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T–E–L–E–V–I–S–I–O–N *in* HIGHER EDUCATION

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AS the subject for a thesis the writer selected one of the most controversial issues which have confronted educationists during the past fifteen years—the educational applications of television to different levels of teaching. In the immediate post-war years the arguments for and against were frequently acrimonious and ill-informed; extravagant claims of the panacea variety were made by its supporters, who saw in television the solution to all manner of educational difficulties, while opponents regarded its proposed application to teaching as an unmitigated evil. Blind prejudice was much in evidence, as is so often the case when new ideas threaten the comfortable, rut-like security of established tradition. Only in recent years, and as the result of a tremendous amount of costly experimental and assessment work, has "heated argument given way to cold appraisal", and progressive educationists are accepting the now-proven fact that educational television, used with moderation and wisdom, is a force to be reckoned with in the teacher's armoury.

The experimental work referred to has been aimed in two directions—to determine the effectiveness of television (a) as an aid to the teacher; (b) as a substitute for the teacher. The results of the former are infinitely more promising than those of the latter; with one or two notable exceptions (1) the investigation showed that the use of television in a purposeful way in the classroom depended to a very large extent upon the intelligent co-operation of the class teacher, and as such is best employed as an aid.

Since this Journal is concerned primarily with higher education the writer proposes to deal with some of the applications of television to this sphere of teaching, taking it as read that the case for television as an aid in primary and secondary education is well founded, and that its advantages outweigh its disadvantages.

(1) *Universities*

To date, the U.S.A. has led the field in the experimental work on educational television at a post-school level. The process started prior to 1954 when a number of American Universities were offering "credit" courses mainly for the benefit of members of the public who could enrol for these as extra-mural students. One notable example of this was the experiment of the University of Berkeley (Calif.) during 1958, although this was more in the nature of a public service than as a means of enabling credit courses to be undertaken. (2) The lectures in Physics, under the title of "Continental Classroom" were telecast from 6.30 to 7 a.m. on Mondays to Fridays. The early time was the only one available to the University—all other items having been reserved for commercial programmes. In spite of this it was found that the series of 160 lectures, given by Prof. H. White of the University Physics Department, was viewed by a regular audience of over 300,000 people ranging in age from 12 upwards. Family viewing was common. As a result of the widespread interest shown in this experiment the University authorities decided to install closed-circuit television from a central demonstration room to a number of lecture rooms in the same building as a means of testing the effectiveness of televised science instruction on full-time students. So successful was the technique in enabling a large number of students to benefit from highly competent teaching that the University has been equipped, at considerable expense, with a properly designed demonstration theatre incorporating a three-section rotary stage which enables two demonstrators to set up their equipment while a third is being televised. Much

of the chemistry and physics at undergraduate levels is now done in this way; each student group has a quota of practical laboratory work in addition.

Successful as this venture has been, there had, prior to 1954, been no systematic enquiry into the real value of televised courses in terms of the competence of lecturers, the amount of learning effected and the attitudes of students to instruction of this nature.

In 1954 the Pennsylvania State University received a grant from the Fund for Advancement of Education for an enquiry into these aspects. It should be noted that for control purposes the investigation was concerned only with the University's internal students. "This was the beginning of the most extensive programme in the use and evaluation of televised instruction in American Higher Education. By the spring of 1958, four years after the original grant, some 3,700 of Pennsylvania State's 14,000 students were registered for one or more of thirteen courses taught over closed-circuit television on the campus at University Park."(3)

Initially the televised lecturing was deliberately kept as nearly similar as possible to that done in regular classes. Cameras were installed in regular lecture rooms, manned by trained student and staff operators. Coaxial cables linked television receivers in other lecture rooms to the "originating" rooms. At first it was customary to have a student audience in the originating room but this has since been abandoned due to the frequent loss of eye-to-eye contact between the lecturer and the viewing students, whose interest was found to wane unless this contact was maintained. To achieve this it is necessary for the lecturer to look directly at the camera lens—it is lost each time his attention is given to any other object or person in the same room. At the same time, though, students are unable to ask questions during the lecture unless two-way audio communication is possible. Opinions are divided in regard to questions during lectures. One investigation shows that 75% of students prefer to be able to ask questions when the need arises.(4) In an effort to provide discussion facilities some institutions lacking the necessary equipment arrange for a responsible graduate assistant to be present with each viewing group. On the other hand, not all lecturers are agreed that questions are desirable. "Some believed that if one outcome of televised instruction would be to force students sometimes to find answers to questions on their own, the students would thereby become more resourceful in directing their own learning."(5)

It is generally agreed that some form of discussion should be engendered as the result of a televised lecture. Not only at Pennsylvania University, but at others too, a number of procedures have been tried in order to make provision for this. Some devote part of the period to lecturing and the balance to discussions led by class tutors. Others confine the discussions to a full period on a day succeeding the televised lecture, although there is some doubt as to the value of this. "Endless variations are possible in determining how best to use class time. An experiment with a literature course at New York University showed that three times as much material could be covered in a televised lecture as in a conventional one, because of the better preparation of the instructors and the absence of interruptions by the students."(6) There is food for thought in this quotation.

A wide range of subjects is catered for on television in the American Universities. Modern languages, History, English Literature, Sociology, Geography, Psychology, Economics, Zoology, Chemistry, Differential Calculus, Anthropology, Music and Political Science are some of the courses available.(7) Some Universities offer a wider diversity than others. Experimental studies to determine the amount of learning which can be effected by televised lecturing indicate, as in the school findings outlined in the previous chapter, that there is no significant difference between conventional and televised lecturing.(8) Its value appears to lie mainly in the ease with which large numbers of students and certain instructional procedures can be taught by a lecturer of extraordinary ability. With regard to the attitudes of students on whom these experiments have been tried, the Ford Foundation reports that, in general, they still prefer conventional lecturing as long as it is given by a good lecturer to small groups. Where groups of over 200 students are involved, 60% of student opinion was in favour of televised lecturing in place of direct contact with the same lecturer. At Miami University "a majority of students have said they would enrol in a television class every time—if it meant they would be assured of being taught by an excellent instructor." (9)

But beside the assimilation of pure subject matter which can be determined by relatively simple testing, there are other aspects of University training which are, in the opinion of the writer, of equal importance. "... to teach students to think more critically and make sounder judgements, to deepen their interests in many areas of human experience, and to acquire attitudes favourably to their major fields of study."(10) As a lecturer in the sphere of higher education, concerned with both under- and post-graduate students, the writer finds that these traits are not easy to develop in most students, due primarily to the pressure of the examination system under which they have grown up during their school careers. Little time is available for the development of critical thinking and the "research mind" in the

school environment, and the great majority of University entrants are so used to having to do little more than reproduce pre-digested factual material under formal examination conditions, that the experience of being asked to think critically leaves them puzzled and bewildered. Attempts to determine the effectiveness of televised instruction in the development of the more intangible factors like those in the foregoing quotation have not been very effective. It is the writer's conviction that this is outside the province of mass communication whether the lecturer is personally present in a large auditorium or exerting his influence via a television screen. These factors are of inspirational origin and are best nurtured in the challenging conditions of face-to-face contact between lecturer and student in small discussion groups. There is, therefore, no question of television replacing the University lecturer any more than it can replace the teacher in school. Experience is steadily mounting in favour of what the writer has already contended—that television is an aid.

The foregoing is representative of the findings of a number of American Universities. At the Pennsylvania State University, where investigations were initiated, results have been sufficiently positive to justify the continuation of instruction through closed-circuit television. From the aspect of University finances, not the least attractive advantage is that in four of the courses offered in which student enrolment is high, the "average cost per student-credit unit per year" fell from $9.48 with conventional teaching to $5.44 for television instruction.(11) A minimum of 200 students is found to be necessary to offset the cost of providing this facility.

In contrast to the American practice of providing televised instruction to full-time students only on closed-circuit, the University of the Sorbonne in Paris has recently initiated the most ambitious scheme yet tried for providing entire degree courses for full-time external students on open-circuit television. The proposal is to divide France into eighteen university "districts", in which undergraduates will receive all their lectures for the whole degree at viewing centres in their home towns. Library facilities are to be established at each viewing centre. The televised lectures will be prepared and delivered by the most competent authorities in each subject at the Sorbonne, and as a supplement to their work, travelling University lecturers will conduct seminars at each viewing centre at regular intervals. The demand for higher education in France has risen far beyond the building capacity of French Universities and this, coupled with typically Gallic, adventurous thinking, has led to a radical departure from established University practice. Naturally it can be applied only to subjects which require no laboratory work—those normally associated with a Faculty of Arts. The findings of this venture are awaited with interest.(12)

(2) *Teacher Training*

In earlier times teachers received almost all of their training as assistants to practising teachers; this system was open to criticism on the grounds that it provided little organised knowledge of educational theory. The need for this resulted in the establishment of teacher training colleges at which the trainee is required to spend a large part of his time. The pendulum has swung the other way, and many student teachers and not a few training college lecturers feel that too much time is devoted to educational theory and not enough to the practical application of it under classroom conditions. Newly qualified teachers frequently complain of their inability to meet the challenges of their first teaching terms with anything like the confidence which they feel they should have; many look back on their training period with dissatisfaction, characterised by an overload of theory administered by a group of lecturers, some of whom are so immersed in it themselves that they have lost touch with the realities of practical teaching. These are strong terms, but in the writer's experience as a student, teacher and training college lecturer, not altogether without foundation. To the credit of the college staffs let it be mentioned that many are as acutely aware of the shortcomings of the existing system as their students are. Difficulties are numerous. College staffs are aware that there is insufficient controlled observation of children in "natural" classroom conditions, and that the natural conditions are destroyed by the presence of anyone else in the classroom besides the regular teacher; that the lecturer discussing child behaviour problems in the classroom is almost inevitably confined to textbook examples and his own experiences; that there is insufficient opportunity for students to observe skilled teachers in action in the classroom without creating an artificial situation; and that the student's own trial lessons, observed by his fellow students and evaluated by a lecturer present in the classroom are very artificial situations. The existence of a school attached to a training college is a solution in terms of convenience only. And since neither the theorists nor the school principals are likely to agree to the proposal that a student should spend at least one term in each year on continuous teaching practice instead of the brief period now in operation in South Africa, there is, in the writer's opinion, only one solution to the impasse—closed-circuit television.

In support of this contention the writer proposes to describe in some detail the way in which a training college in the U.S.A. has attempted to solve some of the problems already mentioned.(13)

Hunter College in New York City is a training institution with an enrolment of some 650 student teachers. Attached to it and adjoining the main building are a primary and a high school for intellectually gifted children; part of the practice teaching is done in these schools and the balance in city schools. During 1959 it was decided to install a closed-circuit television system linking three big observation rooms in the college with all of the classrooms in the primary school. Three cameras were permanently installed in each classroom, one of which was fitted with a wide-angle lens to give a view of the whole room which the remaining two were equipped with lenses of variable focal length so that close-up views of any pupil, demonstration apparatus, or the teacher can be shown. All camera movements are remote-controlled by a technician in a central control room. The college lecturer in charge of an observation group of students is given two-way sound communication with the controller who can be requested to select any view desired by the observing group. Any one, or all three cameras can be in action at a given time, there being three receiving sets in an observation room.

The system has now been in operation for almost two years; it has been found to have a number of advantages over former procedures.

1. The children, although curious at first about the cameras in their classrooms, have accepted them as part of their surroundings and pay little, if any, attention to them. They are not distracted by the presence of other people in the classroom.

2. The amount of observational work has been greatly increased due to the larger numbers of students who can be accommodated in the observation rooms.

3. During observation sessions the lecturer can emphasise points of behaviour or teaching technique as they occur; discussions can take place immediately.

4. The observing groups have a variety of views of the class open to them. The wide-angle camera provides a front view of the children—under the old system the students had little more than a back view.

5. Video-tape recordings can be made of demonstration lessons for reproduction to groups of evening-class students, who, under the old system, would not have been able to observe live classes.

6. It was expected that the efficiency of demonstrating teachers would be increased through the knowledge that they were more than teachers of children. This has, in fact, occurred.

The system has three main functions:—

1. The observation of children—a. as learners; b. as social beings in school; c. their individual differences.

2. The observation of classroom techniques—a. the role of the teacher; b. interpersonal relations between the children and the teacher; c. method as the practical application of theory.

3. The observation of the student teacher in the classroom in less artifiical circumstances than were previously possible. This does not mean that teaching practice in all other schools has been abandoned. The televised trial lesson is used for evaluation purposes and forms a relatively small proportion of the total amount of practice teaching required. Video tape recordings of the trial lessons are made, not merely as a means of letting the student concerned watch his own performance and discuss it with the evaluating lecturer, but also as a means of keeping a visual record of his performance and progress throughout his training period.

The classroom teachers who do the bulk of the demonstration work participate entirely on a voluntary basis. Where possible the demonstrating teachers meet the observation groups beforehand in order to discuss the plan of the lesson with them. Every effort is made to conduct the demonstration lessons in as natural a way as possible and to avoid a "staged show"; a small pilot light in the classroom indicates to the teacher that observation is taking place. In the early stages it was found that students tended to lose sight of the lesson in the d'scussions following it and to concentrate on the teacher as an actor. To counter this the students are given a short course in professional ethics and are subsequently urged to put the emphasis on the learning situation rather than on the personalities involved.

This application of television to a need of a rather specialised nature has been well worth the cost of the installation and its operation. Other training institutions report similar positive results. The Mont Clair State Teachers' College in New Jersey ([14]) undertakes the training of students in the actual handling of closed-circuit television equipment in addition to using it in teacher training; the San Jose State College (California) is connected to several nearby schools so that a wider variety of learning situations can be observed.([15]) Again there is no question of television replacing conventional methods of teacher training—as a supplement to them it evidently has much in its favour.

(3) *Medical Training*

The need for effective observation of techniques is as necessary in the field of medical education as in that of teacher training. Traditionally the demonstration of surgical procedures has been done at an

undergraduate level by having a number of students present at an operation, with the surgeon commenting on its progress. This has become increasingly difficult to carry out in recent years due to the greater numbers of students and the need for larger surgical teams to cope with some of the more difficult procedures. The complex nature of thoracic surgery necessitates as many as twenty people in the operating theatre, with no room for additional observers. The use of closed-circuit colour television, with the camera mounted about the operating table, has been the solution to a very real difficulty.([16]) Indeed, so widespread is its adoption in European, British and American teaching hospitals that direct student observation of surgical procedures has virtually been abandoned. Instead the operation is relayed to small groups in the charge of a lecturer who is able to comment on it, in lecture rooms either adjacent to or some distance from the operating theatre. The advantages are obvious for observations of this nature, although training in the manual skills of surgery must still be given by participation as part of a surgical team.

As new advances are made in the medical field the need grows for practising doctors to keep abreast with developments. It is not always easy for a doctor to leave his practice to attend refresher courses or medical conferences and most doctors admit that they have insufficient opportunity for the reading of medical journals. In an attempt to provide a concentrated course dealing with the newest developments in the treatment of cancer, the American Cancer Society devised a series of thirty closed-circuit colour television programmes for doctors during 1956.([17]) The programmes, each concerning some phase of the disease and its treatment, originated in a New York City hospital and were relayed by microwave to receiving auditoria in most of the cities in the Eastern and Mid-Western regions of the United States. Each auditorium was equipped with a projection-viewer filling a screen measuring 72″ x 54″. Practising doctors assembled for an hour each Wednesday at 5 p.m. to view the programmes—the average size of the audience being approximately 1,000. Simultaneously with the projection of each programme, a kinescope was produced for distribution in 16mm colour film to outlying areas. Beside the surgical and radiological procedures for the treatment of cancer, use was also made of a substantial amount of other visual material in the form of charts, specimens, anatomical models, flannelgraphs and jigsaw diagrams to assist the demonstrating doctors in their explanations. The demonstrators had to be instructed in the technique of pointing to visual material with precise and accurate movements; broad and sweeping gestures tend to produce a disturbing stroboscopic effect on the receiver screen.

This series of programmes met an urgent need in a manner beyond the reach of any other means of communication, and were adjudged well worth the considerable expense involved; it seems likely that further use of these techniques will be made.

In conclusion, it should be stressed that experimental work of the type involved in assessing the effectiveness of television in the teaching process is a very costly affair. To the credit of the Americans let it be said that this aspect bothers them but little, endowed as their education system is with Foundations and Funds to meet contingencies like these. Here, in an educational and scientific backwater at the southern end of Africa, we can only look with envy at the immense volume of general and specialised research work being done in the educational field by the wealthier and more adventurously minded nations.

In the writer's opinion, it is time to ask whether, by setting their faces against television, those in high places are not unwittingly depriving our student population, both pre- and post-matriculation, of a means of enriching their learning experiences in a way which cannot be matched by any other educational aid. When, as a result of a lengthy period of research into educational television, so conservative a body as the British Broadcasting Corporation is brought to the conclusion that the only wise course of action is to double its weekly output of instructional telecasts, is it not time for us to take stock again?

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