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ABSTRACT

Brief descriptions of the use of television as an integral part of educational reform in El Salvador, Niger, and American Samoa are presented, along with plans for a new project in the Ivory Coast. In these case studies, television is primarily a catalyst for reforms that would not otherwise be likely to occur. These reforms include curriculum revision, new teaching methods, new subject content for educational programs, retraining of teachers, production of new teaching materials, and, in addition, an organized attempt at feedback and evaluation. Looking ahead, it is noted that communications satellites will be the next vital medium of educational reform. This brochure is a short preview of a larger handbook on this subject which is currently in preparation (JK)

RECENT DEVELOPMENTS IN INSTRUCTIONAL TECHNOLOGY IN THE DEVELOPING WORLD*

By Sidney G. Tickton

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Today many countries around the world use some form of technological media in education. In a few countries the use is fairly widespread. However, most technological devices and programs are structured around the needs of the teacher and are employed as teaching aids in the classroom. In other words, most educators are using technology to answer the question:

How can technology help the teacher?

A few areas, however, focus education on the needs of the student. Educators ask a different question:

How can technology help the learner?

In the few instances where the student is the center of attention, technology is a catalyst for educational change. Removing technology would make a significant difference to the educational process, because technology is an integral part of a well-thought-out-system. It is no longer primarily a teacher's aid.

Technology as an aid to the teacher undeniably has its place, but it is technology organized to improve student learning and educational reform that has most interested me and my associates at the Academy for Educational Development during the past few years. For this reason, in part, the U.S. Agency for International Development asked us to prepare a handbook which outlines, on the basis of experience to date, the most promising ways in which technology is used to improve education in a few countries. When completed the handbook will be printed in three languages and presented along with a film at seminars of top education officials in the developing world. The film commentary will be in several languages, too.

The film focuses on two examples of educational technology—the catalytic use of television in El Salvador and Niger schools. The examples are diverse in setting and scope, but have in common the use of technology as an ingredient for educational change.

In preparing the handbook and film we sought answers to three main questions:

(1) What do the newer technologies offer education?
(2) Can they help solve the educational problems facing countries around the world?

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(3) Can the new technologies help improve curriculum, make education more responsive to individual students, reach more people, and fill gaps left by a shortage of trained teachers?

There are no simple nor indisputable answers to these questions at present. However, our investigations revealed some distinct trends and significant clues. They lead us to believe that while technology is no instant cure for the crises facing education, technology properly used can increase the effectiveness and productivity of the educational process, multiply the impact of the really effective teacher, and thus improve learning.

As everyone knows, the list of countries employing technology for numerous educational purposes includes all continents, both large and small countries, and rich and poor locations. However, only a few countries in the list build technology into their educational systems to improve the educational process substantially in a short time. These countries are achieving results which American schools cannot equal. They are, in effect, charting some promising educational futures.

The handbook presents three case studies—in El Salvador, Niger, and American Samoa—and the plans for one new project in the Ivory Coast. Each example utilizes television as an integral part of educational reform. A number of other places, too, have developed the use of educational technology and the handbook briefly describes a few about which sufficient information could be obtained.

The handbook reports mainly on countries using technology in the comprehensive restructuring of educational systems to provide results not otherwise thought possible. In the three countries cited as case studies, TV is primarily a catalyst for reforms that would not otherwise be likely to occur. Included are curriculum revision, new teaching methods, new subject content for educational programs, retraining of teachers, production of new teaching materials, workbooks and teacher guides, as well as the television programs. In addition, there is an organized attempt at feedback and evaluation.

"Feedback" is a comparatively new word in education borrowed from electronics. It is used to describe the process of informing the teacher of the effectiveness of his message so that the message, or the process of delivering it, can, if necessary, be modified. Feedback and the measurement of results attempt to answer the questions: Are the students really learning? How do results achieved by one learning system compare with results achieved by an alternative system? Feedback and measurement are essential for continually improving an educational system, particularly one using educational technology.

Most countries using television or radio for education expend enormous initial effort mastering the technique and technology of the new medium but usually allow little time for systematic evaluation. And the high costs of equipment, program production, and training have left little money available for feedback and evaluation systems. However, in the three examples cited in the handbook, feedback systems were built in from the beginning and have been, we believe, enormously useful.

EL SALVADOR

El Salvador began a program of school reform in 1968 after intensive examination and evaluation of the country's educational problems. The purpose of the reform was to make new and better things happen in the classroom—for the benefit of the student and the society, too. The program was built around educational television, with fund and technical assistance provided by the U.S. Agency for International Development.

After evaluating goals and priorities, the planners began the reform program with the junior high schools (Plan Basico)—the seventh, eighth, and ninth grades, which enrolled a total of about 40,000 pupils. Starting in the fall of 1968, curriculum was revised for a limited number of seventh-grade classes; teachers and supervisors for these classes were retrained in the new curriculum, in new teaching methods, and in the use of television in the classroom. Television programs were produced and appropriate student workbooks and teacher guides were written.

A studio not far from the capital city of the country began transmitting television lessons to 32 seventh-grade classes in February 1969, the beginning of the Salvadorean school year. The plan was that during the first year (1) the amount of student learning would be assessed and analyzed; and (2) the production specialists would obtain the experience and confidence necessary to make possible a smooth operation and good results in the second year when TV instruction was to proceed forward on a much larger scale.

Extensive teacher retraining and planning for program expansion proceeded during the school year 1969. The next year, 1970, the new curriculum and teaching materials were extended to the entire seventh grade. Television was introduced in all seventh-grade classrooms which had receivers, and in 32 pilot eighth-grade classes.

This year (1971) use of the new curriculum and teaching materials again expanded to include the entire eighth-grade, and television was introduced in 32 pilot ninth-grade classes. Some 24,000 pupils in 150 schools are participating in the program.

In 1972 with a new television station and a new studio in full operation, about 40,000 seventh-, eighth-, and ninth-grade students—virtually the whole of Plan Basico—will be participating in Salvador's educational reform, all taught a modernized curriculum by retrained teachers using new teaching methods and television, where receiving equipment is available.

One important and very interesting aim of the Salvadorean educational reform program was to retrain all 900 junior high school (Plan Basico) teachers. This was a substantial undertaking for a small country. Moreover, it was a step often omitted from other educational reform or TV instruction programs throughout the world. In Salvador the planners thought that this step was most critical and had to be done well. The Minister of Education agreed and provided personal assistance. As a result, every teacher in the junior high school by the end of this year (the third year of operation) will have undertaken a teacher retraining program in residence at a new

normal school set up especially for this purpose.

At the very beginning, teachers took a retraining course that ran for only three months. The graduates taught the first 32 pilot classes and were later to become the first group of supervisors. At the end of the year, this first group came back for additional training. However, starting with the second group the retraining program ran for the entire nine-month school year. Some 260 teachers in the second group received special training in either social studies and humanities or math and science, as well as instruction in teaching with television, and some background in guidance and evaluation. During the retraining period the teachers received full salary, room, and board at the normal school.

Obviously, during the past three years a considerable amount of rotating of teachers and improvising of activities was necessary, but the results worked out well. Some primary school teachers—Salvador had many unemployed at the time the educational reform program started—were appointed as substitutes for junior high school teachers being retrained.

One of the special aspects of the teacher retraining program was the use of microteaching, a new audiovisual arrangement pioneered a few years ago at Stanford University. The teacher's activities in front of a classroom or a small group of students were videotaped; they were then played back to the teacher, the supervisor, and sometimes other members of the teacher-training class for examination, criticism, evaluation, and learning. The idea was to provide the teacher being trained with some feedback on the adequacy of his or her performance before the class. What did he do right? What did he do wrong? What and how could he do what he had done better the next time?

After the first two years of the El Salvador reform the evaluators concluded:

1. *With regard to students' learning and ability:*

   In both years seventh-grade testing showed substantial learning gains in all subjects taught. At the end of the first year test scores from the reformed classes were about 20 percent higher than those from a sample of traditional classes.

   Everyone in the TV classes, whether rich or poor, from the city or the country, male or female, with high or low ability, came out better in the end-of-the-year achievement tests. Early fears that only the most advantaged students would benefit from TV did not materialize. In fact, TV and the reform program may be narrowing the gap between the better and the poorer students.

2. *With regard to student attitudes and aspirations:*

   Surveys from the first two years revealed that students favored the new system as a whole, and television in particular.

   Nearly three-fourths of the students in the survey sample already had more education than their parents, and they were all aspiring to considerably higher levels. The sample of ninth-grade students showed high aspirations to continue on to the university. Fifty-five

percent of the seventh- and eighth-grade students said they would seek semi-skilled jobs. Almost 40 percent wanted professional occupations.

By contrast, 70 percent of their fathers worked in unskilled jobs, only 10 percent in skilled jobs, and no more than one percent in the professions. Lofty aspirations may cause some difficulties in the future. The universities will have enrollment limitations and it will not be possible for all students to reach either educational or occupational goals.

3. *With regard to dropouts and failures:*

   Students in television classes had lower dropout and failure rates than the sample from traditional classes.

4. *With regard to teachers' attitudes, procedures, and classroom interaction:*

   Teachers using television in their classrooms for the first time were generally in favor of television instruction at the beginning of the year and even more convinced of its benefits toward the end of the year. In the second year of use, teachers also reported that they were in favor of TV teaching, but they did admit that some of the novelty of the new system had worn off.

   Observers consistenly reported that during the first year of educational reform the classes under the new system seemed to be livelier, more appealing visually, and more challenging intellectually than the "old style" classes. As opposed to traditional classes the new system resulted in less lecturing, more questions requiring thought rather than memory, more discussion, more individual study, and greater use of visual aids. The first year results showed no giant leaps forward but rather a steady, consistent mover toward modern styles of teaching.

5. *With regard to feedback:*

   The researchers in the program devised systematic television tests to provide the information that the television teachers and the production teams needed most: that is, how much the pupils were learning. Last year the feedback system brought results back to the studios for two subjects within three days after the program was shown. This year feedback is being expanded to cover most of the subjects taught and as many course units as possible.

6. *With regard to cost:*

   Instructional television, as everybody knows, is not a shoestring proposition of hiring a few people and spending a few thousand dollars per year. This year the administration and production staff consists of 160 people, and expenditures amount to nearly half a million dollars. People tend to be awed by such a sum, but it has to be looked at in perspective. Compared with a total education budget of $25 million, instructional television amounts to 2 percent of the total.

The question is what will happen to the bill when broadcasting is extended to the first six grades of primary school enrolling 93 percent of the pupils. Will costs rise sky high?

One economist believes that after the enterprise gets going and is geared up to a minimum critical size, further expansion can take place with minor additional costs. He found that in 1971, for example, El Salvador is adding one new grade, the ninth, to instructional television; is revising more than 50 percent of last year's eighth-grade and 20 percent of the seventh-grade televised lessons; in addition, there are substantial teacher training activities. But the television budget has risen only $60,000 and only 20 new people have been added. Projecting this annual increase to six new grades by 1978, our economist estimates a television operating budget of about $900,000 a year compared with a school budget of $36 million or a net of 2 to 3 percent.

These figures make no allowance for efficiencies that will occur as the production team gains experience; as administrative cost is distributed over a large number of students; and as the tasks shift from entirely new programs to revising and updating the videotape inventory.

On the other hand, there will be capital costs and teacher retraining. New and cheaper teacher retraining programs will be required, however, inasmuch as for 250 teachers this year the cost was $1,200 per teacher. The country could not afford such a cost level for 14,000 primary school teachers.

The key point is that low cost alone does not make instructional technology cheap. But if the learning effectiveness of television can be firmly established and the level of instruction improved, television has the makings of becoming a great educational bargain.

Some important ingredients went into the Salvador project, including:

1. Revising the curriculum to include up-to-date subject matter and concepts relevant to Salvador's young people;
2. Retraining the teachers to use new teaching methods, to handle the subject matter, and to work with television;
3. Programming adequately—producing some 500 20-minute television programs a year for each grade involved;
4. Producing and promptly delivering a series of weekly workbooks for the students tied directly into the TV lessons;
5. Preparing delivery of a series of guidebooks for the teachers also tied directly to the TV lessons; and
6. Developing a test and evaluation program which started prior to the first broadcast lesson with a series of pre-television tests and functioned continually during the year.

NIGER

Another project which the Academy looked at during preparation of the handbook was the educational television pilot project in Niger, a small, dry, landlocked country in northwest Africa. The Niger project was planned in 1963 and began operation in 1964. Today the educational television program has transformed the education of about 800 primary school children in 22 one-room schools near Niamey, the capital. However, it is still a pilot project. Originally the program was intended to expand throughout the country, but adequate funds for expansion were never available.

Niger was the first African country to give youngsters complete instruction via TV, and the first to use a classroom monitor to offset the teacher shortage—usually a young man with not more than a sixth-grade education but with general enthusiasm and alertness, a desire to learn, and love for and ability to work with children. After a quick three-month training program, monitors were given guidebooks to go along with the television courses. They prepared the students for the TV lesson, then followed it up and assigned appropriate activities geared to the abilities of the individual pupils in the class.

The Niger TV programs are designed and planned by an international team of educators, media specialists, psychologists, and sociologists. They rely heavily on feedback from the programs that they get from the monitors and the children via a traveling observer who periodically visits each school.

The new system's most important job in the Nigerienne experiment has been to teach the children to communicate in French, the national language. All programs, prepared in French, are designed to present broad ideas and utilize, where possible, objects and knowledge with which the children are already familiar. The TV teacher seldom just delivers a lecture. The emphasis is on games, dramatic sequences, open questions, and problem solving.

In a typical TV classroom in Niger the students sit on clay floors around a TV set. During televised math lessons the children often do their own problems on the floor. After the TV lesson the children work on something related to the lesson.

The schedule of telecasts varies with the age and ability of the students. In general, the younger groups receive fewer programs than the older ones because the directors believe the younger groups need more time for reflection and independent work. A typical schedule for older students includes four 14-minute TV lessons per day, five days per week.

By December 1970, children in the two original experimental classes had had four years of television-based primary school, and pupils in the additional 20 schools three years. Each class has moved up a grade each year, but the number of students receiving television programs remains the same. The two original classes have completed their TV experience.

Although the TV project in Niger is very small (only about 800 out of almost 82,000 primary-school children are involved), its achievement has

been impressive. One measure of its success is the very low failure rate within the TV classes themselves; out of 800 pupils, none failed, while the average rate of repeaters in the traditional classes was about 25 percent. Equally impressive, although unmeasurable, is the effect that television seems to have on the children—called by some a type of "personality explosion."

As for student achievement: 96 percent of the pupils in TV classrooms passed a French language comprehension test after the third year, and 60 percent passed a demanding test in speaking French. Traditional classes made a much poorer showing.

The Nigerienne government has asked that the experiment be extended to the fifth primary year, but so far it has not expanded beyond the 22 schools. No one knows what will happen after October 1972, the date the present experiment is now scheduled to be completed. The reports are that survival, as well as expansion, depends on foreign funding.

AMERICAN SAMOA

American Samoa was the first area of the world to undertake a comprehensive educational reform based on television. American Samoa consists of seven islands in the Pacific south of the equator, with an estimated population in 1970 of 28,000. School attendance is compulsory until pupils complete grade 12 or reach 18 years of age. In 1970, public schools enrolled approximately 10,000 students, and church schools about 1,800.

In 1961 the Governor of Samoa decided to upgrade the educational system of the islands to a level comparable to that of the mainland. The educational problems were those shared by many countries—the Samoan educational system prior to 1961 had no school plant to speak of, no organization, no body of trained teachers nor administrators, no educational goals, and only a limited and not very well defined curriculum. The 43 village elementary schools were rundown. The textbooks used in the schools were produced on the mainland for mainland children, and were somewhat inappropriate for the Samoan child. By comparable American standards, the Samoan teachers averaged not more than a fifth-grade education.

One obvious solution to some of the educational problems in Samoa would have been to import a full corps of teachers from the American mainland. This would have been expensive and would not have contributed adequately to development of the schools because the teachers involved would soon return home. Also, replacing Samoan teachers who were prestigious in the Samoan culture would have disrupted the social, cultural, and economic balance of the islands.

Another possibility would have been to train Samoan teachers in the United States. This would have taken considerable time, and a good group of Samoan teachers would not have been ready to start work back home for nearly ten years. Samoa's immediate educational problems could not wait that long. Therefore, the governor arranged for a small U.S. group of

educators and television specialists to come to the islands in 1967. The team worked out a plan for restructuring the educational system, using television as a core for the program instead of just a supplement. Television would teach the students and at the same time provide the Samoan classroom with additional in-service training. The Samoan classroom teacher and the American television teacher would, in effect, teach together as a team.

In October 1964, the first three TV channels began broadcasting to a few elementary classrooms. A year later three additional channels began broadcasting to secondary schools. The basic curriculum, lesson plans, and student worksheets for most subjects are written by the ETV studio staff. The studio production team produces as many as 200 class programs a week.

English-language proficiency is stressed through the basic curriculum —language arts, mathematics, science, and social studies. A modest amount of time is devoted to vocational programs.

The reports are that the system has been successful in raising the level of English language proficiency and general academic achievement in the primary grades. At the secondary level, however, results are less promising. One main reason seems to be that the majority of current Samoan high school graduates were already at least 13 years old when the new system was initiated. They were not able to adjust quickly enough to both a new curriculum and an entirely new method of teaching. They were caught in the shift from one educational system to another.

The educational system in American Samoa has undergone a major overhaul and redesign during the last decade. The system is moving toward more classroom teacher autonomy and more participation by Samoan staff. U.S. contract TV teachers have been replaced by Samoan TV teachers. There are, presently, nine Samoan TV teachers. The television component is shifting its role from basic prescriptive instruction to one of the media components of a centrally planned, but flexible instructional package. However, the system as it operates today is much more than just television. It includes specially designed schools, teacher supervision, in-service teacher training, and curriculum without rote memorization.

IVORY COAST

The Ivory Coast is just beginning a comprehensive educational reform based on television. In March 1970, representatives of the Ivory Coast, France, and three United Nations agencies formally agreed to collaborate on a ten-year $500 million nationwide classroom television system. For more than four years UNESCO has worked with the Ivory Coast in planning the project. France is expected to provide technical experts; the World Bank is providing some funds for construction of a number of buildings, including a training college for classroom teachers who will supplement the instructional television programs. The bank is also financing a center to produce a French-language instructional program.

This appears to be the world's most ambitious educational TV project

to date. The project will equip primary schools for a million Ivory Coast children with TV sets and build curricula around their use. The plan calls for a television receiver in every grade school classroom in the country by the year 1980. Most teaching will be done via television. In full operation the new educational program is expected to:

- more than double the number of children in primary and secondary schools in the country;
- demonstrate that instructional television can reduce the percentage of school dropouts and grade repeaters when used on a national scale in an underdeveloped country.

The first experimental telecasts began in October 1970; by October 1971, televised classes will be offered to first graders in 600 schools. Many of the TV sets will be battery operated to provide for their use in communities which lack electricity. Ultimately, instruction is to be provided for all pupils in the first four grades.

The use of television is being concentrated in the early grades. UNESCO and French technical experts believe that (a) young children are very receptive to televised teaching, and (b) in the developing countries the teaching of young children is generally inefficient and inordinately expensive.

Television, which in the past has been used only sporadically, will became an essential part of the Ivorian national educational system. Success or failure of the project should have far-reaching implications for other developing countries.

* * *

El Salvador, Niger, American Samoa, and the Ivory Coast are, of course, not the only areas in the developing world that are using technology to advance their educational goals. They are singled out in the handbook because, in their very different ways, they are the most prominent examples of the application of technology as a catalyst for integral reform of education in all its aspects: teaching method, teacher preparation, teaching materials, curriculum revision, independent learning, and research and evaluation. These four examples differ from educational applications of technology in many countries that merely add on devices or media to enrich formal education or, in some instances, to spread its reach without necessarily improving its overall quality or effectiveness.

* * *

So much for the examples. From a broader point of view, as the handbook emphasizes, educational technology is still in a primitive state everywhere in the world. Its history to date has been marked with false starts, inflated expectations, and misunderstandings about its potential and effective use. The development of hardware has far surpassed that of software; media have been added on to existing educational systems. What has been publicized as an exciting and productive experiment frequently turns out to be what one long-time observer calls another "going-to": a project that is *going to* accomplish great educational change *if* it proves out, *if* it is favored by political and educational forces.

Moreover, for those of us who like objective reliability and up-to-date

data, the kind of information we would like to obtain about the use of technology at schools, colleges, and universities is scarce.

It is difficult even for trained investigators to judge the effectiveness of various technological devices after first-hand observation. Data on student achievement are scanty, utilization rates for equipment are mostly unavailable, and costing methods tend to be arbitrary. The accounting figures, if they can be obtained at all, reveal only what money was spent on rather than showing what it was spent to *do*—how much, for example, to teach reading to eight-year olds.

Moreover, to top all of this off, projects that open with a flourish one year disappear from sight a few years later because the funds run out or the political administration changes.

THE FUTURE

Clearly, then, technology's full potential for education belongs to the future; but it is not a science-fiction future any more than it is an overnight magic solution to education's problems. Rather, it is a future that could transform education, not by wishful hopes and dreams, but through long-range, thorough, and systematic planning.

There will be many changes in educational technology and its application within the next decade or two. Experts predict the development of low-cost equipment—transistorized TV sets and inexpensive 8 mm movie cameras and projectors that even a child can operate. Potentially powerful educational tools such as electronic videotape recorders may be used to convert ordinary TV receivers into multi-purpose educational machines.

The most spectacular technological development in the offing for education is, of course, the communications satellite. But its successful educational use will depend inevitably on program content and the way in which satellites are integrated into the whole educational program.

A satellite offers a large country (or group of countries) lacking adequate ground communications a system that can cover a geographic area of a million or more square kilometers. It can broadcast to an entire region or beam its presentations selectively to specific areas for particular users. It can reach isolated and widely scattered populations with an ease and total cost comparable to that involved in teaching dense groupings of people. Unobstructed by mountains, rivers, and other geographical barriers, it has easy access to regions that would be difficult or expensive to reach by ground system.

The cost of operating communications satellites for education are so high that they can be utilized effectively only on a very large scale where the cost of the transmission hardware is a relatively small part of the overall budget.

Today the reports are that India and Brazil are ahead of other nations in plans to use space technology for education. But Mexico, Indonesia, and several African nations are interested.

The proposed Indian satellite experiment, scheduled to begin around 1974 or 1975 could dramatically prove the practical value of the satellite.

India will be the first country to broadcast television programs from a satellite directly into small, inexpensive televisions in remote areas.

Instructional television will be beamed directly to individual TVs in some 2,500 Indian villages. In addition, larger Indian cities will receive the TV signals through large receivers and transmit them to their surrounding populations. India will prepare programs emphasizing family planning, agricultural development, hygiene, and the rudiments of an elementary-school curriculum.

If a one-year experiment with a borrowed U.S. satellite proves successful, India hopes to establish her own satellite communications system to reach 560,000 villages by the year 1985.

Reports are that Brazil's prime interest in using the satellite is to upgrade teacher and student education. Brazil is exploring the possibility of a system designed to broadcast to 150,000 schools and other receiving stations.

The communications satellite, in all its costly glamour and immense versatility dramatizes an essential, basic fact which cannot be stressed too often and which we hope the Handbook will help to document. That is: Just as educational technology must be integrated into overall educational reform to be fully effective, so educational planning to be successful must be part of a wider national planning system.

Planning for an educational improvement must proceed hand in hand with systematic planning for housing and employment, for roads and communications, for industry, farming, and trade. Technology can be a powerful tool in improving education, but the lead time is long. Now is the time to begin planning any new educational system that is expected to be in operation five or ten years hence.

SUMMARY AND CONCLUSION

The use of technology to improve education is a development that spread rapidly throughout the world during the decade of the sixties. However, most educational technology projects involve television, "added-on" or "in addition to" existing educational programs.

A few small countries are beginning to use technology as a device to remake and reform their entire educational systems. If they succeed (there is reason to believe that they will) and their experiences are documented with large-scale research and development leading to new insights into learning theory and particularly how people learn, the way may be pointed to dramatic improvements in educational achievement.

There are two attachments to this paper. The first, Attachment A, relates to a new use of educational technology in the United States. The second, Attachment B, refers to a new development in the United States which may have an important bearing on the use and expansion of educational technology throughout the world in the foreseeable future.

Attachment A.

The "Sesame Street" television program is a notable new achievement in the use of educational technology which lies outside the formal school system in the United States. "Sesame Street" is broadcast every day on more than 200 educational television stations. It is designed for pre-school children three to five years old, using the fast-paced plan of action common to U.S. television commercials and bringing instruction directly into the home. Schools are not involved.

The program has a daily audience of 8 million children, is in the process of being expanded, and may have world wide implications before the current development phase of its activities have been completed.

"Sesame Street" concentrates instruction on basic concepts such as numbers, alphabet, and simple words and phrases. Entertainment is interspersed with songs and games in order to make learning enjoyable.

Evaluation reports say that children who watch the program regularly show greater gains in learning than those who do not. The reports also claim that because of the large audiences involved in the production programming expenditures amount to no more than 70 cents per year per child watching the program.

As a result of its great success, "Sesame Street" is planning to start a new series of television programs in October 1971 aimed at seven-to-ten-year-old children who have reading difficulties. One hundred thirty half-hour programs will be broadcast on a schedule of five days a week for 26 weeks.

Programs will be broadcast mainly in the late afternoon directly into the home in order to provide an extra reading opportunity. However, many stations expect schools in their areas to request that programs be broadcast during school hours as part of a regular in-school reading improvement service.

Attachment B.

The proposed establishment of a National Institute of Education is a new development in the United States which may have an important bearing on the use and expansion of educational technology throughout the world in the foreseeable future.

A few years ago the U.S. Commissioner of Education established a national Commission on Instructional Technology in the belief that technology properly supported and wisely used could help meet some of the nations most pressing educational needs. The Commission's task was to determine whether this belief in technology's value for education was justified and, if so, to recommend specific actions for the most effective possible application of technology to education.

The Commission found, as might have been expected, that technology was touching only a fraction of instruction in American schools, colleges, and universities. The results were varied, with some institutions making a creative and sustained use of the new media and others quickly lost interest after an initial burst of enthusiasm.

The Commission then went on to say in its report that it believed that

technology could make education more productive, individual, and powerful; make learning more immediate, and give instruction a more scientific base. The Commission concluded that the nation should increase its investment in educational technology. But it then went on to say that technology could carry out its full potential only if educators embraced technology as a system, and integrated a range of human and nonhuman resources into the total educational process.

In order to be able to achieve such improvements the knowledge of how people learn must be deepened and the capacity to put that knowledge to effective use must be increased. To do this, the Commission proposed the establishment near the top level of government of a new National Institute of Education. This organization would conduct research and make grants to universities and other independent groups to conduct research, carry on development and apply the research findings in demonstration projects to improve education.

The NIE would be expected to work on the big problems facing education. It would, for example, do it itself or support research into the learning process in all its sociological, psychological and physiological variables. There would be short range studies designed to change educational practice immediately; and long range studies which might not change practice for some time. For example, there might be studies on the effects of chemical stimulation upon learning at the same time as there were studies on how to utilize new procedures or processes effectively.

The Commission also proposed the establishment of a number of subsidiary institutes, including a National Institute of Instructional Technology, whose chief function would be to encourage the production of a wide variety of instructional materials using the new technology. The Institute would be a mechanism which could bring education and industry together in a close working relationship to advance the effectiveness of instruction to the application of technology.

Legislation on the National Institute idea is now before Congress and is expected to be enacted soon.