The new media:
memo to educational planners

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With a foreword by René Maheu

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1 What problems are the new media being used to solve?

The new media are being asked to do an extraordinary variety of educational and developmental tasks. They are being used to help improve instruction at every level—primary, secondary, higher education, even in a few instances pre-school. They are being used to train and upgrade teachers. They are being used to extend the school to pupils who have no school buildings, and often no qualified teachers. They are being used to help teach literacy and fundamental education. They are being used to help carry adult education and developmental activities into the community.

Perhaps the best way to get an idea of the variety of uses to which these media are being put in education and development is to review briefly some of our own cases, grouped by the main problems on which they are focused. This will be a rather long world tour, but it should be remembered that these cases are themselves only a sampling of media use.

Problem 1: Upgrading instruction

AMERICAN SAMOA—ACCELERATED DEVELOPMENT

The coming of educational television to American Samoa dates back to the appointment of a vigorous and determined new governor of the territory in 1961. The governor was impatient with the snail’s pace of educational development in the islands, and was determined that as soon as possible the people of Samoa should have a thoroughly modern and effective school system.

Certain decisions about the nature of the schools had been made previously: there should be a United States-type system; the main instruction should be given in the English language; the schools should as soon as possible reach the standards of schools in the mainland United States. But the governor found that students
who had graduated from grade 12 in Samoa typically made only grade 5 to grade 9 scores on standard tests. Most of the teachers themselves came out of this type of education, with a year or two of teacher training added, and were poorly equipped to help their students rise beyond it. Many of them did not speak English so that it was well understood, although they were supposed to teach in it. Most of the class-room activity was rote memorizing—which is almost the only kind of teaching likely to occur when an instructor is not confident of his own grasp of a subject. Classes met in open huts (fales), usually two classes to a hut, competing with each other in volume as they chanted the learned responses. Drop-out and absence rates were high. The clear forecast was that it would be a very long time before a truly modern, high-quality education would be available in Samoa.

To accelerate the pace of educational development, the governor had several alternatives: (a) He could recruit several hundred fully qualified teachers from the United States, and use them to replace the Samoan teachers. This would have had very quick results (supposing that the new teachers could have been recruited), but it would have been extremely expensive, and would have required the politically unpalatable dismissal of several hundred Samoan teachers, many of them with long tenure. (b) He could recruit a smaller number of teachers—say, 100—from the mainland, and place them throughout the school system. This would have been less expensive than the first alternative, and also would have produced a ferment in the system, but it ran counter to a Samoan norm of moving forward together. (c) He could initiate a long-term plan for training future Samoan teachers in the United States, introducing the new trainees into the system as they were ready and as openings appeared. This would indeed have produced well-trained Samoan teachers, and at less cost than the alternative finally decided upon; but the trainees would have had to receive much of their education beyond primary school, as well as their teacher education, in the United States; and therefore this alternative would have had no effect on the system for ten to fifteen years. (d) He could use television. After two planning surveys, this was the alternative decided upon.

The pattern that evolved out of the surveys and the early planning was a kind of team teaching. In the studios a small number of highly qualified teachers, most of them from the mainland, would teach the core of the instruction on television. Another small group of skilled teachers would prepare study materials, class-room outlines and exercises, to guide the desired class-room activity. In the class-room, the Samoan teachers would be responsible for the learning activities built around the television.

It was a breath-taking decision. Television was not being called upon to supplement the on-going work of the class-room teachers, or to help them do a bit better what they were already doing; it was being used so that studio teachers could share responsibility equally with them, help them do something quite different from the rote exercises they had most typically conducted, and, in fact, implement an abrupt and revolutionary change in the system. Rote learning was to be replaced
as soon as possible by problem-solving and individual study. The level of content was to be progressively raised. Higher levels of performance were to be demanded, year by year, of the students. Thus the exciting thing about the Samoan project is that it challenges the traditional slow pace of educational development, which depends upon educating and training all the teachers in a system. The Samoa plan constituted a bet that by placing less-qualified native teachers along with a few mainland teachers to form a teaching team, and using television to multiply the effect of some specially qualified teachers on that team, something new and dramatically different could be made to happen in the class-room.

C. E. Beeby \(^1\) has pointed out with great insight the close relationship of teachers’ training and education to the type of schools that exist at different levels of development. If teachers are little educated and untrained, schooling consists of little more than mechanical drill on the three Rs and the memorizing of relatively meaningless items. This is a first level. If teachers are little educated, but have had some training, teaching becomes more formal. Beeby calls it the stage of formalism. Teaching is more systematic, the curriculum is fixed and centrally determined, instruction is policed by inspectors and external examinations, but the students still learn mostly by rote. As Beeby says, 'The teacher in a village school who has himself struggled to a doubtful grade VI or grade VII level is always teaching to the limits of his knowledge. He clings desperately to the official syllabus, and the tighter it is the safer he feels. Beyond the pasteboard covers of the one official textbook lies the dark void where unknown questions lurk.' \(^2\) Give a teacher a little more education, more training, and he moves into a third level of teaching which Beeby calls the stage of transition. The teacher is a little further beyond his pupils now; he has more confidence, and can let them adventure a bit on their own. Supplementary readers come in along with the textbook. The official syllabus remains, but it is broader and the teacher more often goes beyond it. The basic tools will be taught efficiently, but subjects like composition and arts will tend to be ‘dead as mutton’. \(^2\) The next step, the fourth level of education, is one where teachers are well trained and well educated, where problem-solving and inductive learning begin to play a large part in the class-room, and where the teacher has enough confidence in himself to let the students learn, rather than merely drilling them.

School reconstruction in Samoa began in 1964 with schools that Beeby would probably have classified as low second level. The goal of the plan is to reach third level soon, and fourth level as soon as possible thereafter. The Samoa experiment is different from most school uses of the new media, which typically seek only to do a little better on the same level. Samoa is trying to leap into a new level of education.

\(^1\) C. E. Beeby, *The Quality of Education in Developing Countries*, Cambridge, Massachusetts, Harvard University Press, 1966. (See especially pp. 48–86.)

\(^2\) Ibid., p. 64.
The television installation in Samoa had to be massive, in order to carry such a large responsibility for a twelve-grade school system. A new glass and stone studio building was erected beside the bay, and transmitter building and towers were set on a mountain top. Installing the transmitters on the mountain was a feat of engineering that required, among other things, the building of an aerial tramway across the harbour. (This is now used by tourists as well as by the transmitter engineers going to work on the mountain.) The Samoa station has six very high frequency (VHF) channels, four studios, ten video-tape recorders, and other equipment in similar proportion. It is one of the most impressive educational television installations in the world.

But it is only a means to an end. What the Samoan officials really care about is what happens in the class-rooms. Therefore, even before television there had to be a better setting for class work. Schools were consolidated. The one-room fale schools were replaced by new buildings (twenty-two new elementary schools, and three high schools so far) using traditional Samoan architecture, but modern construction and materials. Here the classes are put in separate rooms so that it is not necessary to shout the neighbouring class. Each class has one or more television sets, with extra speakers. The great problem, however, in new buildings or old, was how to bring the Samoan teachers into the team, and help them to teach in a new way. The consolidated schools contributed to solving that problem by making it possible to appoint for each school a highly trained United States principal who could supervise the teachers and help them and the students over the hurdle to the new kind of class-room behaviour expected of them. Teaching aids were prepared in great detail, and the television itself was used for in-service training of teachers after school hours.

Perhaps the largest effort was the summer planning-workshop. Any dramatic change like introducing the new media in quantity invites a school system to review and revise the goals and means of its education. Samoa, like many other developing countries, found itself short of time for a major review, and swamped by the manifold details of such a great change. The opportunity to review basic objectives was thus not taken up. But in the summer before the television started, and in subsequent summers, the class-room teachers, studio teachers, writers of teaching materials, supervisors, and principals have been brought together for a summer-long workshop. They prepare course outlines, and give general directions for activities to be built around the television. Then the studio teachers and producers go to work on the programmes, and the writers on the class-room guides and exercises. An important by-product was involvement and a certain amount of in-service training for the class-room teachers.

In short, the remodelled Samoan school system became also a teacher-training institution in which teachers and pupils learned together, but at different levels. No change so fundamental could be introduced into a traditional system without some opposition. In Samoa, this came mostly from a group of school officials, previously brought from the mainland, who opposed the use of television to carry
so much of the teaching load. Their essential argument—familiar to all who have witnessed efforts to introduce modern technologies into education—was that the 'machine' would come between teacher and student and thereby de-personalize the relationship which is so fundamental to the educative process. The firm support of the governor carried the schools over that hurdle; the chief opponents were relieved of their duties, and their contracts were not renewed.

As this is written, the second year of television has just been completed. The procedures have generally remained the same, although many detailed changes have come out of experience. The studio teacher fills fifteen minutes (in the early grades) to thirty minutes (in high school) of the class hour. The remainder of the period is handled by the class-room teacher, who is aided by the exercises and readings that come with each lesson. An elaborate system of feed-back comment and suggestions from teachers is in use, and studio teachers tape all their broadcasts so that they themselves can watch as many of them as possible in the class-room. The plan is to progressively raise the level of content and performance required, and increasingly to encourage the new kind of learning experience which is the goal of change.

How is it working? Technically and organizationally, it is working as smoothly as any such radical innovation could. The relatively small elementary-school classes are proving somewhat easier for the Samoan teachers to manage than the large secondary-school classes. On the amount and kind of learning accomplished, the verdict is not yet in. A formal evaluation project is planned, but has not yet begun. What hard research exists is encouraging. Observational reports are also encouraging. Teacher attitudes now are more favourable than they were at the beginning. English spoken in the class-room and in the villages is reported to be far better than it was before television. Rote memorizing and drill are reported to occupy a far smaller part of the class time than before; more questions are asked; more class activities are undertaken. Obviously, a final judgement cannot yet be made as to whether Samoa has found a formula that will really raise dramatically the level of its schools. But people in many parts of the developing world are watching with deep interest.

HAGERSTOWN—SHARING EXPERTNESS

The roots of the Samoa experiment reach back to Hagerstown, which was the first school system to use television in a massive way to carry a major part of the curriculum.

Hagerstown is the administrative centre of Washington county, Maryland, between Washington and Baltimore on the east coast of the United States. The county has a single school system, headed by a superintendent, who is, in his own way, as determined and supportive concerning the innovations within that system as the governor has been concerning the Samoa development. The experiment has
actually taken place, therefore, in the Washington county schools, and should properly be called the Washington county experiment, but is usually referred to as 'Hagerstown' because the studios and the school offices are in that city and most visitors go there.

Washington county had no such impulsion as Samoa to leap from traditional to modern schools. In 1956, when it started to use television, it was neither among the best nor the worst United States school systems—it was rather 'typical'. All or almost all of its teachers had college education plus additional teacher training. The taxpayers of Washington county were supporting the system at a reasonably adequate level. The decision to use television came not so much from dissatisfaction with present performance as from a long look ahead.

Enrollments were increasing, and it was going to be necessary to build a number of new schools. Could some space be saved by designing the buildings around large rooms for television and small rooms for group teaching and discussion—with fewer all-purpose, medium-sized rooms? It was desired to offer better work in art and music, subjects in which many of the teachers had no special competence. In the rapidly advancing area of science, many teachers, especially in the elementary grades, were not equipped to teach modern up-to-date courses. Could television help to share excellent teaching of music, art, and science throughout the system? The question was also asked whether television might contribute to in-service training, both by offering special courses for teachers and by showing examples of excellent teaching.

An opportunity came to answer these questions. The Ford Foundation gave the Washington county schools $1 million, and equipment manufacturers added another $300,000-worth of television equipment, for an experiment that would test out the application of television on a large scale to the problems of an average school system.

This was at the beginning of 1956, early in the history of school television. Most of the schools that were using the new medium had entered upon the experiment gingerly, holding television 'between thumb and little finger at arm's length', as one observer put it, offering mostly supplementary material and on a very modest scale. But what would be the result if television were used for education on a scale comparable with its use for entertainment? This was what Hagerstown had a chance to find out.

They found, as did Samoa later, that six channels were necessary if all twelve grades were to be substantially served. But the electronic spectrum in the United States was too crowded for any school to have six open-circuit channels (quite different from Samoa, where there was no television for hundreds of miles around), and therefore Hagerstown went to closed circuit. It was decided to feed programmes from their studios into coaxial cables provided by (and later hired from) the telephone company to serve school buildings throughout the county. This required less original investment in transmitters and towers, but increased the operating cost.
In the summer of 1956 nearly 100 teachers, principals, instruction supervisors, community leaders, and consultants met in a six-week workshop to think through the use that the Washington county schools were going to make of the new closed-circuit television. They first discussed the advantages and disadvantages of television in the class-room, arriving at a summary which no longer seems new or different but was highly useful as a guide in those early days of the medium. Specifically, they concluded that television could: motivate, stimulate; inform, demonstrate; develop ideas; show applications; enrich backgrounds; provide common experience; suggest activities; or challenge pupils; and that television could *not*: handle class-room discussion; clear up misunderstanding; provide for preparation or follow-up; or direct or supervise applied activities. Then, with the aid of subject-matter consultants and teachers who were already experienced in studio teaching, they formulated plans that they thought would take advantage of television's strengths and provide for the aspects of teaching it could not handle.

One of the most significant decisions taken in the early planning was that television should be treated as an integrated part of school facilities, rather than a glamorous stranger. Hagerstown saw it as essentially a device to distribute the teaching of some of their own teachers more widely than could be done otherwise. Therefore, television has been very local in the Washington county system. The local teachers have planned its use. All the studio teachers have come from among the Washington county class-room teachers. Almost no programme material has been borrowed from outside. Very little teaching has been recorded for re-use in later years. In other words, television teaching has been treated as a part of ordinary teaching, to be done over again each year. This has increased the cost (by not taking advantages of the potential savings from recording and re-use), but has helped to integrate it into the system and avoid some of the uneasiness and resistance which television often rouses among class-room teachers.

The experiment began slowly and carefully. In September 1956, the first television lessons went out in four subjects to about one-third of the senior high school pupils. As skill and confidence built up, and as the cables were extended, the number of courses was increased and television was brought to more students. By 1960, all of the schools were served by the cables. Since then, every one of the approximately 21,000 primary and secondary students in the Washington county schools (forty-six primary and high schools) has received a large part of his teaching by television.

In the first six grades, approximately 10 per cent of class-room time is now devoted to television, with another 4 per cent available as elective material. In grades 7 and 8, about one-third of the time is given to television; and in grades 9 to 12, about 17 per cent, with an equal amount available as electives. Almost every course has a television component, and—as first hoped—it has proved possible to share a great deal of specialized teaching. Modern science is available now throughout the twelve grades, and advanced mathematics ordinarily not
offered in high school can now be taken by students who are up to it. Art and music are offered by television to all the elementary schools.

On the average, twenty-eight programmes a day, 140 a week, are transmitted from the Hagerstown studios. Nearly 95 per cent of these are live. In the elementary schools, two television sets are placed in each room. Junior high schools use large viewing rooms, often school cafeterias for 100 students at a time. High schools use large-screen projection in vacant auditoriums, and a programme is typically viewed by about 300 students. Hagerstown teachers feel that a television lesson should be followed as soon as possible by a session with a class-room teacher. Thus, even when several hundred pupils watch a televised lesson together, an effort is made to separate them into class-size groups (about thirty) immediately thereafter. The teachers also feel that the amount of television in elementary schools (10 to 14 per cent) is about right, that the amount in grades 7 and 8 (35 per cent) may be a little too much, and that the amount in grades 9 to 12 (17 per cent) could be advantageously increased, as it often is by students who choose television electives.

The Hagerstown experiment has now been under way for ten years and there has been time to evaluate it. As a whole, the verdict is good. The system runs smoothly. Tests of learning have shown very encouraging increases. Administrators feel that they have been able to make better use of space and of expert and specialized teaching. One of the most important verdicts was rendered by the Washington county school board which, when the Ford Foundation grant expired in 1961, voted unanimously to take over the entire cost of the television in their own budget. Before the board acted, it made a confidential survey of teacher opinion. Reporting on their experience, and speaking for the teachers, the Hagerstown officials were able to write: ‘Washington county personnel feel, therefore, that the instructional programme of a school system is handicapped without the use of television as a resource.’

NIGER—MAKING THE MOST OF RESOURCES

The problem of Niger is the classical one of Central West Africa: a population largely rural, a very low rate of literacy, only about 10 per cent of children of school age in schools, and only sixty-six teachers having completed higher secondary education, in the whole country.

With the aid of France and French experts, Niger has worked hard and imaginatively to ameliorate this problem. At present, 15 per cent of the national budget is going into education, and this is expected to rise to 29 per cent by 1969. Not surprisingly, Niger has tried to get what help it could from the new educational media. It has used projected pictures and radio broadcasts in order to support literacy teaching with ‘radiovision’. It has organized forty-two radio clubs, somewhat on the pattern of the Indian radio rural form, but designed so that village
people will take a part in producing the programmes and so that there will be a steady two-way flow of information and opinions between the villages and the radio broadcast centre concerning the subject-matter of forum meetings. But the project which is most certain to attract world-wide attention is the use of television along with class-room monitors (many of whom have had only elementary-school education) to teach children in the beginning grades and thus make it possible for more experienced teachers to be shifted to higher grades.

The significance of this latter project becomes clear when one understands that the Niger teacher corps at the beginning of 1965 consisted of sixty-six regular teachers, 459 assistant teachers who had completed lower secondary education, and 717 monitors who had only the elementary-school certificate. Furthermore, there is no likelihood of being able to increase the proportion of regular or assistant teachers very soon, because the country so badly needs educated persons in other responsibilities. Therefore, during the present period of very rapid rise in school population (which is to be tripled by 1973) Niger will have to depend largely on teaching by monitors if it is to have teachers at all. The problem is made still more difficult by the decision of the Ministry of Education to carry out in the next ten years a systematic development of secondary education even if elementary education must suffer by the transfer of best-educated teachers to secondary schools.

Facing these challenges, Niger took a courageous decision. Despite the shortage of well-trained teachers it would not cut back its programme of expanding educational opportunities. As soon as possible it would move its best-educated teachers to the secondary schools where they have a special importance. It would use monitors in the elementary school class-rooms, but assign some of its best teachers to provide a substantial amount of elementary-school teaching by television. And it would start the television in the very first year of school.

This latter decision was itself an unusual and courageous one. Most countries introducing television choose to do it in higher grades after children can already read and write well, and have become accustomed to class-room discipline. But Niger needed to get its best-trained, best-educated teachers out of the elementary class-rooms. Even without these teachers, television would make it possible to begin actual instruction at once in the French language, although the children had no previous knowledge of French. Furthermore, the television, it was hoped, would compensate for the absence of training of the Niger monitors in modern methods of education, and give the pupils an experience other than the traditional school which is based essentially on instruction by word of mouth and does not offer easy access to the modern way of thinking and expression so necessary to the intellectual and economic development of the country. And it was hoped that the example of the television itself would provide quick in-service training for the teaching monitors.

The first year was to be a trial. Television was used only in grade 1 and in only two schools. If the new system was successful there, it would be extended to other schools and other grades.
Although the test schools were near the television studio, care was taken not to intervene during the classes or to give the monitors any procedural guidance that could not be given also in later years when television schools might be distributed around the country. Care was taken also not to freeze the curriculum, but rather to leave the educational authorities of Niger free to make future changes in content in accord with the development of national goals.

The monitors were given a short training course (too short, the directors of the project later decided) and were put in charge of grade 1 class-rooms. Studio and production teams were assembled from French and Niger personnel. Drawing upon their study of the educational situation in Niger, and their knowledge of the developing theory of audio-visual instruction in Europe and elsewhere, the directors of the experiment designed a method of instruction which, they hoped, would (a) make full and imaginative use of the additional visual factor provided by television (for example, refusing such easy solutions as showing the teacher using the black-board as a visual aid), (b) make maximum use of methods of active education, including educational games, rather than traditional lectures or expositions, and (c) integrate the television with the class-room activities. With respect to this last goal, it was decided that the television transmissions should serve as ‘the pivot of instruction toward which all the activities of the class gravitate, including the television follow-up. The transmission should be presented as being a document for the use of the monitor, making it obvious to the children that there is entire co-operation between the speakers or actors on the screen and the monitor, in order to avoid devaluing the monitor in the eyes of his pupils.’

The curriculum included daily lessons in spoken French. The direct method of language teaching was used, only French being spoken in the instruction and in all communication between teachers, monitors, and pupils. Each lesson consisted of an introduction, repetition and use of new words and phrases, and a directed session of conversation. The programmes dealt with such centres of interest for the children as the village, wells, domestic animals, native homes, the human body, human needs, food, clothing, the market, and the river.

Spoken French was emphasized for three months, and reading was started only after this time. Then, three fifteen-minute television lessons per week in reading were introduced, emphasizing the basic mechanisms of reading the sounds, reading words and phrases, breaking down words into syllables, analysing syllables by consonants and vowels, associating consonants and vowels, and word building. Teachers noted that the television presentation made it easy for the children to acquire ideas they might not have understood if presented logically, and to associate new words with pictures on the screen.

Writing lessons (two televised sessions per week) began after the first reading lessons. The children seemed at first to take slowly to these unfamiliar graphic activities, and therefore a special effort was made to design images which encourage muscular sensitivity, stimulate the desired motor activity, and develop kinaesthetic memory. The written images projected on the screen were outlined in relief by
appropriate lighting effects, in order to focus the attention of the children on the movements of writing, and these were accompanied by a rhythmic background of music. Five periods of televised arithmetic per week completed the television part of the trial year in Niger schools. This beginning arithmetic was aimed at teaching in a practical way the numbers one to ten, the four operations of addition, subtraction, multiplication, and division, and their practical meaning, and the application of number skills to short oral and written problems. The television programmes were used especially to help the pupils associate the picture, the name and the symbol of the arithmetical quantity, and to direct active practice by the pupils. When the time came to lead pupils into more complex activities, this was done in many cases by using animation—animated cartoons and silhouettes, scenes with marionettes and an abacus, and sketches acted out in the studio.

Results of the experimental year, 1964/65, were in general highly satisfactory. (We shall have more to say about these results in Chapter 2.) Niger decided to go ahead with its new system. There was a year of delay waiting for Niger’s new television station to go on the air (the trial year had used closed-circuit television), but the present schedule calls for twenty centres, with about 800 pupils, to be taught by television in 1966/67; 300 centres with about 18,000 pupils, in 1968/69; and 500 centres, with about 40,000 pupils, in 1969/70. Only grade 1 was offered with the aid of television in the trial year, but each year one grade will be added. An economic study forecasts that the break-even point, when this type of education will become as cheap as education by qualified teachers (if they were available), will come when primary-school enrolments reach 170,000—at some time in the 1970s.1

COLOMBIA—A CONTEXT FOR EDUCATION

Colombia’s programme, like the one in Samoa, is intended to help teachers escape the restrictions of under-qualification and lack of teaching aids, and make the jump from formalistic teaching to modern education.

More than a quarter of a million primary-school pupils are now being taught partly by television. Class-room teachers are being assisted by teaching guides and utilization teams. The project is on a national scale, using the government-owned television network. But it has taken three attempts to get an effective programme going.

The first one was in 1955, shortly after national television came to the country. This trial lasted only a year. It had been undertaken primarily because of interest on the part of the national executive, rather than commitment by the ministries concerned. When a change of government removed the chief source of support, the project was abandoned.

1. For more details on this Niger experiment, see ‘Educational Television in Niger’ by Robert Lefranc in New Educational Media in Action . . ., op. cit., Vol. II.
The second trial was in 1961. By this time the Ministry of Communication's Radiotelevisora Nacional had created a department of 'teleeducation' and recruited a cadre, and an advisory committee of representatives had been appointed from the network, the Ministry of Education, and the National University. Some of the existing national television programmes were studied, a 'philosophy' of educational television was decided upon, and courses were prepared, with the assistance of university professors, in natural sciences, mathematics, language, geography, and history of Colombia. A limited number of sets were distributed in schools for a year of trial. At the end of the year, the television students did well on tests, and on the basis of this evidence and a favourable report from a conference of class-room teachers it was decided to expand the programme for 1962. Further expansion was planned for 1963, but a financial crisis hit the country. The Ministry of Education felt that educational television was really a programme of the Ministry of Communications, which felt that education was not their central function, and so educational television was abandoned for a second time.

In 1964, educational television was reinstated with $575,000 for equipment from the United States Agency for International Development (US AID), and eighty Peace Corps volunteers to help with the programmes, the maintenance of equipment, and assistance to the class-room teachers. A fundamental point of the 'philosophy' agreed upon in 1961 had been that 'the programme should not be determined by the scholastic calendar'. In 1965, on the basis of previous experience, that was reversed; the renewed programme operated on the principle that the school telecasts must be closely integrated into the daily operation of the schools under the master syllabus drawn up by the Ministry of Education. There had also been an organizational change, by which the television network was made the responsibility of a new semi-autonomous Instituto Nacional de Radio y Televisión. This organization had an advisory committee representing the ministries of communication and education and the public. Within the educational television section of the new institute, a committee was appointed by the Minister of Education to supervise the school programming, and both studio teachers and supervisors were to be paid from Ministry of Education funds. This went far towards ensuring a closer integration of the television programme into the total programme of the Ministry of Education and gaining the commitment and support of that ministry, the lack of which had previously been a severe handicap.

Television is now being used to upgrade the quality and expand the content of instruction in the first five grades. Each of these grades receives two fifteen-minute lessons per week in each of three subjects—one and a half hours of televised instruction per week. But these ninety minutes are meant to be expanded by the class-room teacher who is provided with guides containing suggested discussion, activities, and exercises to be used in conjunction with the television teaching. Thus the television programme is to serve as leaven for the 'total syllabus'.

1. 'Colombia's National Programme for Primary-Level Television Instruction' in New Educational Media in Action..., op. cit., Vol. II.
Subjects were selected on the basis of what were thought to be priority needs. The scarcity of visual aids in most Colombian class-rooms was felt to be an especial handicap in social studies, natural science, and language. Music had been neglected in the schools, mostly because few teachers felt competent to teach it. Decision had been taken to introduce the 'new math.', and it was felt that television could initiate teachers into the required methods. Consequently, mathematics is offered by television in all five years of primary school, natural science in four years, language in three, social-studies in two, and music in a new experimental programme in grade 1 only. Teacher orientation programmes are broadcast for one-half hour in a free period on Tuesday and Thursday, and for one hour on Saturday morning.

In 1965, educational television was reaching 802 primary schools in six departments and the Bogotá district. It was estimated that about 13 per cent of the total enrolment in the nation's official primary schools were being served. Within the areas where the programme was operating, the percentage being served varied from 41 per cent in the Bogotá district to 13 per cent in Caldas. Thus, there is still considerable opportunity for expansion.

Additional television sets are being provided to expand the service, but because of various unhappy experiences (damage, theft, appropriation of the sets for private use, and so forth) the Colombian officials have established certain criteria for placing new sets in the schools. They require that the school authorities demonstrate some interest in the programme, that the school have electricity or make arrangements to be wired, that suitable arrangements be made for safeguarding the set, and that the school have a suitable room to be used only for television instruction.

Continuing research has been done on the Colombia project since 1964; and the results demonstrate considerable additional learning from television. The most important discovery, however—supporting a great deal of research done under experimental conditions in developed countries—is that the amount of learning from the television depends to a very great extent on what happens in the classroom before and after the broadcast. One of the most typical patterns of teaching in Colombian primary schools has been to 'tell' the pupil, and then drill him in repeating what he has been told. The research team has found that when the teacher can be persuaded to depend less on this method and instead to encourage the pupil to assume a larger part of the responsibility for his own learning, through shaping his own response, asking and answering questions and the like, a significant increase in learning takes place.

One of the chief uses of the Peace-Corps volunteers in Colombia has come to be that of serving as official links between the planners and makers of the television programmes and the class-room teachers, and encouraging these different teaching procedures. The liaison officers find themselves very busy, showing the teachers how to adjust the sets, reporting broken sets, and, most importantly, advising on class-room activities and procedures to provide an effective context for the television. The 'utilization' programme, as this contact with the class-room
teachers is called, has come to be regarded as one of the essential elements of the Colombia project.

The Instituto Nacional de Radio y Televisión is committed to the educational television project and for the 1966 school year has offered to provide transmission for nine day-time hours if the educators should want them. Best available evidence indicates also that the programmes are being welcomed in most class-rooms and being enthusiastically accepted by parents. As one teacher expressed it, the television does not make her job easier, but does make it more rewarding.

NIGERIA—TEACHING UNDER DIFFICULTIES

Each of the political divisions of Nigeria at the time of our study in 1965 had its own ministries, its own broadcasting organization, and all but one its own educational television programme. Up to this time there had been very little co-ordination and almost no exchange of programmes among them. They constituted in fact separate cases in the use of educational broadcasting, and that is how our teams studied them—a case in Western Nigeria (Ibadan), which had been in educational television since 1959; a case in Northern Nigeria (Kaduna), which had been broadcasting educational television since 1961; and a case in the Federal District (Lagos), which began educational telecasts only in 1965. (Restrictions of research funds and time made it necessary to omit the programme in Eastern Nigeria.)

Separately and together these constitute a history of the difficulties a country may encounter when it enters television without the resources that were available to some of the projects we have been reviewing.

Television was intended to help Nigeria solve the problem of upgrading instruction—in Lagos, primary; in Ibadan, secondary; in Kaduna, primary, secondary, and teacher training as well. There is no doubt that this is a serious problem, or that Nigerian schools could benefit from the assistance television could give them. But one's heart cannot but go out to the people who have tried so hard in the last half dozen years to provide that assistance in the face of the difficulties and obstacles that beset everything they did.

To begin with, the two older services came into being under less than the most favourable circumstances. In Ibadan, the possibility of providing educational television to Western Nigerian schools was used as one of the chief arguments for obtaining a regional television station. During the campaign for the station it was stipulated that 50 per cent of the broadcast time would be devoted to educational programming—a promise that has never been kept, and, indeed, an amount of time that the educational service might not be able to afford to programme if it were offered. Similarly, in Kaduna, one of the strongest points in support of the campaign for a regional station was that it would help to solve the region's educational problems. In both regions, once the stations were obtained, however,
their management and the original political proponents of television became less interested in educational uses. The management point of view is understandable; the stations are commercial, and the profitable hours for small commercial stations are in the evening. To light up the station in the day-time requires a special crew of technicians and producers, or overtime pay for the evening crew. To light up for educational uses is not commercially justifiable unless education pays for its time as do commercial advertisers, and this the educators find difficulty in doing. They have less support than they might because the stations were established by or under the Ministry of Information, and therefore the Ministry of Education, which is responsible for the schools, is less willing to co-operate. The result has been a series of difficult relationships and negotiations between the people responsible for the educational programmes and the people responsible for the commercial stations, in an effort to obtain enough time, to have the programmes broadcast in the day-time when school is in session, to obtain space or rehearsal time or technical crews, and the like. In Lagos, where some of these relationships have been relatively easier, it has been necessary, because of station scheduling policies, to broadcast school programmes at times that overlapped time-tables and disrupted the class-room schedule.

A second group of difficulties has stemmed from technical insufficiencies. These have affected both transmission and reception. Among the most irritating ones have been electrical power failures. These are frequent. Often the power does not fail at the transmitter at the same time as it does on the lines that serve the receivers. Thus the broadcaster is never sure what sets are not powered at a given time, and a teacher is never quite sure whether he will be able to get the scheduled broadcast or not. Most primary schools outside the main cities have not had electrical connexions. A larger proportion of the secondary schools have electricity, but resistance to class-room television is often quite strong in these schools due to the influence of expatriate teachers who do not believe in teaching with television. To introduce electrical power into a primary school and install a set costs in the neighbourhood of $1,300, five or six times as much as an installation would cost in a country that has electricity widely available. The problem of maintaining sets has been a grievous one. For a long time no arrangements were made for maintenance, although maintenance technicians have now been trained in Hagers-town. At the time of our study it was estimated that three-fourths of the sets were inoperative.

One reason why so little has been known about the condition of receiving sets in one region is that typically no personnel have been available to make contact between the educational broadcasters and the school users of the programmes. As a result, little information has been received at the studios about whether the programmes are being received or used, and what might be done to improve them.

The shortage of such liaison personnel is only one of the many shortages that have plagued Nigerian educational television. Technicians of all kinds have been
in short supply. Programme personnel shortages are chronic. Authorized staff levels have not been reached. When someone is sent overseas for training, that further depletes the staff. Teachers have had little or no training or experience with television work. Some of the persons teaching primary-school classes on television, for example, have never taught primary school in a class-room.

Contributing to these difficulties in one region or more have been lack of strong support from the top, difficulties with the commercial stations, shortages of trained persons of all kinds, and a prevailing philosophy that television is primarily a supplementary and enrichment device, not a tool of direct teaching. In one of the stations, the total educational production was one twenty-minute programme per week for each of four courses, scattered among primary, secondary, and teacher-training schools. The frequency of power failures and of sets out of order, and the scarcity of information as to how and where the programmes were being used, left the television teachers somewhat uncertain concerning the impact their efforts were having.

Nigeria is getting advice and help now from experienced Hagerstown personnel, among others. Maintenance technicians have been trained, programming hours are being increased, and various other forward steps are being taken. Therefore, the catalogue of difficulties and problems which we have recited may no longer be so grievous when this is read.

Whether Nigeria should have gone into educational television when it did, instead of concentrating on radio or correspondence teacher training or inexpensive visual aids, is beside the point; it went into television, and its experience there is instructive. Let us not fail to note that even under the cloud of horrendous difficulties a few people have believed deeply enough in television’s potential contribution to Nigeria’s educational problem to keep educational television alive for six years. Their troubles, however, should be taken into account by other countries that contemplate entering educational television and wonder whether they have adequate resources at hand.

THAILAND—THE MINISTRY’S OWN RADIO

Thailand made a decision directly contrary to Nigeria’s. Although it has two commercial television stations owned by departments of the government, it has been cautious about moving into educational television, and instead has preferred to concentrate its effort on teaching by radio.

When the Bangkok Technical Institute was founded in 1953, the Ministry of Education saw an opportunity to combine technical training in radio skills with an educational radio service. A committee was appointed within the ministry, with the director of the technical institute as chairman, to study the possibilities. On the recommendation of this committee, the institute built and operated a low-power radio station as a training laboratory, and the ministry established an
AUSTRALIA  "Schools of the Air"; correspondence courses linked with radio broadcasts over the two-way transmitters of the Radio Flying Doctor service
HONDURAS A student performs a problem in simple addition under the guidance of the monitor. The receiver is shown on the right.
educational radio service under broad interdepartmental auspices. Beginning in January 1954, a home service of sixteen hours a week was broadcast in the early evening for school children, teachers, and the general public.

From this point the ministry moved gradually and carefully into school broadcasting. After two years it was possible to increase the strength of the transmitter somewhat and add two short-wave transmitters, thus enabling the signal to reach a number of the rural schools in Thailand. Another planning committee was appointed with the present Minister of Education as chairman, to determine the best use the country could make of radio for its schools. It is rather impressive to review the careful planning that took place during this period. A survey was made of station coverage. Then a second survey was made, interviewing school officials and teachers concerning local conditions, educational needs, and the help they felt they needed from radio. On the basis of these and other discussions the committee decided that three subjects could most usefully be taught directly by radio. One of these was English, which is offered widely as a second language in Thai schools although many teachers are not well prepared to teach it. A second was music, where special talents are required of a teacher. A third was social studies, which Thailand was anxious to use as a vehicle for inculcating desirable social values, and which needed fundamental revision if it were to carry out that assignment. In each of these subjects it was felt that radio could offer something the school itself could not readily provide, and would also serve as an example to the teacher.

School broadcasts began in 1958, four years from the beginning of the ministry’s radio broadcasts. English was offered initially for the fifth year, later for other years. Music and social studies were offered for the first four grades.

Even here the ministry began slowly. Only 286 schools were selected for the first year’s trial. After a year, the project was reviewed with district education officers and the decision made to expand it. In the second year, 500 schools received the broadcasts. The number was gradually increased as sets became available and programming experience accumulated. Now the broadcasts are used by about 5,000 schools and 800,000 students. Music and social studies are still offered for the first four grades, but English is now available for six levels, and certain additional programmes are being offered, including a daily thirty-minute lunch-time programme for students and a thirty-minute programme for teachers twice a week.

The ministry is now experimenting with television, in the same careful rhythm which it entered radio, producing two half-hour educational programmes per month, one for each of the commercial stations. There is no sign yet as to when and whether television will be used for schools.

School broadcasting in Thailand has been operated throughout with minimal facilities and at minimal costs, though always with careful planning and cautious expansion so as to make the most of the resources at hand. The low-cost operation has created some problems. One of the worst of these is the strength of signal.
In the early years of school broadcasts, the programmes could be received satisfactorily in much of Thailand. That was when the air was relatively uncluttered. In recent years, however, new commercial stations have occupied many of the available frequencies and have very much cut down the effective coverage area of the educational station. Two hours a day have been bought from a station in northern Thailand in order to get some programmes through to that area, but it has now become necessary to increase the power of the transmitter considerably, or establish relay stations, or both, if there is to be any approximation to national coverage.

A second problem has been training. There were experienced radio broadcasters and good teachers in Thailand, but the two skills rarely existed in the same person. Teachers were selected who combined excellence in the class-room with qualities that were thought to promise excellence in the studio, and some of these did indeed turn out to be good radio teachers. Training opportunities were seized upon as they arose. The first producer of the station, a woman who had had professional radio experience, trained some of the teachers in broadcasting techniques. Two producers from the Australian Broadcasting Commission later spent some time at the Bangkok station, and gave training. Nine or ten programme people have been sent overseas on training fellowships. Gradually a nucleus of experienced and trained persons has been building up.

Low-cost operation has also made it a problem to provide sets. Some of these were bought by schools, some were given as gifts by private donors, some were bought from ministry funds, but the great opportunity for expansion came when 3,000 sets were provided by Australia under the Colombo Plan.

The technical operation of the station has been handled smoothly and inexpensively by students and faculty of the technical institute, for whom it has been a training laboratory.

Thus Thailand has moved carefully ahead with its minimal-cost operation, taking advantage of an opportunity here, a bit of help there, moving into new tasks only when it saw the way clear to do them, and always preparing carefully in order to cut waste and false steps to a minimum. By the nature of its organization it has been able to avoid some of the problems we have noted elsewhere. For one thing it has always had strong support at the top, and there has been no question of divided authority between ministries: the Ministry of Education is solely responsible for this operation. Furthermore, it has been responsive to such information as it got from the users of its programmes. Thus when some research was done on its three main programmes in 1958 and 1959, and the English programme was found to be less effective than the other two, this programme was studied and extensively revised over the next years. As a result of careful and prudent operation, Thailand is able to offer a useful service to 5,000 schools at the cost of approximately one cent an hour per student.
MPATI—A STEP TOWARD THE EDUCATIONAL SATELLITE

The Midwest Program on Airborne Television Instruction (MPATI) grew out of the thinking of a number of educators in the United States concerning the order of magnitude of tomorrow's educational problems. A 'population explosion', a sharp rise in the per capita cost of educating the United States student, and the increasingly rapid rate at which current knowledge becomes obsolete—this situation seemed to pose a threefold problem: (a) how to provide a higher quality of education; (b) how to provide it to an increasing number of students; (c) how to provide it without increasing costs beyond economic capacity. The solution to this kind of problem, they suggested, might require a true technological breakthrough.

Television had already proved to their satisfaction that it could be used effectively along with live class-room instruction. But they asked whether it would be possible to break through the approximately 7,500 square-mile barrier—the fifty-mile radius—that limits the range of most ground-based educational television. Could a signal be broadcast over ten or twenty times that area and thus save the cost of spacing transmitters over the area and connecting them? A detailed engineering study conducted by the Ford Foundation showed that the cost of transmission via an airborne system was markedly less than via an equivalent land system. Some day, perhaps, a communication satellite could be used to provide such a capability for educational television. But for the immediate future there seemed good reason to try an airborne transmitter which, flying at 23,000 feet, could cover nearly 150,000 square miles—only a fraction of the coverage area of a satellite, but nearly twenty times the coverage of a ground station.

More important than the size of the coverage area, however, was what it might mean for the quality of programmes. If a much larger number of students could be served, it should be economically feasible to spend more per programme with no higher cost per student. Moreover, the programmes thus created could be taped and shared with ground educational television stations in other parts of the country. It was out of this idea that MPATI was born.

It was an expensive project. About $17 million went into it during the period of development, $15 million of which were provided by the Ford Foundation. The project has now been operating for five years. It is broadcasting twenty-four lessons a day, serving 450,000 students in its coverage area with a little over 1 million pupil-hours of television each week. Another half-million students are viewing MPATI courses recorded and broadcast from ground stations in their own areas. The technical problems appear to be solved, and the project has reached or is very near the point of financial viability.

What has been learned?

Technically, the major finding is that airborne broadcasting is effective over a 400-mile circle (i.e., 200-mile radius), and may indeed be a practical way to serve areas intermediate between ground-station coverage and satellite coverage. The
signal from the Airborne planes is quite good, although receivers at a distance require larger aerials and booster amplifiers, as well as ultra high frequency (UHF) converters. The average cost of a receiver installation for Airborne is about $500, roughly twice the cost of an installation for a ground station.

So far as the effectiveness of instructional television is concerned, nothing has been learned from Airborne that contradicts what has been found from studies of ground stations. One of the most interesting things to note, however, is the great care which the MPATI leaders found it desirable to take in making and producing programmes which are to be used by so many schools and pupils. Perhaps all educational television programmes should be made with as much care, but they seldom are.

At the beginning, a tentative curriculum was devised by school officials and consultants in the coverage area. This included a variety of courses which were considered to be among the priority needs of primary, secondary, and higher education in the area. Twenty-four television teachers were selected from 400 candidates and assembled for a ten-week conference to work with consultants in planning the television materials. Meanwhile, contracts were signed with a number of educational television-production centres to develop video-taped material according to standards specified by MPATI. Production teams from each of these centres were brought together with the television teachers and consultants. ‘First-generation’ courses were put into production, and lesson guides for classrooms were designed and written to accompany each one.

The first tapes from each centre were very carefully reviewed by four-man teams, made up of a subject-matter expert, a specialist in the level of teaching represented by each course, an expert in television production, and a recording engineer. After the first five tapes in each series were completed, production was, in most cases, temporarily suspended while the teacher, production team, and academic consultants gathered for a clinical session on the available programmes. These sessions, says the head of MPATI, were initially painful. Professional egos are not accustomed to such thorough, public assessment. It came to be recognized, however, that such clinics were the greatest source of suggestions for course improvement, and they were held periodically during the making of each series. In the first year as many as 30 per cent of the tape lessons submitted were redone one or more times. As the year went on, however, quality improved, and specifications for a ‘second generation’ of courses began to emerge from the experience with the first ones. MPATI estimates that the cost of making a thirty-minute television lesson, with these careful quality controls, is about $2,000. That is somewhere near an upper limit for the cost of instructional television production as we have so far seen it.

Perhaps the most interesting lesson to be learned from MPATI experience, however, is in the difficulties and problems of serving a very large number of different school systems over which there is no central authority. This is quite different from the problem of serving Samoa schools or Hagerstown schools, or Thai
schools, but it is the kind of problem which would be faced by a television service that crossed the boundaries of political authority—for instance, a satellite, or a television station or network that served independent units or different culture groups. In the MPATI-coverage area were some hundreds of independent school districts, each of them with a different board of education, a different curriculum, a different schedule, and different ideas as to what it wanted from television. Meeting the different needs of these units, making them feel ‘a part’ of MPATI, gaining their financial support, has been a very difficult task.

MPATI tried to meet that problem by creating a regional organization which would preserve local educational autonomy but still allow local districts to participate in an educational service none of them could afford alone. Several hundred school and college administrators voted to form a non-profit, membership corporation, to be owned and controlled by participating schools and colleges. The aeroplanes, tapes and other physical assets of MPATI were transferred to this corporation. There is an annual membership meeting, where the member schools and colleges elect their representatives to the board of directors. A state has one director for each 100 member schools, and one director for each 100,000 pupils in member schools. In addition, twelve members are elected at large to the board.

Purdue University has from the beginning provided a corporate and operating home, including the use of its airport, and a number of universities in the area have co-operated with schools in their area in programme production and utilization.

In addition to this organization, however, MPATI devotes a significant part of its time and budget to maintaining relations with its member schools, giving them engineering counsel, conducting orientation workshops for teachers, furnishing them with lesson guides, soliciting their comments and advice on the programmes and schedule. In a smaller way, this kind of relationship has been a requirement for effective operation in each of the cases we have examined. In MPATI’s case, where the audience is not only large and scattered, but also voluntary rather than centrally controlled, it is a very big requirement indeed.

Problem 2. To teach teachers

ALGERIA—MEETING THE POST-INDEPENDENCE EMERGENCY

Before Algeria became independent in 1962, foreign teachers had predominated among its 20,000 teachers. When independence came, 80 per cent of these foreign teachers left. Furthermore, much of the French population of the country left, and thereafter the demand for educated people in business, industry and government further depleted the teaching staff. Nevertheless, the government went bravely ahead with its plan for universal education, and increased enrolments by
over 50 per cent, largely in the primary schools. This was the educational emergency that Algeria faced in the first year of independence—its enrolment increased by approximately 50 per cent, its teaching staff reduced by approximately 50 per cent, and the dynamic of national goals not countenancing any cut-back or slowing-up of the programme.

Algeria recruited 10,000 monitors (moniteurs—the moniteur is a newly established rank at the bottom of the teaching hierarchy). Almost none of these were certificated as teachers, and indeed most of them lacked the basic education to be adequate teachers. The Algerian Ministry of Education put these new recruits in charge of class-rooms and then attacked, vigorously and imaginatively, the task of bringing them up to the necessary level for teachers’ certificates.

An in-service course was designed to bring a monitor up to the level of instructor in four years. This course was supported by a rich variety of learning opportunities, using class-room sessions when there was time and opportunity, and educational media when they were available.

One device was a journée pédagogique, an all-day session held once a week (several consecutive days in some remote areas) when school was not meeting. These sessions concentrated on the teaching of language and mathematics. To help demonstrate ministry-approved methods of teaching, three films were made locally of expert teachers in action in the class-room, and other films are planned. The films were well photographed and apparently effective. The most typical way of using them has been to show a segment of the film and then have a long period of discussion of the method illustrated. Hardly any other method, supervisors said, would so quickly have given these apprentice teachers a clear idea of the kind of teaching expected of them.

The films were on reading and language study. To help the monitors and any other interested adults increase their knowledge of mathematics, three self-study manuals were written and published, with ten programmed lessons in each. Nobody had told the Algerians that it was difficult to write programmed texts, or that despite a series of training workshops programmed learning was still not in school use elsewhere in Africa or in the Middle East. And it must be admitted that the three Algerian manuals are not formal Skinnerian programming. Nevertheless, they are built around the idea of eliciting active student responses and telling the student if he has responded correctly. After a student reads a short text, he has a series of questions to answer, blanks to fill, problems to work. He can check his own answers. The programmes were pre-tested, and seemed to work well. When they were put into wide use they were further combined with a television programme. The student works through this programme and then watches a television teacher review and expand upon the basic concept he has been studying. Needless to say, the television serves as a pacemaker to keep him on schedule with lessons.

Some of the monitors’ in-service instruction is carried by correspondence courses which cover material through the first cycle of primary school. Lessons for these