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INSTRUCTIONAL TELEVISION--PROMISE AND OPPORTUNITY.

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INSTRUCTIONAL TELEVISION HAS HAD SOME REMARKABLE SUCCESSES, BUT ITS OVERALL IMPACT HAS BEEN INSIGNIFICANT IN THE LIGHT OF ITS POTENTIAL, AND OF THE INCREASING DEMANDS OF THE EDUCATIONAL SYSTEM. FOR TRULY EFFECTIVE INSTRUCTIONAL TELEVISION, EFFECTIVE PROGRAMING ADAPTED TO THE NEEDS AND RESOURCES OF THE MEDIUM IS NEEDED, ALONG WITH INFORMED AND ACTIVE PARTICIPATION OF THE TEACHERS. STUDENTS NEED TO BE ACTIVE LEARNERS; TELEVISION TEACHERS NEED TO HAVE BOTH INSTRUCTIONAL AND BROADCASTING SKILLS, AND CLASSROOM TEACHERS NEED TO TAKE ON THE POTENTIALLY REWARDING ROLE OF PREPARATION, SUPERVISION, COORDINATION, REINFORCEMENT OF RESPONSES, AND EVALUATION OF RESULTS. INSTRUCTIONAL TELEVISION CAN BE USED TO BRING EXCELLENT TEACHING TO DEPRIVED SCHOOLS, TO RAISE AND MAINTAIN STANDARDS OF QUALITY THROUGHOUT THE NATION, TO ALLEVIATE THE PROBLEMS OF INCREASING NUMBERS OF SCHOOLS AND STUDENTS, AND TO TEACH PEOPLE OF ALL AGES IN A SOCIETY WHERE ADULTS INCREASINGLY WANT AND NEED CONTINUING EDUCATION. AN INSTRUCTIONAL TELEVISION SATELLITE WITH SEPARATE CHANNELS FOR STATES OR REGIONS WOULD GIVE A LARGE BASE OF SHARED RESOURCES FOR DEALING WITH EDUCATIONAL PROBLEMS. THE SATELLITE MIGHT BE COUPLED WITH A NATIONAL PROGRAM LIBRARY IN A SYSTEM WHERE CONTROL WOULD REST WITH LOCAL EDUCATION SYSTEMS. THIS ARTICLE WAS PUBLISHED IN "MONOGRAPHIC SERVICE," ISSUE 4, JANUARY 1967. (BB)

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# INSTRUCTIONAL TELEVISION: PROMISE AND OPPORTUNITY

Wilbur Schramm

In this Monograph, after admitting that ITV has not fulfilled its promise, Dr. Schramm discusses two factors which dictate a new look at the problems and opportunities of instructional television:
First: the educational system as a whole is experiencing vastly increased demands and these are bound to get higher in the years ahead.
Second: there is the prospect of a new television technology -- the satellite. Can TV in this new form help us meet the monumental educational tasks ahead?

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# INSTRUCTIONAL TELEVISION: PROMISE AND OPPORTUNITY,

by

Wilbur Schramm

INSTRUCTIONAL TELEVISION: PROMISE AND OPPORTUNITY

We have now had a little more than ten years of experience with instructional television.

Already it is in use in 50 countries. Here in the United States about 10 million elementary and secondary students and 600,000 college and university students now receive a part of their curriculum by television. Hundreds of controlled experiments on television teaching have already been done.

Ten years is a short time in the life of educational technology. It took 350 years after Gutenberg before we found out how to make and distribute textbooks to meet the special needs of schools and colleges.

Today, two factors dictate a new look at the opportunities and problems of instructional television:

First: the educational system as a whole is experiencing vastly increased demands and these are bound to get higher in the years ahead.

More and more pupils will be in school, and for longer periods. For many adults, continuing education and refresher training will be a pattern of life. There will be more to teach and learn. In ten years our scientific knowledge will double. All this will strain our educational resources to the utmost -- teachers, schools, teaching materials, financial support.

Second: there is the prospect of a new television technology -- the satellite. Can TV in this new form help us meet the monumental educational tasks ahead?

This paper will first review briefly the record of instructional television to date -- its accomplishments as well as its failures. Then we will take a closer look at some of the demands facing the United

States educational system over the coming decades to see what impact instructional television might have on them. Finally, we shall ask what the satellite adds to all of this.

Instructional Television - The Record and the Promise

Since 1956, Hagerstown, Maryland, has taught the core of its curriculum by television throughout all twelve grades to every student in the county school system. Results were so good that the school board, after observing the program for five years, looking at the students' achievement scores, and collecting anonymous opinions from teachers and administrators in the system, voted unhesitatingly to take over the $600,000 annual cost and continue the program. By using television, they have been able to offer science from the first grade to the twelfth, music and art in all schools, modern language courses as far down as the third grade, and such specialized courses as calculus in high school. None of these activities was possible before television made it possible to share expert teaching. Before instructional television, two-thirds of American junior high school students rated above the Hagerstown average in standardized tests of mathematics; after four years of televised instruction, two-thirds of American students rated below them -- the Hagerstown average rose from the 33rd to the 68th percentile (measured against national norms) on problem solving; from the 31st to the 84th percentile on arithmetical concepts. Eighth grade students in general science scored two full grades higher, on national norms, after three years of television than students in the same grade had scored before television. In one measurement, low-ability children were found to be progressing about twice as fast under televised teaching as comparable students under conventional teaching.

In a quite different kind of project, the Chicago school system has for ten years offered a complete junior college curriculum by television. Requirements, subject matter, examinations are the same in every way as for students on campus. Home students have certain hours in which they can consult instructors if necessary by phone; they send in some written work to be corrected and come to campus for a few special classes and for examinations. Every year about 10,000 students register for courses, and 10,000 to 40,000 unregistered viewers are in the audience for every broadcast course. Consistently, home students have done as well or better than students on campus in the same courses.

There is also the Midwest Program for Airborne Television Instruction (MPATI) which broadcasts instructional television programs from high flying aircraft to schools in a six-state region. Perhaps the greatest contribution of MPATI to instructional television has been a technical one; namely, it has demonstrated that airborne broadcasting can be effective over a 400-mile circle. In addition, the program has demonstrated that schools and school systems throughout this region can cooperate on program development and the sharing of instructional television broadcasts.

One of the most spectacular uses of instructional television has been under way since 1964 in American Samoa, in an effort to raise the level of instruction in the schools from traditional rote learning to modern education in a few years rather than the century or more it might take if events were left to follow their natural course. The United States government has consolidated the schools, installed six channels of open-circuit television, and provided expert help. The curriculum is being taught by teams consisting of expert studio teachers in each subject matter field, other teachers who prepare exercise and reading materials, and the

native classroom teachers who are helped by supervisors and workshops to manage the learning activities in the classroom.

There is little hard evidence on the experiment as yet, but observers report unanimously that remarkable progress is being made in language learning, in particular, that questions, experiments, and individual inquiry are beginning to replace rote drill, and that the native teachers are indeed practicing new methods. When one observes a Samoan teacher who, two years before, would have been content to have her class repeat a lesson after her -- when one observes such a teacher studying a lizard with her class, asking what the animal eats and who eats it, and working around to a discussion of the balance of nature, then one can hardly doubt that profound changes are coming to Samoan schools. Indeed, observers have asked whether we do not have deprived schools on the mainland which might benefit from the same learning opportunities as are being offered in Samoa.

In a number of American schools television has made it possible to introduce modern foreign language courses in the elementary school, although most elementary teachers are not well-prepared to teach the language. Denver, for example, has done this; the results have been carefully studied, and the method widely adopted.

In many medical schools instructional television has made it possible for a large number of students simultaneously to watch surgery from a vantage point or observe a microscopic examination. In some colleges and universities television is used extensively. Penn State, for example, offers twenty-eight courses, from family economics to meteorology, by television, and tapes them for use on other campuses.

Thus, instructional television can be exciting and effective.

Yet for all these success stories, ITV has been, in may ways, a disappointment. Measured against the great problems of education, its uses have so far tended to be rather insignificant. It has been used most often by the schools that need it least -- the innovative schools that already have an outstanding corps of teachers and are abreast of new developments in method and matter. Despite generally encouraging research results -- ITV usually does at least as well as ordinary classroom teaching* -- there have been more cases than we might expect when instructional television has not made the hoped-for impact in actual use.

For example, Continental Classroom began with considerable enthusiasm, offering a course in atomic-age physics broadcast at 6:30 A.M. over more than 150 NBC outlets. The special hook-up was designed to make the course available to any college in the United States; 300 of them picked it up the first year. Courses in chemistry, mathematics, and American government followed. After several heavily subsidized seasons and impressive records

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* A summary of 390 comparisons of televised teaching with ordinary classroom teaching in American schools found that in 63 percent of the cases there was no significant difference, in 21 percent of the cases pupils learned significantly more from television, and in 14 percent, significantly less. A rigorous study examined existing comparisons very closely and focussed on a small number in which all the possibly contaminating variables had been controlled so that the comparison clearly measured the effect of doing the same teaching by television vs. the effect of doing it face-to-face. In no case was a significant difference found. Nor is it easy to see why there should be a difference, inasmuch as television is only a device to carry teaching and demonstrations. Its advantage is to be able to draw on a larger supply of excellent teaching and demonstrations and make them available where otherwise they might not be seen -- not necessarily to be able to present them any better.

of participating institutions and viewers, however, Continental Classroom was dropped. Broadcasting instructional programs using commercial stations runs smack into strong competition from commercial programs. For this and other reasons, Continental Classroom has all but passed from the scene.

Another project that began with high hopes of ameliorating a severe shortage of teachers in Texas lasted about as long as Continental Classroom. Between 1956 and 1959, every teacher training institution in the state, the Texas Education Agency, and 18 commerical television stations cooperated in a program of teacher training, and enrolled more than 1,000 college graduates. Any recruit who enrolled for credit qualified for a temporary teaching permit after successfully completing the one-year televised course. But the statewide experiment found no followers in other states, and Texas itself dropped the program when its foundation grant ended. Actual results were disappointing: the pool of recruits was smaller than expected and the per capita cost of training was high.

More generally, now that we have moved beyond the first burst of enthusiasm, we know that there is no magic about instructional television. Dull teaching on a picture tube is no better than dull teaching in a classroom. Outmoded methods of teaching language or art or science or mathematics are no better on television than elsewhere. They may be worse, because more is expected of them and so many people can observe them. Television is only a pipeline. It is likely to be as interesting as what goes into it, and as effective as the learning activity that can be generated around it.

From this mixed and spotty record, what can we say about the conditions necessary for ITV to fulfill its promise -- to be truly effective? Two of these conditions can be stated with some confidence:

We must have truly excellent programming adapted to the special needs and resources of television as a teaching medium. And, second, we cannot rely on television to do the job alone. It works best with informed and active participation of the classroom teacher at all stages of the process of learning.

Let us examine each of these in some detail.

Programming

U. S. Commissioner of Education Harold Howe has remarked wryly that "like the drug for which there is as yet no desease, we now have some machines which can talk but as yet have nothing to say." Instructional television has typically been in the charge of broadcasters who were not experienced educators, or educators who did not know broadcasting well. Often it does the most obvious thing -- film what happens in the classroom, the panel discussion, the chalkboard as a visual aid, the "lecturing face as a focus of attention." As Rudolph Flothow of Lockheed has pointed out, television has typically put the teacher in his least effective role -- as dispenser of information.

But television has a great power to challenge a student:

-- by showing him a problem vividly and letting him try to solve it;

-- by letting him follow through a scientific experiment, deciding at each point what should be done next, and checking his procedures against those of the experimenter and his predictions against what actually happens;

-- by playing a game with him, using either the quiz pattern so popular on commercial television, or more sophisticated games such as those by which Nobel laureate William Shockley lets grade school children learn how to solve problems.

Television should keep the student active, not passive before the tube. It should invite discovery on his part, rather than foreclosing discovery by giving all the answers. To do this, it has to be willing to stop talking and let the viewer take part; it has to stop telling him and listen to him; stop trying to fill his mind, and let him exercise his mind.

Most of the weaknesses in its programming, says Jerome Bruner, "exist because we have neglected the potential and failed to exploit it to the fullest .... For the future of instruction by television, the greatest mistake could be to put it to work sanctifying the traditional. Simply filming lectures, panels or seminars ties television to all the blarney of the old academic techniques. [Instruction by television] needs invention. Felicitously discovered, television can then serve as the quality control for the entire educational system, building and maintaining taste to a level never before imagined."

Why has instructional television never reached the level of programming excellence it should someday be capable of reaching? For one thing, it is young. We have already mentioned the lack of people with the combination of educational and broadcasting skills.

Furthermore, truly excellent television programming is expensive -- ordinarily more costly than most school systems can afford alone. It requires a wide base in teaching resources. In conventional instruction, the resources base is the school itself -- its libraries, laboratories, instructional aids, the total capabilities of its teachers and its facilities. In practice it is often smaller than that, restricted essentially to the teacher and his classroom. From this base the teacher draws his information, illustrations, examples, practice patterns.

Potentially, instructional television can draw upon a larger resource base. Large stores of information become available. The capabilities of

a number of individuals can be drawn upon for the preparation of the teaching and the presentation itself can be planned and rehearsed, step by step, before it is actually made. But if the base is to be larger, it takes more money for programming to draw all these resources together for a vivid and meaningful impact. In actuality, however, ITV has too often been restricted to the same narrow base as conventional instruction and financed at bargain basement prices.

The Classroom Teacher

Only in the rarest of situations can ITV be counted upon to do the whole job of teaching. It can carry lectures and demonstrations, but it is not a very flexible tool for directing practice. And it cannot conduct a good class discussion or talk over a pupil's own problems with him.

In some cases, where students are homebound or where television is used alone for experimental purposes, they learn a great deal from television. But they learn a great deal more if classroom activity is integrated with it.

In fact, almost nowhere in the world is television being used alone to carry a serious responsibility in instruction. The pattern of use that is emerging is a kind of team teaching, in which one teacher does his part of the teaching in the studio, making use of all available teaching resources, including subject matter specialists and production technicians, and of extra time to build substance and illustration into an effective presentation of 10 to 30 minutes. Then other teachers carry out their part of the teaching in the classrooms, weaving the television into the pattern of classroom activity, handling discussion and questions, encouraging individual inquiry, and centering their efforts on the individual student's learning activities.

Thus, ITV does not displace the classroom teacher. It gives him a new and potentially more rewarding role. He must plan together with the studio teacher, coordinating the work. He is still responsible for instruction, but he can draw on new resources. He must prepare the class for instruction, supervise its activities, reinforce the responses to be learned, and evaluate the results. If well done, the product is an efficient teaching-learning system -- studio teacher, classroom teacher, teaching materials, guidance activities. In this system, the classroom teacher remains the fulcrum. It is not surprising that ITV meets a certain resistance where this central role for the classroom teacher has not been made clear in advance or achieved in practice.

Where instructional television has been used most effectively, it has been used this way as an integral part of a teaching-learning system. The participants in that system share the planning and the decision-making, and find their now roles neither threatening nor degrading, but rather potentially highly rewarding. The studio teacher, after his first anxiety at having his teaching exposed to the critical eyes of his colleagues and superiors, has been grateful for the added time and help in preparing his lessons. The classroom teacher has found that, freed of some of the responsibility for "telling" his students, he can spend more time <u>teaching</u> them, more time encouraging their individual learning activities. The principal finds that he has an opportunity, if he wishes, to spend less time on curriculum and scheduling, and more working with his teachers. All are likely to gain a new vision of what cooperative teaching can accomplish, and the level at which a classroom can operate; given a sufficient resource base. Every competent study of teacher and school administrator attitudes toward television used in this way has found that these attitides became

more favorable as people gained more experience with the new method.

These two conditions -- adequate programming and effective participation -- have rarely been met together. Thus, in a sense, instructional television has not yet had a real test in this country. It has not had a sufficient resource base or been used in the way it works best.

Even more significant, we have not used it in the schools that most needed it or applied it to the great problems where there is a "felt need" for it.

What instructional television has been is not the measure of what it can be.

The Need

It is no accident that the more spectacular uses of instructional television tend to occur in the developing countries, where educational needs are so glaring that extraordinary means and nontraditional methods are clearly required to meet them. In the entire country of Niger there are only 66 qualified teachers, and slight chance to add to this number because the tiny trickle of educated young people has to be piped to other parts of the development program. In that situation the potential usefulness of television to share such expert teaching as there is cound hardly be questioned.

By contrast, we have felt less need for the new weapon and have not taken it very seriously.

But we do have educational problems of a size and importance to challenge instructional television to its full potential. Conversely, the widest application of ITV, at least for the foreseeable future, is not as a scattershop seasoning throughout the educational system but precisely in bringing massive resources to bear on these insistent problems. What are some of them?

## The Deprived Schools

These schools are with us now. Some of them are Negro schools where we are beginning to try to make up for decades of shameful neglect. But there are others, equally laggard. Some of them are in remote areas. Others rest on an inadequate financial base. Whatever the reason, in many of them a majority of the pupils have already fallen so far behind by as early as the fourth grade that the door to educational advancement is already closed.

What is the high school situation? Here are figures for one state whose situation is not at all unique. Forty-one percent of the pupils in grades 9 to 12 have no opportunity to study a foreign languate; 84 percent have no opportunity to study art; 47 percent have no opportunity to study agriculture; 60 percent, no opportunity to take courses in industrial arts; 72 percent, no opportunity to take courses in preparation for trade or industry.

Suppose, now, that this state and otherslike it were able to deliver a full quota of students to high school. The high schools would have to increase their course offerings enormously to produce confident and useful citizens, able to go to work after high school or go on to college. But more than one-sixth of all the high schools teachers in charge of science, mathematics, and foreign languages in this one state do not have their certificates endorsed for those subjects. That means they have had no special training in those fields. And the need for solid training in subjects like these is extended farther and farther down into elementary school; a higher and higher proportion of teachers will have to teach these basic courses without special training in them.

There is no royal road to improving the lagging schools. There is no way to do it without money and personnel. No one wants to accept a

ituation in which these schools have a lower proportion of highly trained eachers. But we must speed up the process of improvement by sharing the eaching resources we have.

The resemblance to the Samoan situation is obvious. In that case he United States government admitted that it had neglected the develop- ent of schools. The plan for rectifying the situation as quickly as ossible was to spread the benefits of high quality teaching and well- lanned and well-supported lessons. And as we have seen, the plan was no hreat to the existing classroom teachers. Indeed they were vital to its uccess. And their own professional performance improved as a result.

The essence of the Samoan plan is not television; it is sharing esources. Television was simply the most efficient way to do it.

We can hardly ignore the implication. Can we afford to be less maginative and less resourceful on our mainland than we have been in the acific?

## New Standard Of Quality

Of one thing we can be absolutely confident as we look ahead: merican education will not be content to stand still. It will demand igher quality of product.

Can instructional television contribute to this? If it cannot, if it is quantitatively but not qualitatively useful, then we are much less interested in it.

Before we can expect a real contribution to quality from television, of course, we must learn to use it well. This means learning to use it as a teaching-learning medium, rather than an informing or entertaining medium; learning how to integrate it into the existing educational system in such a way as to make full use of the present corps of teachers and

administrators and to get it used efficiently in the classroom. It also means that there must be enough money to program it adequately. If those requirements can be met, then the possibilities are quite exciting.

How many nuggets of excellence have we in our schools that would contribute to the general enrichment if we could share them? A great teacher here. An exciting demonstration there. A challenging lecture or series of lectures in one place. A drama in another. How many truly excellent learning experiences like these might we share widely instead of restricting them to a single audience or a single class?

Think what television might mean to teachers themselves. At present the lag between our educational innovation and its widespread application in the classroom is at least five years. This is what it takes to work down through the process of publication, consultation, workshops, and special training. To reach all schools may take as long as 50 years.

But suppose that the innovators and expert consultants could be made available on television, rather than in person. Suppose that the workshops could be held on television, rather than in person. Suppose that advanced courses for teachers could be made available by television so that teachers could maintain an ongoing program of advanced study and professional improvement, with appropriate rewards, rather than waiting for a free year to go back to a university. Would this not reduce the lag in adoption of new methods?

Impressive evidence comes from many parts of the world that the experience of seeing excellent teaching on television is itself an effective way of improving teaching in a classroom. Many who, in the last few years, have seen a truly excellent teacher like David Page teaching the new math by means of a dialogue with elementary school students -- drawing them out, leading them to discover for themselves the relationships

and processes they should know -- have realized for the first time what this kind of teaching might be and do. And all have known that our own teaching would never be quite the same again.

Instructional television can enrich the learning of its users by gathering up experiences that would enlarge their environments. It could bring agricultural life to city children; city life to rural and small town children; an intimate sense of government, of science and industry, of other countries; some acquaintance with great men, great art, great events.

The real challenge of this new technology to use is that we should use it to share this kind of experience and excitement, this kind of quality, with all the schoolrooms of America that want it.

## Expanding Schools

The United States Office of Education estimates that by 1970 approximately 60 million young people will be enrolled in our schools: 37 to 38 million in higher education.

By the early 1970's there will probably be a powerful movement toward providing school for everyone from about age 3 to 20. There is more to be learned, and more special skills needed for employment. Children must be brought earlier into a group that will motivate them. We will want to bridge the awkward period when teen-agers who are not specially trained have a hard time finding jobs. If we do indeed adopt a general pattern of schooling for everyone from 3 to 20, it will have the effect of doubling school population.

We can look forward to all-year schooling, a longer school day, and training for more and more specialized jobs.

Not only will the amount of knowledge to be taught this greatly enlarged school population be much greater, but also there will be new

ways of teaching it. And new approaches to knowledge will interact with the methods as they already have in the "new math" and the new natural science curricula. Information retrieval centers, increased use of computer-based instruction, and the new curricula jointly planned by subject matter and experts in teaching are signs of what we may expect. Undoubtedly, therefore, there will be a broad need for retraining teachers and keeping them up-to-date in subject matter and method.

There is no reason to think that we cannot solve this problem. We faced something like it once before in the 1920's and 1930's, when the schools were asked to meet the new and higher intellectual goals then set by educational philosophers and leaders, and also to take care of the children who became available when child labor was closed off, and when the Depression forced us to create work, reduce unemployment, and hold educable youngsters in school. We met that problem, made long strides toward universal primary education, and were able to report that for the first time in history a major nation had more than 50 percent of the relevant age group in secondary school.

That achievement brought the nation rich rewards, but it was not accomplished without extraordinary efforts and without raising some extraordinary problems. We cannot expect to meet the educational demands of the 1970's and beyond without comparable problems and even greater efforts.

Here too the requirement is for the best and most effective technology we have available.

Lifelong Education

Educational needs of the future will not cease with age 20. Continuing and refresher education is likely to become a way of life for American adults. "In this age of sweeping scientific discovery and rapid technological change, highly talented manpower must undergo continuous self-renewal

if it is to maintain its creative potential," said the National Committee on Utilization of Scientific and Engineering Manpower, in 1964. For all workers, the committee said, "obsolescence is an occupational hazard against which the individual must guard." A straw in the wind is the practice recently instituted by the French Atomic Energy Establishment at Saclay: their diploma lapses after five years unless revalidated by attendance at refresher courses and success in further examinations.

In the coming decades, professionals will need constant updating. Already the University of California has on its rolls one out of every three lawyers and one out of every six physicians licensed in the State, for refresher courses.

There will be an immense need for job retraining with changes in technology and the coming of automation. Some idea of the dimensions of this field may be gathered from the fact that in 1963 there were enrolled in federally aided vocational programs 828,000 in agriculture, 1 million in trades and industry courses, 1,800,000 in home economics, 54,000 in practical nursing, and 185,000 in skilled technician training.

There will be a great need for teaching in-service training.

And beyond all these will be the need for more general education of adults. One interesting new dimension will be education for the aging. As early as 1957, U.S. Office of Education statistics showed that more than one-fourth of all people enrolled in formal programs were over 45. And the demands of useful and informed citizenship in the changing world we live in will undoubtedly lead more and more people into general adult classes.

There is no bomb shelter against the learning explosion.

Whatever happens, we know we shall have to have more teachers,

more materials, larger libraries, and more schools. But if we are to have a chance of meeting the needs sketched above, we must share effectively the resources that we have. This is where instructional television comes in.

As we have seen, it is essentially an efficient method of gathering in teaching resources from a wide base and sharing them broadly among large numbers of users.

From many countries now we have precedents to indicate that if good teaching and demonstrations can be brought in by television, fewer highly trained teachers will be required in residence, and some of the work can be supervised by monitors and chairmen, rather than subject matter experts. The experience of these countries indicates that well-designed television can be a powerful aid and support, rather than a threat or annoyance, to classroom teachers, a way of liberating them from some of the demands upon them and freeing time for other essentials of good teaching.

Furthermore, we have evidence from our country and elsewhere that home teaching or out-of-school group teaching can be done efficiently by television. Several dozen countries now teach by television everything from literacy to surgery refresher courses in this way. Japan, the Soviet Union, and other countries now offer secondary and college-level courses by television combined with correspondence study. Industries, here and elsewhere, have found that their employees could learn needed skills effectively through television, film and programmed learning. This experience cannot be disregarded when we face the kind of demands for persons and facilities that we do now and shall increasingly face in the next years.

## The Implications of the Satellite

How much excellent teaching could we share more widely by television?

How much learning could we center outside the schools by combining television with correspondence study or out-of-school group study? How much could we strengthen the learning resources available to our students? The answers we make to these questions are inevitably related to the uses we are able to make of instructional television. Increasingly they are becoming related to the use we might be able to make of a satellite for education.

Nobody knows exactly what the effect of a satellite for education would be, for there has never been one. We can say with some confidence what it would not be, however. It would not be to create a nationally controlled system of education or a government office to program the satellite. Unlike many other countries, we rejected that possibility a long time ago. We have decentralized control over our schools.

Whatever television reaches the classroom through a satellite will come in, like all other learning experiences in the school, because the school boards, trustees, administrators, and teachers say it should come in.

This does not mean that every school would itself program the satellite. No medium with a coverage area as large as a communication satellite can be programmed efficiently on a school-by-school basis. But the alternative need not and should not be a single national program center. It is possible that there would be enough channels to assign one to a state, so that the schools and colleges of the state might cooperatively decide how to use it. Or a channel might be programmed by a regional organization to meet the special needs of that region. Undoubtedly, many programs would originate in individual schools. It is possible to conceive of a national educational program office to cover public events of great educational importance, or to handle production on order from state or

regional organizations. There would almost certainly be need for a national program library, to facilitate exchange of programs and materials. There will be numerous and diverse program sources. But control will throughout the country remain where it is now -- with the educational system.

The main difference between instructional television by satellite and instructional television without it is that the satellite will offer a much larger base of sharing resources, and a much quicker way of doing so. A new course, developed and produced by one of the national professional organizations -- or by a university or school system -- might be offered to all the nation's schools at once, if there were sufficient demand for it, rather than filtering slowly down through all the separate educational television outlets and individual school systems. This might have been done, for example, with the Physical Science Study Committee's new course, or the "new math" when it was new. It could still be done with the new biology or the social studies course which is in preparation.

The wider the use of a course, the greater the resources that can be put behind it, and therefore the more likely we are to have distinguished programming. A single school system has difficulty in finding the money to produce instructional television of consistently high quality. If it does produce excellent material, it seems wasteful not to share it with other systems. If the process of sharing can be enlarged -- with neighboring school systems, with the schools of a state or a region, with schools or colleges of similar kinds throughout the country -- then it is possible to draw on greater resources and more skilled professionals to produce the material. The result is likely to be higher quality.

It is easy to exaggerate the importance of timeliness in instructional television. Only a portion of educational transmission would need

to be handled in "real time." Yet the advantage of being able to be timely when necessary, and to share materials quickly, is a great one. Suppose a class in Arkansas, as well as a home audience, could have a seat at a Congressional hearing or a UN debate or a press conference. Suppose it could join young people its own age in a walk through the White House, or Harlem, or the New York Stock Exchange, or the Mt. Palomas Observatory, or the TVA power works. Some of these would gain more than others from timeliness, but there is no doubt that satellite-borne television could bring distant environment to classrooms with a contemporaneity and realism that is not possible in any other way.

For higher education, we can envision lecture or interview series with great scholars of the world, with chiefs of state, with heads of national and state government agencies or Congressional Committees. Universities could share lecturers, campus to campus, or join together in seminars with two-way questions and discussion.

A communication satellite could provide voice links from some of the participating classrooms back to the teacher, for questions and discussion with the television teacher. In the same way circuits could be maintained back to the studio, or to some other central places where the responses of pupils to questions or to opinion items might be recorded. This could be handled in such a simple way as the pupils pushing buttons numbered according to answers or opinions. Both the teacher and the student would know what answers are being given, and, if there is a right answer, whether the student has given it.

The satellite could be a channel for the rapid exchange of data between scholars or libraries. The scholars of this country, suffering with problems of information storage and retrieval, delays in getting articles published in journals and difficulty in keeping up with the new knowledge

from other laboratories, could conceivably by means of new channels be able to call upon a distant colleague for information, or order information from a library or data bank.

Conclusion

Here is the challenge:

-- to apply the developing technology of instructional television imaginatively to the great problems of American education

-- to use it to share our resources of excellence as widely as possible.

-- to do so in a way that supports and assists the classroom teacher

-- to offer through it new and more challenging learning opportunities to students

-- and to humanize rather than mechanize the educational process

As Charles Frankel has said, we must work within and we must solve "the overhanging problem of using technological progress to enhance rather than destroy humane values and the aesthetic quality of life."

Instructional television and the communication satellite are not the whole answer to this challenge. But we cannot afford to overlook the contribution they could make.