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1970
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https://hdl.handle.net/10539/27478
Spargo, P.E. (1969/1970). Educational television in South Africa. Symposium: A Journal of Education for Southern Africa, pp. 31-36.

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Educational Television in South Africa

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"Television is the most powerful medium of mass communication which has ever existed . . . "(Dr. Michael Apter).

IT IS CERTAIN, as the 1961 Education Panel reports pointed out, that the number of children of school-going age in South Africa will increase markedly between now and 1990. Taking into account a steady programme of immigration these numbers will, if anything, increase even more rapidly than predicted. Together with this, it is almost equally certain that South Africa's industrial and commercial expansion will continue steadily. This will mean that the supply of teachers, particularly graduate teachers in such vital specialist subjects as the sciences and mathematics, will decrease even further than it has already.

By the light of these rather bleak predictions, it would seem that the chance of maintaining any semblance of excellence in our education— White or non-White — is small. Under these circumstances, it is imperative that all possible solutions to this problem be examined with great care. Television is undoubtedly one of these, and it is the purpose of this article to examine what contributions educational television (ETV) can make to the future of education in South Africa. Various closed-circuit, as well as a national open-circuit, i.e. broadcast, television systems are being planned at present and the time is therefore particularly apposite to give careful consideration to the use of this medium. Mistakes made in the planning stages will be difficult and expensive to rectify later.

Open-Circuit (Broadcast) Television

Broadcast television will doubtless be of general educational value in that it will be able to provide a large variety of 'instructional' material to an extensive audience. Even if a large quantity of material of this sort is broadcast one can be reasonably sure that it will be widely viewed, for the viewer's inherent inertia, i.e. his reluctance to switch off his set even if he regards the programme as rather 'heavy' or intellectual, will mean that instructional programmes will also be widely watched.

However, if the Republic's broadcast television system is a commercial one, which is probable in order to pay its way, there is good reason to be very cautious about the proportion of worthwhile material, i.e. that could reasonably be classified as 'educational', that will be broadcast. Watching sport, a mediocre 'kitchen sink' drama or a war scene on television may be more entertaining than reading about similar events in the Sunday newspapers, but it is hardly of greater educational value. More effectively communicated rubbish is still rubbish.

Direct Broadcasts to Schools

What of 'pure' broadcast ETV — for example broadcasts directed specifically to schools during school hours? Such telecasts might be national in character, i.e. intended for very large numbers of children spread over the whole country. They will therefore be in danger of suffering from the fact that in attempting to satisfy the diverse requirements of this large heterogeneous audience they will lower their standard to that of the common denominator. This would be contrary to the whole principle of differentiated education, in which different streams require material of differing degrees of difficulty and challenge. The problem of broadcasting to schools using differentiation could perhaps be solved by preparing separate sets of material for the different streams and broadcasting it either on different channels or at different times on the same channel. However two channels will increase costs considerably, while two streams sharing the same channel will mean a decrease in viewing time for either stream.

Broadcast ETV will also offer little or no regional specialization or flavour if it is organized on a national basis. This is an important factor in a country as large and diversified as South Africa. For example, the story of the development of the Witwatersrand Goldfields would hardly hold the same sort of interest for a child in Cape Town or Natal as it would for a child living on the Witwatersrand. It would therefore need to be handled differently in different regions because of the differing backgrounds of the viewers. This will naturally raise production costs considerably in subjects such as history or geography, where regional factors are important. Thus it is important at the

very outset to consider whether a broadcast network should transmit educational programmes on a national or a regional basis. From what has been said above it is clear that in many subjects regional programmes are to be preferred.

The question of differences between the various provincial syllabuses must also be considered. Although the development of 'common basic' syllabuses now in force in South Africa ensures that all the provinces use basically the same syllabus for a particular subject, provinces are nevertheless allowed a certain amount of freedom to add to subtract material. This will again mitigate against national educational broadcasts, as provincial broadcasts can be tailored to the syllabus of that particular province.

Timetabling within schools receiving telecasts is always a very difficult problem in open-circuit television transmissions to schools. However the development within the last few years of comparatively cheap video tape recorders means that a school equipped with such a VTR will be able to record inconveniently-timed broadcasts for later replaying within the school at a suitable time.

A strong factor in favour of broadcast ETV programmes, whether national or regional, is that they will have behind them the very considerable financial and human resources of a national television system, which should ensure quality of production. This should prove particularly valuable in producing programmes which need expensive 'location' filming, such as geography or natural history programmes. This means that a national television system is well suited to produce the 'enrichment' type of programme, rather than material that fits a particular, rigid syllabus.

The costs to schools of receiving broadcast ETV will be comparatively low, as the major proportion of the costs of the whole system will be borne by the country as a whole, either in the form of television licences or grants from direct taxation. To an individual school, apart from the costs of an aerial and wiring, the cost will be principally that of the receiving sets — which today cost about R300 for a large 25" educational receiver suitable for classroom use. If a school is to make extensive use of broadcast ETV it is desirable that each classroom in the school should be equipped with a television receiver in order to give maximum timetable flexibility and in order to eliminate moving classes to special 'television rooms'. The cost of receiving sets for a school of 1,000, which has about 40 classrooms, would be about R12,000. This may appear to be a high price, but seen in the light of what it costs to build a new school — about R500,000 for a large high school — this amount is relatively trivial.

Regional Closed-Circuit Television Systems

In several countries of the world, and notably in the United Kingdom, there are very large closed-circuit educational television systems. In these systems a large number of schools are connected by cable or microwave links to a central source of programmes, i.e. to a central studio complex. Examples of such systems are those in Glasgow (300 schools) and in London (c. 1,100 schools).

The advantages of such systems are as follows:

(1) Being purely educational, the schools in this system are able to receive many more hours per day of ETV transmissions than they do from broadcast transmissions.

(2) Being regional, they offer all the advantages of a regional system discussed above.

(3) In areas which are desperately short of highly-qualified specialist subject teachers such a system effectively 'spreads' the few able teachers over a much larger number of children.

(4) By broadcasting to *teachers* just after school hours, such a system can be a powerful means of retraining teachers. It can provide, in effect, almost a continuous series of refresher courses for teachers.

(5) The video and audio quality of the programmes received via closed-circuit television is higher than that of programmes received via a broadcast system, as there is very little external interference.

Such systems are very expensive both to instal and to run effectively. The major cost of the installation, rather surprisingly, is not in equipping a first-class studio but in installing the extensive cable system linking schools with the studio. Thus the more concentrated the population in the area which such a system serves the more economically viable it will be. It would obviously be worthwhile examining whether there is any area in South Africa where such a system might possibly be justified.

The Witwatersrand, centred on Johannesburg, is the most concentrated urban complex in the Republic, having a total population, both White and non-White, of about 2¼ million. Could this region perhaps support such an ETV system? Let us examine the number of children such a system would be able to serve firstly in the Johannesburg area and, secondly, on the Witwatersrand as a whole. As a first step we will analyse the number of White children in provincial schools within a certain distance of the centre of Johannesburg. As it is assumed that

such an ETV system would be installed largely to alleviate the ever-worsening shortage of graduate secondary school teachers, this analysis will be limited to high schools only. Both English and Afrikaans-medium schools will be included. The table below shows the number of high schools as a function of the distance from the centre of the city.

Distance from Centre of City (miles)	*Number of High Schools*
1 — 2	5
2 — 3	4
3 — 4	11
4 — 5	6
5 — 6	4
6 — 7	3
7 — 8	1

From this table it will be seen that there are only 30 high schools within a radius of 6 miles of the centre of the city, with a few a mile or so further out. Assuming an average school size of 700 pupils, which is not unreasonable for city high schools, this gives a total school population served of about 21,000. Extending this to include the East and West Rand, it is found that outside Johannesburg there are only another 33 high schools in the area extending from Randfontein to Springs. Most of these are smaller than the city high schools in Johannesburg.

The total number of high schools in the whole complex is therefore only 67, and these are scattered over an irregularly-shaped area some 50 miles in length and 15 miles wide. These facts indicate clearly a small number of high schools scattered over a wide area, and in order to be able to decide whether a regional ETV system would be viable a detailed cost-analysis would have to be carried out. Another approach would be to compare this proposed system with other systerms. If this is done it is soon apparent that the small size and high dispersion of this system, compared to the large size and low dispersion of systems such as those of London and Glasgow, make it seem unlikely that a regional closed-circuit ETV system would be a practicable proposition in the Witwatersrand complex, let alone anywhere else in South Africa.

A local factor which would also increase the cost and complexity of a local system compared to overseas systems is the existence of two official languages. This will either mean a smaller number of programmes in a particular language on a particular channel or, more probably, more channels. This latter solution will naturally mean much greater expense.

It might be supposed that the enormous problems facing secondary education in a large urban Bantu complex such as Soweto, outside Johannesburg, might also be partially solved using a closed-circuit ETV system. However, the fact that there are only a handful of secondary schools in the whole of Soweto makes it extremely unlikely that a closed-circuit ETV system would be viable.

Television in Teacher Training

In the field of teacher training considerable use can be made of television and this is the only aspect of educational television in which much progress has been made in South Africa. The pioneer institution in this field has been the Johannesburg College of Education, which has had a medium-sized closed-circuit television system in operation since the end of 1967. This system has been described in some detail elsewhere by the author (Transvaal Educational News, Vol. LXIV, No. 7, August 1968, p. 11) and only an outline will be given here. Basically, it consists of a central studio and four viewing rooms. The studio, which measures 30' x 20', is equipped with three cameras, a lecture-demonstration bench, a video tape recorder, a teleciné unit, and the usual studio lighting and soundproofing. The three cameras are used for viewing a variety of situations, such as the lecturer and blackboard, charts, maps, titles and diagrams, and such objects as scientific apparatus set up for demonstration purposes. Two 19" monitor sets are provided in the studio, one for purely internal monitoring to check camera focus, etc, and the other for monitoring the actual video output to the viewing rooms.

From the studio the video and audio signals are transmitted through coaxial cable to the four viewing rooms, which are situated up to 1,000 feet away from the studio. These rooms have a combined seating capacity of 240 and are equipped with 25" television receivers. Each viewing room is also fitted with a button for attracting the attention of the lecturer in the studio, and a microphone. This enables questioning or 'talk-back' to take place. Both question and answer are heard by all the rooms in the system and not only by the room in which the student asked the question.

So far the system has been used almost purely for instructional purposes, i.e. lecturing to large groups of students—usually first years—thereby eliminating the dull repetition of lectures. Using the system up to seven first year groups can be handled simultaneously and thus the fourteen first year groups can be dealt with in two television lectures. As each programme has to be produced by a team of several lecturers there is

not the saving in staff time that might be expected. However, television is such a demanding medium that there is no doubt that generally a far higher standard of preparation and lecturing has resulted.

A start has also been made in bringing school classes into the studio and televising 'model' lessons conducted by lecturers. These lessons are then watched by large numbers of students in the viewing rooms. Unfortunately, the rather artificial atmosphere of extra members of staff and lighting in the studio tends to destroy the effectiveness of this approach to using closed-circuit television for training in teaching techniques.

Another approach to using closed-circuit television for training students in teaching techniques is to take advantage of television's virtually unique ability to allow student teachers in a college of education to observe an actual teaching situation in a real classroom. To appropriate computer jargon, this observation takes place in 'real time', i.e. while the lesson is actually in progress in a nearby school. Using this approach, several classrooms in the observation school are fitted with small television cameras. As the cameras are in position permanently the children do not know when they are in fact being observed. (The teacher, it must be said, does!) This method enables student teachers to observe and analyse realistic classroom situations without their presence interfering in any way with the natural spontaneity of the class.

The college of education is then linked electronically in some way with the school, either by a microwave link or by means of a coaxial cable. A microwave link is limited to two institutions which are within 'line-of-sight' of each other, as the microwave beam must have a completely unobstructed path between the two institutions. A coaxial cable link is cheaper than a microwave link, especially if the cable need not be buried but can be slung above ground using the ordinary telephone poles for support. Depending upon circumstances, ordinary telephone wires can also be used to form this link. In such a link pairs of telephone wires, known as 'balanced pairs', are used. This method is best suited to linking institutions which are close together and which are served by the same telephone exchange. A final method of effecting a telephone link is to instal video tape recorders in the college and the school and transfer tapes of recorded lessons from the school to the college. These tapes would then be shown over the normal college closed-circuit television system. Unfortunately, if this latter approach is used much of the spontaniety and excitement of a real-time link is lost. Obviously, the closer an observation school is to a college of education the easier it is to establish a television link between the two. Therefore an important point in siting new colleges of education in South Africa is their proximity to suitable primary and secondary observation or 'model' schools.

A final aspect of teacher training in which television has a valuable part to play is the diagnostic one. Although criticisms of a student's mannerisms, speech, personality and approach are made by members of the college staff during the teaching practice periods students never have the opportunity to see *themselves* in action. If they did so then identifying and remedying their own faults would be very much faster and more effective. With the advent of comparatively cheap video tape recorders, it is now a simple matter for a portion of a student's lesson to be recorded on video tape, which also carries an audio track. This tape can then be played back to the student and analysed at will by the lecturer and student together. This aspect of the role of television in teacher training is long overdue in South Africa, particularly in view of the modest financial outlay required.

Electronic Video Recording

A recent development in the field of television techniques that could play an important role in educational television in South Africa is the technique known as electronic video recording, or EVR. In many ways this technique is the video counterpart of the long-playing gramophone record, the basic intention being to provide a means of playing high quality, i.e. professionally-recorded, vision and sound through an ordinary unmodified television set at a comparatively low cost.

In the EVR system both sound and vision are recorded on special film. This film is narrower than even the ordinary 8 mm cine film, but the special recording process records on this film both sound and vision of a higher quality than the best 16 mm film. This film is loaded into casettes, which are then sealed. The film has no sprocket holes, which are a major source of deterioration on an ordinary cine film. Both the lack of sprocket holes and the fact that the casettes are sealed, mean that wear on the film is very much reduced. It is claimed that even after 50 plays the film still shows substantially no reduction in video or audio quality. Each film has two tracks, each of which is capable of carrying thirty minutes of recorded material, i.e. a full hour per casette.

To operate the system the casette, known as a 'telecartridge', is inserted into a playback unit known as as a teleplayer. This compact machine,

about the same size as a domestic tape recorder, 'reads' the film in the casette and produces from it an electronic signal identical to that transmitted in ordinary broadcast television. As the electrical interference which often mars broadcast television is absent the quality of the picture and sound produced is, if anything, better than that of broadcast television and equal to that of closed-circuit television of the highest quality.

The teleplayer is connected by a simple coaxial cable to up to a maximum of ten ordinary television receivers. If the system demands more than ten receivers then additional amplification is needed. No modifications are necessary for an ordinary television set to be used as part of an EVR system, and by the use of a simple switch the set can be used immediately for receiving closed-circuit or broadcast signals. It should be noted that an EVR teleplayer, like an ordinary record player, has playback but not recording facilities.

It is expected that the black and white EVR system will be available in 1970, with the colour system being introduced in 1972. Unfortunately, no details are yet available on the price of the colour system, but it is certain to be considerably more expensive than the black and white system. Even costs of the black and white system are still very tentative, but it appears that a teleplayer will cost about £200 in the United Kingdom and casettes with an hour's programme material £20, provided at least 100 copies of a particular programme are produced.

It is at once obvious that the EVR system has many desirable features, combining as it does many of the advantages of films with those of television — while avoiding many of the drawbacks of both. Rooms need no darkening, as they do with films. A fully equipped television studio, always the most expensive item in anything but the biggest closed-circuit television systems, is not needed. EVR recordings will maintain their quality longer than films, because of the sealed casettes and absence of sprocket holes. The equipment appears to be robust, readily portable and simple to operate. Stop-frame facilities enable a teacher to discuss any particular point of interest on a film, while the fast forward and rewind speeds enable any section of a programme to be quickly selected and replayed as often as desired.

It is not yet certain how the EVR system is going to be integrated into our present educational structure, but its potential is obvious. In a large high school, say of the order of 1,200 pupils, a possible system would be one in which one or more centrally-situated EVR teleplayers feed recorded programmes to sets of classes simultaneously — say all the standard six classes in the school. However, not all lessons in a particular subject would be taught this way. Rather, a set of, say, 40 'key' lessons could be presented on EVR in a particular subject over the course of a year. These lessons would then serve as a high quality framework around which the teacher could build the year's course. With the supply of skilled and adequately qualified subject teachers deteriorating rapidly, this is one of the few ways of maintaining secondary school teaching of even a moderately high standard. Naturally, it would be highly undesirable if there was any sort of compulsion whereby teachers were forced to use the EVR material presented. However, if the quality of the material and the challenge it therefore offers were sufficiently high, the system would prove itself and even competent experienced teachers would feel that they could use the EVR material to advantage and with no loss of freedom or individual interpretation.

As with so many innovations in educational technology, the equipment or 'hardware' is the simplest part of the system to design and produce. It is the quality of the software, i.e. the programme material, which will determine whether the system has any real chance of success. Who, then, will produce this software? One can only put forward the plea that serious consideration should be given to founding a central organization charged with the responsibility of producing the key lesson series described above. While such an organization would undoubtedly need a number of professionally trained personnel, such as cameramen, lighting experts, etc., its success would largely be determined by the maintenance on its staff of a balance between such professional experts and the teachers who will use the material and who have the vitally necessary experience of classroom problems and solutions.

Colour Television

Whether South Africa's broadcast television system will use black and white or colour is a problem outside the strictly educational field. But what of colour in closed-circuit educational television systems? It is clear that colour television will have many advantages over the conventional black and white in some specialised fields of education. For example, closed-circuit television systems used for relaying the details of surgical operations from operating theatres to groups of medical students or doctors nearby must be colour systems as the colour of the object being televised is of vital importance to the viewing group.

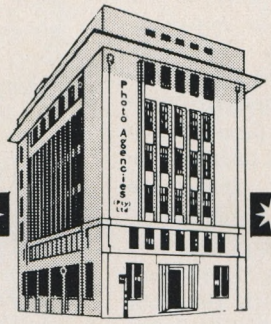
However, for a general educational television system in a school, college of education or university, it is very doubtful whether the much greater cost of a colour system can really be justified in terms of its added effectiveness as an educational tool. The comparative costs of cameras in the two systems will give some idea of the problem of costs in colour television. The cheapest colour camera available at present costs about R13,000 while a good quality transistorized black and white camera can be obtained for about R400. Added to this is the fact that at present colour television equipment makes much greater demands in terms of servicing and maintenance than black and white equipment.

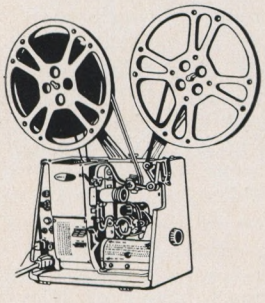
Conclusion

It is abundantly clear that television has a very definite contribution to make in many fields of education in South Africa today. However, for all its potential, television is no universal panacea for all the ills that beset education today in this, or any other, country. The danger in introducing television in any form into education is to imagine that once the hardware has been purchased the success of the system is automatically assured. Nothing could be further from the truth.

What is needed in South Africa today is not a headlong rush to purchase ETV equipment, but a long, hard look at the role ETV can play in a country which is rich in material resources but poor in human resources. The goals of any ETV system, however simple, need to be set long before the system is designed in detail or any equipment is purchased. Once the goals have been set an honest appraisal of how far ETV can contribute towards the attainment of these goals can then be made. If it is honestly felt that these goals can be attained more cheaply and effectively in some other way then the enthusiastic advice of the manufacturers of television equipment must be set aside. We must ensure that the tail never wags the dog.

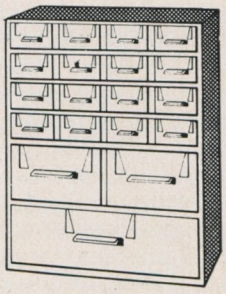
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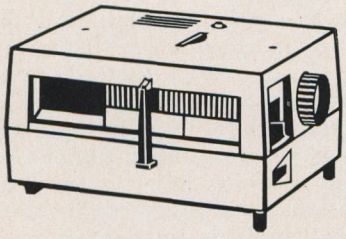


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