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ABSTRACT

Three trends have shaped the goals of instructional technology during the last ten years. These are: a trend toward multi-disciplined approach to achieve specific learning objectives through field testing; a trend toward the development of more complex, multimedia, expensive equipment, materials, and systems; and a trend toward programs designed to facilitate individualized instruction. Most of the present instructional systems, however, are developed by a team consisting of a few subject matter specialists, writers, and editorial people organized and funded by an educational publisher. Development costs for such a system may run $200,000, even without systematic evaluation in the field. Present business strategies and the present pattern of federal funding tend to hinder rather than help the development of new instructional systems. Business strategies call for selling more of the presently developed material rather than pursuing new ones; the federal funding pattern has tended to be hit-or-miss without effective leadership or control. Progress toward more effective instructional technology might be made if the federal government funded a company willing to undertake the development of a specific instructional system to the point at which a significant number of school systems voluntarily elect to use the system at local expense. (JY)

Toward the Development of Effective Instructional Technology for American Education

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PREPARED AT THE REQUEST OF STUDY OF INSTRUCTIONAL TECHNOLOGY

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I. Development During a Decade of Change

About a decade ago, when a number of forces in our society had successfully begun militating for changes in American elementary and secondary education, I had two experiences which I now offer as "anecdotal background data" for the discussion at hand.

The first of these experiences occurred during a visit to the office of an educational publisher in early 1958 before Sputnik and the passage of the National Defense Education Act. We were speaking of one of that publisher's most successful mathematics textbooks at the time, and I was told of the difficulty in editing the text some years earlier. The original manuscript had been written entirely on large sheets of brown wrapping paper by an impecunious but talented retired teacher. Just why the publisher had risked his investment of time, money, and an editor's eyesight on that particular teacher I do not recall, but it was perfectly clear that those investments had paid off. The textbook that resulted from the manuscript had clearly met the test of the educational marketplace; it had sold many thousands of copies and had been used to teach hundreds of thousands of students. The cost of turning that manuscript into a textbook, including printing and marketing, may have been as much as but probably not more than $75,000. For this sum (a portion of which had been the investment of a retired teacher's "free time" in the hope of royalties), the publisher had got a product he was able to mass-produce for potentially every mathematics student in the country.

The second experience came about a year later at a conference where I met a number of people newly associated with the first federally funded curriculum development project. The project was being organized to produce a course in high school physics and, like subsequent federally funded curriculum projects, it had enlisted the services of dozens of scientists and science educators, who organized and designed the course, and who were to be assisted by scores of teachers, writing and field-testing the materials with high school students prior to commercial large-scale distribution. The cost of developing these materials (books, films, laboratory equipment, etc.), all designed for a market containing only a small segment of the country's high school population, has been estimated by a reliable source at about $7-million.*

These two cases from the annals of instructional materials development have not been cited to raise the question of whether the materials for a physics course, produced at a cost of some one hundred times more than the cost of materials for a mathematics course, are one hundred times as instructionally effective. Whatever the answer to this question, given certain economic, political, technological, and educational trends that have developed during the last decade, the question in that form is irrelevant. The questions that <u>are</u> relevant are: "How do we develop instructional materials, equipment, and systems that <u>are demonstrably effective</u> in the sense that they do what they have been designed to do with specific types of individual learners?" and "What are the chances that instructional technology of this quality will be produced in any quantity during the decade ahead?"

While we are attempting to come to grips with these critically important questions, we will also be forced to look rather closely at the growing

* Some of this expense must be attributed to the "start-up" costs of the whole curriculum reform movement, which may be legitimately allocated to this first large-scale project.

interdependency of education and industry in this country,* but first we must examine three trends that have shaped the development and present condition of instructional technology during the last ten years. These are: one, a trend away from the "intuition-honed-by-experience-and-shaped-by-an-editor" school of development toward the "multi-disciplined-team-working-to-achieve-specific-learning-objectives-through-field-testing" school of development (i.e., a major step in the evolution of a rationally based instructional technology); two, a trend away from the standard textbook toward the development of more complex, multi-mediated, expensive materials, equipment, and systems; and three, a trend away from a master curriculum for all students in a mass-instruction program toward multi-mediated, multi-level programs intended to facilitate individualized learning. As we shall see, the question of whether today's emergent instructional technology may effectively meet today's changing educational needs depends on a number of factors related to these trends. Some of these factors seem to point to an affirmative answer and suggest specific and successful responses to these needs; others seem to prohibit the possibility of fulfilling these needs for some time to come.

II. The Present Pattern of Developing Instructional Technology

As a result of the events of the last decade, the instructional materials being developed today are seldom, if ever, created by retired teachers armed with teaching experience, perseverance, brown wrapping paper, and a good editor. On the other hand, most of today's materials are not yet being developed by the large complex multi-disciplined teams of scholars, teachers, writers, producers, editors, technicians, cameramen, artists, psychologists, instructional

* P. K. Komoski, "The Second Industrial-Instructional Revolution -- The Growing Interdependency of Industry and Education," 14th Annual Educational Media Leadership Conference, University of Iowa, 1968

technologists, and field researchers working together to produce materials designed to achieve specific learning objectives with individual learners.

The prevalent pattern of developing instructional materials today usually does involve a team, but a modest one made up of one or more subject matter specialists and a few writers and editorial people organized and funded by an educational publisher. The team usually works together over a period of years and is often titularly headed by an educator with a national reputation. In reality, the team is more apt to be directed by an editor of the publishing company financing the project, and the actual creation of the materials may be done by one or more junior editors. Most often, the team does not include field researchers whose job it is to force the team from intuition toward empiricism (if not science) by providing the creators of the materials with systematic feedback, collected from learners, on the instructional effectiveness of the materials as they are being developed.

The cost of having such a team develop sufficient materials for a year of instruction, without systematic formative evaluations in the field, may run as much as, but usually not more than, $200,000. Thus, the costs for today's common pattern of development are greater than similar costs were ten years ago, but they do not approach the costs associated with the method of materials development represented by the large federally funded curriculum projects described earlier. Of course, those federally funded teams continue to produce materials and those materials are marketed by commercial producers. However, only a handful of the many commercial producers who do not have access to materials so designed have been willing or able to invest the large sums of developmental capital needed for the empirical shaping of instructional materials

by "inhouse" teams. In their defense, it should be noted that in some cases the cost of such evaluations can be so great in relation to the cost of developing the materials themselves and to the size of the potential market for these particular materials as to lie well beyond the funds of all but the largest educational producers. This cost of pre-marketing formative evaluations is clearly an inhibiting (and in some cases a prohibiting) factor in the large-scale development of effective instructional materials, systems, and services that will demonstrably meet the needs of learners.

When it comes to the prevalent pattern of developing instructional equipment or "hardware," the over-riding fact is that with very few exceptions such equipment is not developed specifically for the purpose of instruction. Most so-called "educational hardware," i.e. projectors, recorders, television systems, etc., have been created for the general consumer market. The cost of creating hardware systems for the specific purpose of making instruction more effective has never seemed economically justified to equipment producers. (The largest producer of such "hardware" did only 20% of his business in the education market in 1968.) In one sense, one may argue that this makes it possible for education to acquire equipment it might not otherwise have access to, but this dependence on "what is available" has made it impossible to discover how effective technology developed specifically for educational purposes might be. One exception to this general pattern of "hardware" development during the last decade has been the teaching machine, but it, more than any other "hardware," has suffered not only from chaotic incompatibility, and from a dearth of effective "software," but from premature commercialization that took the form of blatant claims of universal effectiveness generalized from a handful of well-developed teaching machine programs. The only piece of "hardware" that has been primarily developed for

educational use and has worked well is the overhead projector.

All of this adds up to a present pattern of development that may be described as an almost random groping toward the development of effective artifacts of instructional technology. But perhaps this is all anyone has a right to expect after ten years of zealous effervescence and sporadic efforts. The questions to be answered during the next ten years are "How can this technology be used to produce effective and desirable educational results?" and "How can we best know what specific technological artifacts ought to be developed?" The answer to the latter question does not lie, as is so often suggested, in having educators, or for that matter anyone, arbitrate what sorts of products the education industry ought to set out to produce. Such an approach, at best a futile exercise, at worst could develop into an effort by educators (who tend to think that "improving the use of instructional technology" means using more of the products they have been using) to build an educational Maginot Line of 16 mm projectors and record players as their answer to the challenge of the future.

Whether a decade from now we are to end up safe and sorry or equipped with new and effective tools of instruction depends to a very great extent on how the changing education industry continues to change and how much value is placed on the task of developing effective instructional technology -- not just by that industry, but by the Congress, state legislatures, local school boards, and individual taxpayers. At the present time, the prognosis for the next decade seems far from good. In an effort to understand why, let's look at the changing education industry and the "education market" it serves.

III. Present Business Strategies and the Present Pattern of Federal Funding Hinder Rather than Help the Development of New Instructional Technology

The present strategy of most (not all, but most) companies in the education industry is to give the educator what he wants to use at the price the educational market will bear. This has been a sound successful business strategy for many years and, in the view of many, there is no reason to believe that it could not remain so for many years to come. There is some question, however, as to how sound and successful an educational strategy it might be. The reason this question may be validly raised is, as we have already mentioned, that when the working educator, with little time left over from "running the shop," thinks about what his needs are, he tends to think in terms of products that are familiar and already available, rather than of those that are unfamiliar or those that "ought" to be available. Thus, for the most part, industry cannot learn what it needs to know from the educator directly. In a technologically dynamic society in which he has not been particularly active, the educator has few answers as to what instructional technology ought to be developed to meet changing educational needs.

From the business standpoint, therefore, the safe thing may be to continue to produce the traditional sorts of mass-instruction materials, thereby satisfying the educational purchaser, but not, unfortunately, the educational consumer, who is the individual learner. He, the student, is increasingly frustrated by these traditional educational materials; he has been told all his life that he is to be given every opportunity to develop as an individual, and that he will be allowed to make his own choices as to what products he uses in developing his individuality. And he has had his individual choice in so many other areas -- from "variety packs" of cereal in the morning to any one of the stations on his very own transistor radio at night. But the education industry is still far from making technology as responsive to the individual as other industries have managed to make it, for instance, in the areas such as mass communications and

food processing. And, even if educators and industry could discover and agree upon what products ought to be made and marketed to meet the needs of individual learners, products designed to meet those needs will not necessarily be forthcoming, because of what might be called the confounding economics of the new instructional technology. Some economic peculiarities arise from the traditional economic and social facts of American education life, with which hitherto non-educational corporations are often totally unacquainted. Others are functions of more substantive educational factors.

One extremely important economic fact is that, despite the frequently cited bit of information that the educational sector of our economy expends some $50-billion annually and is expanding, the actual market for products and services traditionally purchased for educational purposes is only a very small percentage of this figure. Close to two-thirds of the total monies expended each year on public education are spent for the professional salaries of public employees engaged in teaching or in managing the country's largest locally controlled public service. Another large percentage of these monies goes toward maintenance, repair (one large city system is reported to have spent over $1,000,000 repairing broken windows last year), and construction of buildings. Other large amounts are spent on amortization, transportation, and an array of general administrative expenses. As a result, and much to their chagrin, many new corporations in the education industry have discovered that the portion of the total education market for which they are competing with other companies is worth perhaps $2-billion to $3-billion rather than $50-billion. The question is whether a two or three billion dollar market is large enough to justify the competitive efforts of a Xerox, a Litton, both an RCA and an CBS, a Westinghouse and a General Electric, a Time-Life and a McGraw-Hill, a Sylvania and a Raytheon. The answer to this question at present would seem to be "no" -- Xerox, RCA and

Raytheon have recently cut back drastically within their education divisions and other companies maintain a "wait and see" attitude. To make the answer "yes" will clearly require the opening up of markets for new types of educational products and services. It is also quite clear that this "market development" cannot be accomplished by the industry alone, not only because of the economics of the situation but because nothing has been done to spell out what is needed. Even after ten years of federal funding, which has increased the local school systems' purchasing power by a really large factor, the market has not changed materially. The increased funds have been used, as might be expected from what has been said earlier, to further increasing use of existing technologies for traditional instructional purposes.

Therefore, federal support has not (except in the case of some of the large-scale curriculum projects and of programed instruction) led to the development of new technologies or individualized applications of existing technologies. Seldom, if ever, has federal money been given directly to the education industry for the purpose of developing entirely new products and services (a phenomenon which occurs frequently in such "public service" sectors of the economy as transportation, communication, aero-space, national defense, and even agriculture). When federal dollars do support developmental activities, it is usually through the indirect mechanism of a joint project with a federally supported, university-based research and development center or a regional laboratory, often conducted at the risk of strained industry-university relationships, and some questions about the university professor as entrepreneur. And even this indirect funding raises fears on the part of some local educators that the federal sponsorship will result in undue influence on local decision-making because the donors will eventually establish

specifications (in this case, curriculum objectives) of the sort that are established by the Department of Defense when it contracts with industry to develop a new weapons system.

Some of the new corporate conglomerates, experienced in providing goods and services to the military, might welcome the specification of "good clear curriculum objectives" by any agency whether federal, state, or local. These military-system-builders-turned-educational-suppliers are learning that in the "software" field it is very hard to pin educators down. They are also learning that most of the companies now selling "hardware" to education are marketing products (projectors, tape-recorders, television equipment, etc.) which were developed for sale in the general consumer market -- and perhaps modified slightly for sale to school systems. These established hardware producers (over 90% of whose business may be in markets other than education) will resist any requirement to change their products to conform to purely educational specifications.

But given what some believe will be a period of federal cutbacks in support of instructional technology, many of the large systems producers are, as mentioned earlier, cutting back and moving toward marketing more traditional types of instructional materials, developed by and sold through well-established (and recently acquired) subsidiaries experienced in making and selling traditional educational products to a traditional educational market. As Edward Katzenbach put it before he vacated the presidency of the Raytheon Education Company: "The money is not in the new stuff, it is in the old stuff." From a "hard-nosed" business standpoint, continuing to sell the "old stuff" may be the best possible solution to industry's present frustration with the peculiarities of the education market. Thus, for the time being, there could be no discernible division within

the industry--only intensified competition among the "old pros" selling traditional mass-instructional products dressed up with new packaging and sporting new labels which carry symbols of the prestigious corporations that are now standing behind the old familiar names. Those who rationalize the desirability of such a situation point out that, "We have never really made use of all the things already available for use in education," adding that, "Most schools do not have enough readily available films and other media including books," and capping their arguments with, "There are school systems where students don't even have their own textbooks for each of the courses they are taking." For such people the better distribution through more massive marketing of existing mass-instructional products seem to be the best and only economical solution to the problems of both the education industry and the educational system it serves. The only problems not apt to be solved by this possible turn of events would be those of the "ultimate consumer" -- the individual learner.

IV. The Immediate Outlook and the Conditions Necessary for the Future Growth of Effective Instructional Technology

If this is indeed the turn that events take in the future, what will the effect be on the three trends we identified at the outset? (the trend toward more complex and more expensive patterns of development and the building of innovative multi-media instructional systems; the trend toward the development of rationally based instructional technology, and the trend toward the use of the new instructional technology to individualize instruction). In returning to look again at these trends after an examination of some of the economic and political factors that surround the changing education industry and which contribute to the peculiar nature of the educational market, we cannot be encouraged. While the trend toward more expensive materials will undoubtedly continue, this

increased cost is apt to be paid for more or less traditional products sold to a market supplemented by federal funds that must be spent in a given year. The trends toward the development of a rationally based technology of instruction and toward individualized instructional systems are apt to be talked about a great deal, but probably few materials will appear which have been systematically developed and thoroughly evaluated to the point where they will be demonstrably effective within an individualized instructional program. Those so developed will undoubtedly be too few to make a significant impact. What then of the continued growth of these trends toward the improvement of American education? Such growth depends on three things -- one: our society's willingness to pay the full cost of adapting educational curricula for individualizing instruction; two: the ability of the developers of new instructional artifacts to make materials, equipment, and systems that are continually adaptable to the changing needs of individual learners; and three: the willingness of professional educators to use and shape these technological artifacts by responsible, on-going evaluations of their performance in a range of instructional settings.

Were these three things to occur on a reasonable scale, we might indeed expect to see great strides in instruction at all levels of education. The fact that none of the three is likely to occur to anything like the degree needed to cause significant increase in the development of effective instructional technology during the next decade indicates rather clearly that certain conditions necessary to that growth are not present.

Those conditions are not as simple as a lack of acceptance of new approaches to instruction on the part of educators. Contrary to the opinion of those who would place all blame on the immobility of the educational establishment, there are enough educators willing to introduce effective new instructional technology to bring along their colleagues during the next decade. What is lacking is understanding of how to do what needs to be done to develop a really effective new

instructional technology.

Practically all present attempts to create effective instructional materials, equipment, and systems suffer from an incomplete cycle of development. The truth of the matter is that although developers of instructional technology have learned a good deal about the nature of the full developmental cycle they have not learned all they need to know, and, because of inertia and the exigencies of the educational market place,they have not applied what they have learned. Many people, both in the education industry and in the schools, seem to feel that the first problem is what products to make. That will always be a problem, but the problem which industry, the schools and the government should address first is how to make products that are effective. Educators and school board members have listened to a decade of excited claims and testimonials about new technology with no clearly evident increase in effectiveness of instruction. In time these purchasers will begin to demand a guarantee of a product's effectiveness. They may question why a nation which can put a man on the moon cannot plan for effective individualized instruction. They may even demand the recall of entirely ineffective systems, which can have as high a potential for danger -- though of a different sort -- as a defective carburetion system in an automobile.

While such a situation is conceivable, it is not likely to occur immediately because, as the educational market is now constituted, the increased cost of transforming products that are educationally attractive into products that are also educationally effective would have to be passed on to the consumer. At present, the consumer is in no position to absorb these costs. Given a choice between a product which costs "x" dollars and may or may not be effective, and one that costs "x+" dollars and will probably have to be reworked by the producer and adapted to by the school system to be made effective, most educators will select the less

expensive product. Of course, were the school system guaranteed that the product would be immediately effective, they might very well be willing to pay the higher price. But given the nature of instructional technology, it is not very likely that such guarantees will be forthcoming. Therefore, despite the fact that there are likely to be more and more demands for effective instructional technology during the next decade, it is questionable whether the conditions or climate necessary for the development of instructionally effective technology will be present. Yet "effectiveness" is technology's most essential attribute; i.e., technology is man's process of organizing his mental and material resources to do what wants doing effectively. In the process, efficiency and economy may also be achieved, but they are valued "side effects" which may or may not occur. For too long, technology has been applied to education in the hope of achieving efficiency and economy -- hardly, if ever, has it been viewed as that element within education that has to do with achieving educational effectiveness. Since that day a decade ago, when the decision was made that the United States would put men on the moon, the central concern and only acceptable criterion of success has been to get them there and back effectively. Once we accomplish that, we will then begin to concern ourselves more with how we can get people there more efficiently and economically. (Had the recent Apollo 8 Mission been done more economically or efficiently, but less effectively, it would not have been any more impressive, and could have been tragic.)

The fact is that the same sort of commitment to effectiveness simply does not exist within our society when it comes to instruction. Were it to exist during the next decade and were the commitment to be backed up by $20-billion of federal support*, there is little question that we would be able to boast of

* This is approximately the amount spent in a decade on our space program. Much of the money has been granted directly to industry by NASA.

having created the world's first universally effective instructional technology. In time, it might even become "efficient" and "economical."

V. How Progress Toward More Effective Instructional Technology Might be Made

All this implies, and I think correctly, that whatever small progress we do make toward a more effective instructional technology during the next decade will depend on the ability of school boards, educational producers, federal funding agencies, and the citizenry in general to tolerate what may be construed as inefficient and uneconomical practices in the effort to produce instructional systems that work. This tolerance must take a number of different forms. For the companies in the education industry capable of such tolerance, it will mean a willingness to forego immediate profits and "hang in there" for the long pull (something many companies have talked about but which few are doing). It will also mean a willingness to develop a demonstrably effective product (perhaps just one to begin with that is effective with only one type of learner). In addition, it will require a willingness to keep in touch with the users of the product (both students and teachers) to be sure that it is working as effectively as possible, and to revise and redesign faulty elements. (This implies the on-going training of teachers in the use of the product in some instances.) Finally, (and this will be the toughest one of all) it will mean the willingness to forego the ingrained prejudice that those instructional products are best that sell best, whether effective or not. In an "unnatural" market where companies supply "educational consultants" to write requests for federal funds with which to purchase what is available, the "natural" evaluation of products by the market place cannot be relied upon.

Of course, few education companies can at present afford to gamble on the corporate strategies implicit in the above four points. However, it seems likely that more of them would be willing to carry out these strategies if federal funding were directly available to them to develop effective new products.

What this implies for federal funding is a greater willingness to provide substantial incentives to companies ready to take on a sustained (perhaps ten-year) commitment to the building of effective instructional systems. Under the present style of federal funding, such a relationship to the commercial sector is not likely, but when one considers that for the past ten years the federal practice of supplying funds for buying traditional technology has not only been sustaining but supplying an increasingly rich diet for those within the commercial sector content to market traditional instructional technology, the changes proposed here seem justified.

Now there are those who may argue that the large amounts of federal support that have been made available for the development of computer-assisted instruction (CAI) during the last few years is proof that this type of federal support is already available to industry. This type of support is not what is being described here. The support for CAI did not include commitments from and to companies in the education industry to support the sustained development of that technology over a number of years along with a program of ongoing evaluation in terms of its effectiveness on learners. While federal support of CAI has been large, it has also been largely unsystematic with the hope of efficiency and economy taking precedence over the concern for effectiveness. Furthermore, because it has been support specifically for CAI, it has put the Office of Education in the position of seeming to favor CAI over other aspects of instructional technology. A different pattern of funding would be necessary were federal funding agencies to help sustain the development of the effective use of technology in education during the next decade.

It would be presumptuous to say precisely how this should be done, but it is clear that in general the federal government should be willing to make a

significant amount of money available through whatever channels there are (a Commission on Research, Innovation and Evaluation in Education of the sort recommended in the recent report of the Committee for Economic Development might be an excellent mechanism) to any company willing to undertake the development of a specific instructional system or artifact to the point at which it is regularly achieving a designated set of objectives in a significant number of school systems that have voluntarily elected to use the system at local expense. Proposals might be granted support on the basis of formula containing such factors as: "innovativeness," "the educational need being responded to," "the amount of investment the company is willing to make relative to the estimated cost of development and the size of the company," "the number of pilot school systems which have committed in advance to use the product until it is proven effective or discarded," "the ultimate contribution the product might make to the growth of instructional technology." Special recognition of some kind might be given to those companies whose products eventually proved effective in a wide range of schools. A product's effectiveness would be judged on the basis of the effect the materials were having on learners and on the willingness of a significant majority of the pilot schools to adopt the product at local expense once it had been developed. Ideally, any company having an adequate number of pilot schools might be given one such grant on request.

It may of course be argued that such a program would constitute an intrusion upon the working of the "natural education market." But that market has been "unnatural" ever since the National Defense Education Act went into effect, when schools were given money to purchase either "more of the same" or a variety of new products of uncertain effectiveness. The companies that have benefited from this pattern of federal support to local purchasers may feel that there is nothing

unnatural about the pattern at atll, but the fact of the matter is that, as has been shown, this nourishment has tended to put fat rather than muscle on the growing field of instructional technology. Furthermore, this pattern has tended to produce sales and profits for companies with established market visability while less well-established companies with more effective products have difficulty competing in a market where effectiveness is not rewarded by adequate support or recognition. By means of the plan suggested above, all companies, large and small, established or new, independent or part of a conglomerate, would have an equal chance to acquire proportionate developmental subsidies. That is, the formula would allow a smaller company undertaking a million-dollar product development project to acquire a subsidy of, say, $750,000 while a company that was four times as large might be able to acquire only $250,000 for a project of the same size. This aspect of the plan would greatly lessen the possibility that the education industry will coagulate into a few large producers living on federal subsidies.

There is also a need for this kind of sustained commitment on the part of the schools as well as government and industry. Too often during the last decade educators have rushed to use a promising product of the education industry only to abandon it at the first sign of difficulty, or on occasion, because federal funds were abailable for an even more promising "innovation" in the same area. However, it seems likely that there are enough school systems willing to commit themselves to the voluntary and sustained use of a particular artifact or system of instructional technology until such time as both they and the producer of the product agree that it is providing effective instruction -- or should be abandoned. At the point of judging it to be effective, presumably the school system would be willing to adopt the product for broad and continued use at its own expense.

As indicated earlier, a company would have to enlist a number of such volunteer pilot school systems in order to qualify for a product development subsidy or grant. If, at the end of a number of years of sustained development, the majority of these volunteer systems decided to purchase out of local funds the materials equipment and (presumably) services required for continued use of the product, it might reasonably be concluded that the product had been proved effective, at least, for the types of student using it in those volunteer schools. Given this specific concrete evidence in the form of a commitment on the part of the pilot school systems, it is likely that other school systems would feel they could move with confidence to adopt the materials.

A second thing that the educational community could do (and in a sense is beginning to do on a modest scale*) is to sustain a self-supporting cooperative exchange of information about the effectiveness of specific products of instructional technology. When fully developed, this exchange will give all cooperating school s stems and companies ready access to impartial, accurate, and up-to-date information on the performance of specific products and services being marketed by the education industry. Such data would be used to prepare "product performance profiles" describing a product's ongoing record of use with specific types of learners in schools across the country. These data would be collected from teachers, students, and supervisors, and made available through an independent, non-governmental, non-industry "professionals' cooperative." Decision-making based on such dependable information could go a long way toward guaranteeing an effective "corrective feedback" to the education industry -- a feedback based on continuous product evaluations by teachers and their students.**

* See Stake, Robert, "Designing for the Future: an Eight-State Project," Planning for Effective Utilization of Technology in Education, 1968, pp 302-307.

** See also, Komoski, P. Kenneth, "The EPIE Institute, Improving Educational Technology through the Exchange of Product Information," Proceedings of Project Aristotle Symposium, 1968.

Were significant commitments to be made by industry, the federal government, and the schools, real progress toward effective instructional technology might be made in the decade ahead. At present, only partial components of this interdependent system exist.* That is to say, there are a few companies that seem committed to a sustained effort to develop their products through to the point of effectiveness. Likewise, there are schools (more than many people suspect) willing to work in a sustained way with such companies. In addition, a significant effort is being made to build a cooperative exchange of professional information on product effectiveness. However, there is no available mechanism for sustained government support for those companies and those schools willing to do whatever it takes in time, talent, and effort to develop effective instructional technology. Until such financial support is broadly available, we cannot look forward to real progress in the development of this emergent technology.

VI. Epilog

As we have seen, the education industry is no longer what it once was -- a specialized off-shoot of the publishing business. At this point in our history, it has the potential of becoming a unique, extremely large, and profoundly important industrial and social phenomenon in American society. The great electronic boom of the fifties and sixties has made possible heretofore undreamed-of instructional techniques, as well as changing radically the environment in which the learner exists.

Thus, the continuing increase in the size of the American educational enterprise since World War II and the dynamic nature of the American economy and its

* See Komoski, P. Kenneth, "The Second Industrial-Instructional Revolution," Keynote - 14th Annual Educational Media Conference, University of Iowa, 1968.

growing dependence on educated manpower, have inevitably made technologically-oriented corporations aware of the direct pragmatic value of education not only to their own well-being through trained manpower, but as a newly developing market for educational products and services. The emergence of what has been called "the learning society" is a major reason why corporations have felt they would not only do <u>well</u> by actively entering the education market, buy why many have talked about doing "<u>good</u>" as well.

Whether they can manage to do either is, at this point, far from certain. The position of this "position paper" is that the answer to this important question is not entirely under the control of this new industry nor should it be, no more than it is, or should be, under the control of the federal government, or, for that matter, the educational establishment. Nor is this a question to be answered in a general sense, definitely and once and for all. Rather it will have to be dealt with over and over again in terms of specific products that will have to be shaped and reshaped by educational producers, practitioners, purchasers and, hopefully, <u>by the ultimate educational consumers -- individual learners.</u> The suggestions made in this paper, if carried out, could increase the number of times this question is answered in the affirmative during the next decade.