PAPER 12

MEDIA IN DISTANCE EDUCATION

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1. Introduction

It is now 20 years since Wilbur Schramm and his colleagues published their seminal 'The New Media: Memo to Planners' (Schramm et al., 1967) which reviewed 23 case-studies of the use of 'new' media in education. The optimism of that document is still refreshing to read, but subsequent experience provides a more depressing picture. Most of the projects reviewed have long ago ceased to function. Some failed dismally. Others achieved considerable success in educational terms, but were wound up because of lack of political support or more often simply because the money ran out. Some have been overtaken by newer and more exciting technology (see Lyle, 1982). As Schramm and his colleagues realised even then, the use of media is insufficient on its own to make a project successful.

Unfortunately, the failure of many media-based projects has understandably led many planners to believe that for distance education, media (other than print) are an expensive luxury, best left alone (see, for instance, Samson, 1983). This assumption though is just as naive as the assumptions made over 20 years ago about the power of media to solve basic educational problems. Media do have a useful role to play in distance education. What is important is to be aware of their potential and their limitations, and even more so to understand the conditions that are necessary for their successful use. This paper tries to set out what is known from experience about the use of media in open and distance education, and in particular the conditions that must be met for their successful use in collaborative projects.

2. Review of Experience

I will not attempt to provide a systematic and comprehensive review of the literature on the use of media in distance education, although a bibliography is provided. Instead, I will adopt a more idiosyncratic approach, drawing selectively on the experience from these reports, concentrating on the main parameters or factors that need to be considered by planners.

There are text books on media selection (see for instance Reiser and Gagne, 1983; Romiszowski, 1974), but they are totally useless for planners of distance and open learning systems, since these books are based on an algorithmic, reductionist approach, resulting in tiny decisions at a classroom level, assuming no constraints other than pedagogic requirements. Planners of distance learning systems though have to live in the real world, where finance, politics, and the power of existing organisations all influence decision-making. So the first point to be made is perhaps a comforting if not very helful one. There is no logical, step-by-step procedure for deciding on the 'best' media configuration or collaborative arrangements. A large number of factors, none of which can be measured or weighted scientifically, have to be taken into consideration. In the end, all these factors have to be thrown in and an *intuitive* judgement made. (Fortunately, human beings are quite good at this, provided all the factors have been thoroughly considered first).

Secondly, since the one common feature of most distance learning systems is that they are all different, this means there is no single optimum choice, either for the selection of media or for collaborative arrangements for using media in distance education. Each teaching system has to be custom designed to suit the circumstances in which it has to operate.

This does not mean though that there are no guidelines or experience to draw on. There are certain factors that have to be taken into consideration when deciding which media, and how much of each medium, to use. In other words, there is a checklist of points to consider.

3. Access

Of all the factors to be considered in distance learning, access and delivery is perhaps the most important. No matter how instructionally effective a particular medium might be, it is useless if it cannot get to the target audience.

The appropriateness of a particular medium, in terms of access or delivery, will in turn depend on the philosophy and aims of the distance or open learning system. Is the system aimed at all adults, or are there priority target groups? Is it aimed primarily at home-based students, or at students at work, or will students study primarily in centres? If the target group is all adults studying at home, the choice of medium will be dependent on what kind of equipment the vast majority of the target group will have at home. For many developing countries, this will be the radio set. For countries like Canada, Australia and Britain, it will mean a wider range of media, like television, postal services for print, radio, telephone and audio-cassettes.

If on the other hand the target group is to learn primarily at centres, equipment that can be shared can be provided: in developing countries, this could be terrestrially broadcast television, radio, and audio-cassettes; in developed countries, computers and video-discs. For countries spanning large or geographically difficult areas, and especially for co-operative projects spanning several countries, satellites now offer a realistic and low-cost system of distribution, although again in countries where most of the target group have low incomes, community or centre-based access is likely to be essential, rather than private reception. For instance, despite 100% of the population of India being within the footprint of the Indian satellite broadcast signal, only 5% can afford TV receivers, and much fewer direct satellite broadcast reception equipment (Agrawal, 1982).

Another point to be considered is the *quality* of access. While all students may have a radio at home, it will not be much use if the only times available for distance learning programmes are when the target group is asleep or at work. Similarly, there is no point in providing centres with expensive equipment like television sets, if they are unreliable or no-one knows how to maintain them properly. There is also a good deal of evidence (e.g. Scanlon, 1982) which indicates that study centre attendance leads to many practical

problems for students in using media (e.g. queueing) and can prove extremely inhibiting or even impossible for many students.

Another major factor affecting access across national borders is the problem of copyright, especially in broadcasting. The cost of clearing rights for use in another country can be both time-consuming and expensive, particularly if high quality broadcasts are to be used.

The wider the range of media to be employed, the more important become arrangements with *other* institutions, such as broadcasting or telephone organisations, for improving access to students.

4. Pedagogic issues

Unique characteristics of media

Before going any further, we should ask *why* we should use media other than print in open or distance learning.What can other media do that can't be done by print or face-to-face tutorials? This is a very difficult area to cover for a wide range of media in a short space, so I will concentrate on the unique educational characteristics of television, as an example.

We need to start by asking *why* is television (or any other medium) to be used, and for what *teaching purposes* ? There are two important aspects of any medium. One is its appropriateness for*delivering* learning material to large numbers of students; the second is its *presentational* characteristics.

Distribution It may be that the aim is to take advantage of the *distribution* characteristics of television, by recording and distributing illustrated classroom lectures. If the main purpose is to get a high quality lecture to a large number of students around a country or region, or the latest information on new developments out as quickly as possible, or to up-date those with already a good grounding and basic understanding of a subject, then the illustrated lecture may be an acceptable use of television, since preparation time is about the same as for a face-to-face lecture, and, perhaps most important of all, it is a very cheap way of using television, since production costs are kept to a minimum. Stanford University, and more recently the National Technological University, in the United States, and the Chinese Central Television University, have all used television extensively for this purpose. If television though is seen primarily as a means of distributing lectures, questions need to be asked as to whether or not this might be done more cheaply and effectively by radio, or a combination of print and radio. The University of Wisconsin in the United States has for many years used dedicated *telephone* lines to local centres to do the same thing.

Presentational characteristics Each medium has its own presentational characteristics. Television has two different kinds. The first is television's ability to bring to distance learning students material not otherwise available, such as experiments

requiring expensive laboratory equipment, case-study material of social and technological events, field-visits, dynamic presentation of ideas through animation and graphics. Many more examples could be given (see Bates, 1984, pp. 244-247, for a list of such functions found appropriate in the Open University context).

The second is television's ability to help the learning process in unique ways. Television can provide concrete examples or models of abstract principles, can model processes, and through the combination of picture (usually providing the example) and commentary, relate example to principle. In other words, for many students there are often times when words are not enough; they need to be able to see to understand, and television is one way - in a distance learning situation often the only way - in which this can be done. (Salomon, 1983, suggests a number of ways in which television is particularly powerful in assisting the learning process, such as illustration, modelling, and providing alternative ways of thinking about subject materials that students would have difficulty in generating for themselves.)

However, to use television to exploit fully its presentational characteristics requires much larger budgets than for just relaying lectures, and relatedly, a much higher level of production professionalism. This is more likely to be achieved through collaboration with a broadcasting organisation, provided the broadcasting organisation does have that expertise in the educational area (which is not always so).

Production styles and the design of distance learning materials

Each medium can also vary in the way materials are produced. Television programmes made by broadcasting organisations generally tend to have a unity of their own, independently of even media to which they are directly related. Broadcasts tend to adopt a continuous flow, deliberately being constructed to hold the viewer's attention right through the programme, and often provide material not otherwise available to the viewer or teacher, thus exploiting the unique presentational characteristics of the medium.

Video, though, while concentrating on the unique presentational characteristics of television, can be structured quite differently from a broadcast programme, particularly if it is intended to exploit some of the *utilisation* characteristics of cassettes . Thus television material can be made in short independent segments, with clear stopping points, explicit directions for activities or questions for discussion. This is even more true for audio-cassettes, in comparison with radio.

Lastly, television or radio programmes may be either completely pre-recorded, or include a *live* element, including feedback or questioning from students, or exchange of materials from different sites. There is no technical reason why live interactive programming cannot be done using terrestrial broadcasting, but due primarily to scarcity of time on terrestrial networks, such use has tended to be

confined to cable or satellite broadcasting, as in the case of Knowledge Network in British Columbia, Canada.

Media differ considerably in the extent to which they encourage *active* learning. Generally, broadcast television is so designed that it is difficult for learners to interact overtly with the programme material, at least during transmission. Live interactive programming provides a form of surrogate interaction for viewers, but is still limited. Cassettes allow for much more interaction, often at a sophisticated level of response, such as discussion or open-ended responses from learners. Computers are considered to be the most interactive medium after 'real' teachers, but computers may restrict the level of response to fairly mundane activities, such as multiple-choice or menu selection. The extent to which any particular medium encourages interaction or active learning depends to some extent on the way it is designed, but is also determined to some extent by the nature of the medium. What is clear is that the design of multi-media distance learning materials which encourage active learning requires considerable *instructional* as well as *programming* expertise. An understanding both of media and learning is required.

Learning from media

In the end, though, do people learn just as well through modern media as through the more traditional face-to-face teaching or books? Do they learn just as well as from, say, television as from lectures? Yes, students can learn just as well, if not better, from television, but *what* they learn, and how effectively, depends on the design of materials.

There is a good deal of research evidence which suggests that *content* may be learned just as well through any medium (see for instance Olson and Bruner, 1974; Clark, 1983). However, media differ in the *kinds* of learning they encourage. Thus in general, print is best for teaching in a condensed way, dealing with abstract principles, where knowledge of detailed facts or principles is important, and where knowledge is clearly defined. Television on the other hand is much better for presenting complex or ambiguous situations, for providing concrete examples to illustrate abstract ideas or principles, and for encouraging students to make their own interpretations and to apply what they have learned in an abstract way to new situations (see for instance studies done by Salomon, 1979, 1983; Bates and Gallagher, 1987).

The extent to which television is successful in doing this depends on how programmes are made. Television is rarely best used as the prime medium for delivering large quantities of information; instead, it is much more valuable for providing deeper understanding and for developing skills of analysis and application of ideas presented through other media, particularly print (see Salomon, 1983). If the programme is designed to give concrete examples of abstract ideas, it is necessary to make the relationship explicit. Open-ended documentary style programmes, bringing in case-study material for analysis by the student, can help develop students' skills at

applying and interpreting what they have learned (see Bates and Gallagher, 1987).

Because television is such a familiar medium, it tends to be taken for granted that students will know how to learn from it. This is not the case. There is evidence (Bates and Gallagher, 1987) that students need help and guidance to use television, particularly where comprehension is not the main purpose. Most students approach television as if it were a lecture, unless the programme is made in such a way as to encourage them to question and analyse what is being presented to them. This may mean building in stopping points for discussion, direct questions on the commentary, replaying sequences with different interpretations, etc. Television can be a very passive medium. For individual learners, this can be avoided by designing the programmes to encourage frequent interaction with the material through relevant activities. The most effective way to get the most out of television material, though, when interpretation and application are the main aims, is through group discusssion, guided by relevant questions for discussion (see Durbridge, 1982). This is one reason why live, interactive programming, even for rather straight television lectures, is so important.

Professionalism

If the aim is to exploit the unique *presentational* characteristics of television or any other medium, then three kinds of expertise are required. The first is knowledge of what that medium can do, related to the subject matter to be taught. This is important, because a skilled television producer or computer programmer may be able to suggest ways of using television or computers which would never occur to a teacher without any experience of using these media. The second is knowledge of the subject matter, and valid and effective ways to teach that subject matter. The third is expertise in instructional design, how to integrate for instance television material with the other teaching material, and how to help learners get the most from the various media. These three kinds of expertise rarely exist in one person; therefore a team approach is required, where those with different expertise work together to create the whole package. The most obvious case of this is the British Open University, where subject experts, print editors, television producers, computer experts and instructional designers all work together. The team approach though takes time, and costs money.

Most media are not homogeneous, but can be used in many different ways, according to the learning context and the teaching aims. To get the best out of media requires a professional approach. It is essential that before deciding whether or not to invest in a particular medium, their pedagogic characteristics, and the need to provide professional support, are fully understood.

A question of quality

Despite the difficulties and the extra costs incurred, there is no doubt in my mind that media such as television and computers have an important and valuable role to play in distance learning. Many of

the weaknesses of ephemeral broadcast television can be avoided by recording material in a permanent form, and even more so by designing material to encourage interaction and active learning from the students. Some of the high costs of computer-assisted learning can be reduced by buying courseware from other organisations and by providing terminals or micro-computers in local centres. Satellites make networking of centres across large distances economically viable for both television and computing, once the basic satellite infra-structure is in place.

Distance learning courses can be designed without a television or computing element. However, a well-designed television component can not only help reduce drop-out and increase comprehension, it can also assist the development of higher-order learning skills. Computing can provide practice, revision and reinforcement of both knowledge and skills. In other words, such media can increase the *quality* of distance learning. There is however a high price to be paid for this, as we shall see.

5. Costs

Of all the factors, this is the most tricky, because of the problem of defining exactly what counts as a cost in distance education. (For a good review of this area, see Perraton, 1982, and Rumble, 1986). For instance, broadcast transmission costs might be offered free to a distance teaching organisation (e.g. ACCESS Alberta, for Athabasca University), or it might be charged at marginal cost (e.g. BBC transmission of Open University programmes) or it might be charged at full commercial rates (e.g. Pakistan Radio for the Alama Iqbal Open University radio programmes). The nature of the financial arrangements between collaborating institutions becomes critical in determining the costs of distance education. Who pays for what?

Most of the literature on the costs of media (e.g. Laidlaw and Layard, 1974; Jamison, Klees and Wells, 1976; UNESCO, 1977, 1980, 1981; Wagner, 1982) adopt what I call a capitalist, 'rational' macro-economic approach to costing media. However, while investment in education at a national level may be considered 'rational' in free market terms (if one holds that ideology), such an approach does not usually make sense in terms of *managing* a distance education system, since budgets may come from a variety of different sources and their utilisation may be non-negotiable. For instance, if a government in a developing country controls the broadcasting system, and decides to make a certain amount of its facilities available to a distance teaching organisation, it does not make sense for the distance education institution to ask for cash instead to increase print production. The cash is not there; instead an existing resource is to be used for a different purpose. What is more important is to be aware of different *kinds* of costs, and particularly the secondary costs that are likely to fall on a teaching institution as a result of using media, whether offered free or purchased at market prices, and those costs which are within the power of the distance education system to control.

Costs of media in distance education need to be broken down in

several ways. First of all, it is important to distinguish between *fixed* and *variable* costs. The cost of running an in-house video or print production unit is likely to be fixed. The staff for instance will have to be payed whether or not the unit produces a large or small amount of work. The BBC estimates that somewhere around 80% of the cost of providing broadcast services for the British Open University are fixed. On the other hand, costs of *distribution* for print are likely to be variable, i.e. they will depend on the number of copies mailed. Broadcast television distribution costs though are fixed, in that the cost of a broadcast transmission is the same, whether it is watched by one or a million. Some activities can be both fixed and variable. Television production for instance can be divided into fixed costs (e.g. utilisation of a studio, which has to be payed for irrespective of its level of use) and variable costs (the *extra* costs incurred each time a programme is made). Once a programme is made, though, its total production costs are fixed, irrespective of the numbers who use it. (This also applies to texts: design costs are fixed for a particular text, there will be variable costs for each new text produced, while printing and distribution are always a variable cost). This is why it is often much cheaper to buy in material than to produce it oneself, since it is only the variable costs which have to be paid for (strictly speaking, the cost of bought-in material usually includes a cost factor to cover some of the overheads, but it is averaged out over all production, not just those bought by the institution).

Media differ in the relationship of fixed to variable costs. Face-to-face teaching has relatively low fixed costs and high variable costs; print has relatively high fixed costs, and relatively low distribution costs; broadcast television has very high fixed costs, and very low variable costs.

Does this division matter? Very much, because the economics of using media depend to a large extent on the division between fixed and variable costs, the range of material produced, and the numbers of students using a particular media component. The greater the number of students using a single component, or the more media components produced (e.g. the more television programmes produced), the more effective it is to have high fixed costs and low variable costs. Thus if the distance education system has very large numbers of students (i.e. well over 1,000) following a specific course, it pays to use media with high fixed costs and low variable costs; for small-scale distance education institutions not expecting to expand numbers greatly, media with lower fixed costs may be better, even though the variable costs may be higher. It should be noted that some of the newer technologies, like video-cassettes, radically change the fixed-variable ratio for a medium such as television. The consequence of this is that if broadcasting is to be used, it can be justified on economic grounds only if there are very large numbers of students or viewers intended to watch each transmission. The establishment of a special department for making broadcasts for a distance education institution can be justified only if it is to produce large numbers of programmes per year (e.g. over 200). This is not to say that television is necessarily inappropriate on cost grounds for small institutions; however, other modes (in this case, low-cost

video-cassette production and distribution) would be more appropriate. In some cases, where few programmes are made, but each programme will be used by large numbers, it will be better to buy in just the necessary production from outside, but still use transmission.

Before entering into any collaborative arrangement with a broadcasting institution or a publishing company, managers of a distance learning system should be very clear about the balance between fixed and variable costs, the likely amount of production to be required, and the likely numbers of students to use the various media.

Another distinction that has to be made is between costs at different stages of media use. The main cost areas are:

- production
- distribution
- costs for utilisation (e.g. equipment)
- student costs

Production costs can vary enormously. Using television to relay lectures is very cheap, once a studio is installed and manned. Exploiting the unique presentational features of television will require more expensive productions. However, costs can be kept down by using low-cost production and editing equipment. Full-scale broadcast production on the other hand will be expensive. For the latter kind of programming, production costs are likely to exceed distribution costs by a factor of at least 50 to 1. Being offered free transmission time on a satellite is no big deal then if the cost of production has to be found.

In developing countries in particular, the cost of reception equipment would normally have to be included as an essential part of any project using television or computers, since students would not normally be able to find this cost for themselves.

The cost of reception equipment is significant:

> 'The constraining factor in large-scale growth of the INSAT-I utilisation is essentially the investment involved in provision of community TV receivers, direct satellite reception of VHF type, and rebroadcast transmitters.'
>
> Dept. of Space, Govt. of India, 1983

On the other hand, if the distance teaching system is responsible for supplying equipment for learners (e.g. television receivers, computers), then these hardware costs can well exceed both production and transmission costs, since to justify high fixed costs (and both broadcast television and computer-based learning have high fixed costs) large numbers of students will need to use the material - requiring large quantitites of hardware, if that is to be supplied.

For this reason, it is not a good idea to depend on media which

require hardware provision for students (even at centres) unless the fixed and variable costs of the medium are low (audio-cassettes and even more so radio are good examples of media with low fixed and variable costs).

Lastly, an important consideration is the extent to which students are expected to meet the cost of using media. Who pays: the institution or the student? What would the effect be on enrolments if students have to supply their own equipment? Will students be expected to travel to face-to-face tutorials - or pay their own telephone charges to call a tutor? These are matters of policy, not often implemented consistently in individual institutions, but they can affect considerably the costs of studying in distance or open learning.

It is too simple therefore to see certain media (such as television) as being expensive, and others (such as print or face-to-face tuition) as being cheap. It depends on the system configuration. With large numbers of students, and a suitable means by which students can access material, broadcast television may be justified economically, especially if the responsibility for production and or distribution costs lie with the broadcasting organisation. In other contexts, video cassette distribution might be appropriate. In really poor countries, radio, perhaps backed up with audio-cassette recorders at centres, might be the most feasible medium economically. If the fixed costs are included (e.g. the cost of academic time), print may not be all that cheap to produce, and quite expensive to print and distribute, depending on the numbers involved. Lastly, the economics will be muddied by the assumptions and policy decisions made by governments and other agencies as to which costs will fall on the distance education system, the student, or other organisations. Despite this, a careful cost analysis, based on disaggregating costs and separating fixed and variable costs, can be most helpful, and ought to be an essential step before entering into collaborative arrangements.

6. Organisational issues and collaboration

A key factor in deciding which media to use is whether available organisations can reliably produce and/or deliver high quality materials. For instance, it is no good relying on print if the postal service is unreliable, or does not reach key target groups. Broadcasting might be expensive, but if the organisation has a reputation for reliability and quality, that is an important factor to take into consideration.

It is also better to work with organisations that are committed to the project, willing to work with media, and prepared to be flexible, than with institutions who do not believe either in the project or in the use of media. At this point, something needs to be said about dual-mode institutions. These are institutions which combine conventional on-campus universities with off-campus teaching, using distance teaching methods. Deakin University in Australia is a good example of a dual-mode institution, providing on-campus teaching in Geelong, Victoria, but also distance learning courses for students

across the whole of Australia. Dual-mode institutions are common in Canada, Australia, New Zealand, Scandinavia and the USA.

One of the problems of dual-mode institutions is that conventional academics usually get little or no reward for working on off-campus activities. Furthermore, many conventional university staff have no idea how to use media sensibly for educational purposes, as they rarely use media in conventional teaching. In distance education, though, it is not a question of whether or not one *should* use media, but rather*which* media should be used. Locating distance education activities within a conventional university can lead to all kinds of problems, unless it is independently financed and unless it provides career advantages and professional training in distance education to those who work in it.

For instance, distance education requires dramatically different ways of designing and delivering courses using media, from conventional university courses. Greater budgets need to be given to operational and production areas, media managers need to have a major role in decision-making, and structures (such as course-teams) need to be designed to encourage integration of media. These requirements often cut across traditional academic power bases in conventional universities, especially academic departmental structures, and hence tend to be strongly resisted.

All these factors have major implications for the structure of collaborative projects, and particularly for deciding on which institutions should be involved. A number of management models have been tried to integrate media in distance learning projects:

In-house production

A distance education institution produces (and perhaps distributes) its own media. This is common with both print and computer-based learning, less so with television, although even this is not unknown (e.g. Fernuniversitat, Deakin University). In-house production is particularly popular with dual-mode institutions, where an A/V or computer department already exists to serve on-campus students. It is worth noting that the British Open University has in-house academic computing services (separate from administrative computing services), and in-house print design, but external printing (because of high volume). Broadcast television is nearly always produced and distributed by a broadcasting organisation, and not in-house. The advantages and disadvantages of in-house production of media can be summarised as follows:

Advantages

1. Control over costs and production lies with distance teaching institution
2. Low-cost

Disadvantages

1. Especially (but not exclusively) in dual-mode institutions, media production (other than print) is often given lower priority than academic activities, hence tendency for underfunding

2. With underfunding, often small quantities of production, quality poor and hence non-print media tend to be peripheral
3. Collaboration with external agencies more ad hoc, and hence tendency not to use existing external facilities to the full, resulting in duplication of efforts

Partnership

A distance education institution goes into partnership with a broadcasting organisation, at least as far as distance learning activities are concerned. This is the basis of the relationship between the British Open University and the BBC. There is a contract between the two institutions. The BBC guarantees to produce a certain level of programmes for the Open University and guarantees to transmit these programmes on a national network. The Open University pays the full cost of this, and guarantees to supply an adequate quantity of academic material for production. BBC producers are full members of the course teams, contributing towards the content of the course. The BBC retains final editorial control and responsibility.

Advantages

1. Access to national transmission, and hence high visibility for the OU, as well as cheap distribution to all target group
2. High reliability and a high quality product, from department specially set up and devoted to OU needs
3. Imaginative use of television appropriate to academic needs, through course team model

Disadvantages

1. Very high cost (£10 million per year, 15% of budget)
2. Editorial control with BBC; programmes not always seen as relevant by students

Co-operative models

The essence of this model is several independent institutions coming together for specific projects to combine complementary resources. There are few examples of this with regards to media in distance education, although there are examples in educational broadcasting. For instance, in Sweden, the national broadcasting organisation, two correspondence schools, two adult education organisations, and a publisher got together to design and deliver a set of courses for teaching English ('Start'). The BBC, the National Extension College, and local colleges of further education have combined resources in the U.K. to produce a number of multi-media adult education courses (e.g. in adult literacy and computer literacy). The tendency has been in this model for the broadcasting organisations to take the lead, with other organisations providing support for the broadcast element.

Advantages

1. Each organisation does what it does best, without too much interference from the other organisations
2. Learners get a 'rich' package of learning
3. Existing resources are maximised without duplication of existing facilities

Disadvantages

1. Tends to be ad hoc and limited to a small number of courses in any one year, because of the effort required in getting everyone together; hence no coherent package of courses (like a degree programme) possible
2. Depends perhaps too much on goodwill alone between different (sometimes competing) organisations
3. Usually one dominant partner (the broadcasting organisation) which everyone else has to follow

Open Access

The essence of this model is the provision (by government) of a communications infrastructure to which different distance learning institutions have open access (as of right). This model is being developed in British Columbia (Canada). The provincial government has established and finances an educational communications authority (Knowledge Network), which is essentially a television network based on cable and satellite television. This network is available to any provincial educational institution, including the various distance learning institutions (Open Learning Institute, the three (dual-mode) universities running distance education programmes, and one or two local colleges (e.g. North Island) running distance education courses). It is the responsibility of the individual institutions to enrol and accredit students, to provide programming, and to run the rest of the distance learning system; Knowledge Network just provides the means of delivery. To ensure greater utilisation and co-ordination between the various providers of distance education and Knowledge Network, the provincial government has created the Open Learning Authority of British Columbia, with one common board over all distance learning activities.

Advantages

1. Guaranteed access to province-wide television distribution at no cost for distance teaching institutions, giving wide publicity to their activities
2. Editorial control lies with the distance teaching institutions
3. Relatively low cost to run (£2 million a year)

Disadvzntages

1. No money for production; hence low-quality in-house television production or over-reliance on bought-in productions
2. Lack of coherence and still impossible to take degree solely by distance education methods
3. Several small institutions duplicating functions (e.g. printing)
4. Lack of expertise within distance education institutions on how best to use television for distance education

It can be seen that each model has its strengths and weaknesses, but that the actual pattern of co-operation usually depends on an existing set of institutions getting together (sometimes to prevent new institutions being created which may thereaten existing

institutions' activities) or on conventional universities developing new or reinforcing existing distance teaching activities.

The creation of completely new institutions like the British Open University, of sufficient power and autonomy to by-pass existing institutions, is rare in developed countries, but not in developing countries. Perhaps the most successful new open university in recent years is Sukhothai- thammithirat Open University in Thailand (STOU), with nearly 200,000 students and a reputation for efficiency and good quality materials. STOU uses radio extensively, and increasingly television, collaborating with independent broadcasting organisations.

There is a great deal to be said for creating specifically designed large distance education institutions in countries where there is a severe shortage of higher education places or considerable dissatisfaction with existing provision. However, this is at least initially a high cost option, although STOU now has so many students that it recovers 80% of its costs in fees, and hopes to be financially self-supporting in a few years.

Conclusions

It can be seen that not only is the nature of the organisational structure very important, but that each model has its own strengths and weaknesses. Nevertheless, a number of general points can be made.

With media production, you get what you pay for. Too often too much emphasis is given to distribution, and not to production. Producing large quantities of high quality media is expensive. It needs money, on a recurrent basis. On the other hand, distribution systems in comparison are relatively cheap. Many of the models (e.g. the open learning system in British Columbia) avoid putting money into media production, hoping that somehow, high quality materials will get produced once the distribution system is in place. They will not. Using existing broadcasting resources is one way of avoiding new production costs. This though is dependent on the broadcasting organisation having the right sort of expertise within the educational sector, is willing to re-direct resources away from other areas to the production of distance learning materials, and requires a structure which enables broadcasters and academics to communicate with and understand one another.

Quality production requires quality staff, i.e. staff who understand the characteristics, strengths and weaknesses of the media in which they work. There is no substitute for professionalism. One reason why media other than print have been so little used in distance education is because academics are unaware of how to use visual media properly, production centres have generally been underfunded to provide quality productions in sufficient quantity to make an impact, and because professionals in media such as broadcasting or computing do not always understand the requirements of distance teaching. It is better not to use television or computing at all, than to use them badly (see for instance O'Shea and Self, 1983).

Getting different institutions to collaborate in the field of media is difficult. Professionals in different areas have different values and priorities. Broadcasting in particular is seen as a mass medium, requiring large audiences to justify the high costs, and broadcasters tend to defend their editorial control to the point of arrogance. In general, broadcasters have also been reluctant to move into non-broadcast production, and adapt production styles accordingly, despite its advantages for distance education. Non-broadcast video is only relatively cheaper than broadcasting; quality production is still expensive, and still requires people who understand the medium. The same applies to computer-based learning. Whatever organisational structure is set up, therefore, it has to provide sufficient funding for the media activities, and structural mechanisms which enable media professionals to communicate with and influence academic colleagues (and vice-versa) in the process of course design and production using media. These structural mechanisms (such as course teams) do not happen by accident, but have to be planned and designed specifically.

Buying in materials from other institutions can be useful, but needs to be done with great care. Students find it difficult enough to learn from indigenous productions; language and cultural problems associated with imported programmes increase student learning difficulties (see Agrawal, 1986, and Calvert, 1986, for instance).

In terms of costs, radio is likely to be the cheapest for large numbers, and audio-cassettes for low numbers, on a specific course (see Bates, 1982). However, audio-cassettes are likely to be much more effective than radio (see Bates et al., 1981). Print is more expensive, and more effective, for straight comprehension, especially if combined with audio; non-broadcast television is suitable at relatively high cost for courses with relatively low numbers of students, where students have problems in comprehension from the text, or where higher level cognitive skills are required. Broadcast television can do the same as non-broadcast television for high numbers of students, but at much greater cost, and less effectively than video-cassettes. Computer-based learning is likely to be extremely expensive both to produce and deliver, for either small or large numbers, having high fixed and high variable costs.

Lastly, it is clear that if a wide range of modern media are to be used, not only will adequate funds have to be found, but scarce expertise as well. This will not be achieved by different institutions without that expertise combining efforts; either a collaborative partner will have to be found with that expertise, or the expertise will have to be trained or bought in (and that will be expensive).

Basically, there are two kinds of collaborative approaches, with two different approaches to media, that could be considered, giving four possible models. The two collaborative approaches would be either one which seeks to take responsibility within the collaborative model for production as well as distribution of distance learning material, or one which does not attempt to produce material, but merely to buy in and distribute it. The two approaches to media would be high or low

profile, i.e. to use a wide or restricted range of media. A low profile use of media would lead to relatively low-costs, but probably also poor quality teaching. A model that took responsibility for production as well as distribution would have higher costs, but probably more relevant and better quality material. You pays your money and you takes your choice.

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