country. There follows a contribution from France.

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Bichot, Jacques: **L'insertion professionnelle des jeunes**
Economic and Social Council Opinion and Report, May 1987, 275 pp (Journal Officiel: 26, rue Desaix, F-75732 Paris Cedex 15).
Young people: 16-25 years old. Entry into working life. Employment programme. Social partners. Regional planning. Associations. France.
An analysis of the procedures for helping young people in France to enter working life. The report contains:
- statistics on young people;
- a review of the position of young people with regard to employment and unemployment;
- the manner of their entry into working life;
- government measures to promote entry into working life since 1975;
- the contribution made by social partners, regional action, the role of associations in promoting entry into working life;
- an economic and social review, comments and proposals.

Noferi, Pascal: **Gestion des ressources humaines et compétitivité de l'entreprise**
Paris: Adase, 1987, 332 pp. (Address: 56, avenue de Wagram, F-75854 Paris Cedex 17).

Business management. Personnel management. Remuneration. Work organization. Continuing vocational training. Working conditions. Technological change. France.
Produced under an agreement between the Union des industries métallurgiques et minières and the Ministry for Research, as part of a 'technology — employment — work' mobilization programme, this publication takes the thematic approach to the management of human resources.

Twelve of the chapters are devoted to a review of new developments in this field, including enterprise culture and planning, the management of employment forecasting and pre-planning, recruitment and guidance evaluation, and studies on vocational training.
Each chapter is preceded by an abstract summarizing the topic and followed by a bibliography of publications on that topic that have appeared between 1982 and 1986.
Attached to the research is a list of the public and private agencies contributing towards the project as well as a description of some 20 specialist software packages on the management of human resources.

Vasconcellos, Maria: **Les formateurs, groupe social et identité professionnelle**
Paris: Université de Paris VIII, 1987, 78 pp. (Université de Paris VIII, 2, rue de la Liberté, F-93526 Saint-Denis).

Trainees. Training of trainers. Motivation. Occupational aspirations. Trainers. Occupational status. France.
Research on former students attending the course for trainers at Paris University VIII from 1980 to 1985 has thrown light on training practitioners as a social group and on their professional identity. This report is based on an analysis of enrolment applications followed up by biographical interviews. The individual, subjective information is supplemented by objective data on the status and organization of the profession.

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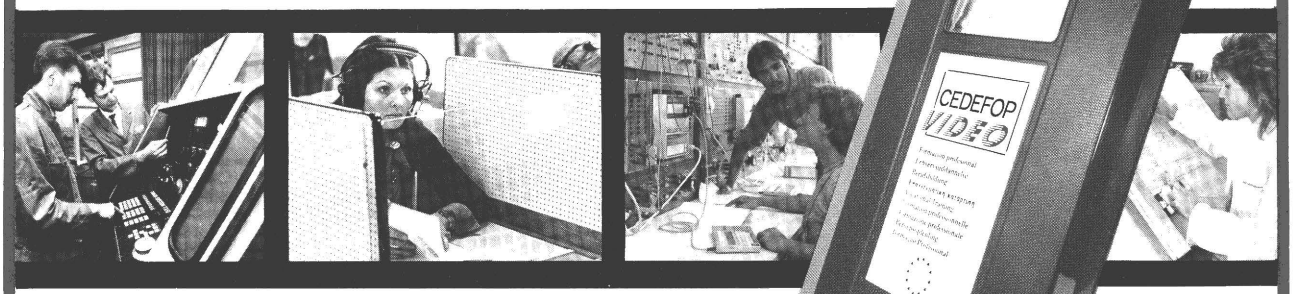

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