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Examination of potential corrosive effects which the use of instructional technology could have on the teaching profession indicates that there are three problem areas where alternatives exist. First, educational objectives should be the criteria used in assessing the new approaches, the basic question being not how much use can be made of the devices but what their contributions are to the outcomes of education. Second, standards in such areas as class size, teacher qualifications, and instructional budgets must be maintained or strengthened, with technological devices such as statewide television networks following as supplements to instruction, not as substitutes for quality standards. Third, indications that the new media and appliances will provide a variety of new educational roles (leading to increased specialization) and will require additional personnel (thus increasing costs) have resulted in pressure to use varying pay grades for staff members. The proposed vertically differentiated staffing patterns, hierarchies in which each teacher is paid according to the role he plays, will lead to divisiveness among teachers and will extend the disjunction between teachers and administrators. A preferred alternative is the increased use of paraprofessionals and a more flexible horizontal differentiation based on differing assignments and tasks with personnel still being paid according to the level of their academic degree and years of experience. (JS)

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INSTRUCTIONAL TECHNOLOGY AND THE TEACHING PROFESSION

By: David Selden, President
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PREFATORY NOTE

In the fall of 1968, I received a call from a representative of the Study of Instructional Technology in Washington, D. C. I was told that SIT would like me to do a paper commenting on teacher attitudes toward the introduction of electronic and other teaching devices. I felt that I would like to write such a paper but I did not see how I could find the time. Also, I am generally opposed to the practice of ghostwriting. By arrangement with SIT, it was agreed that I would collaborate with Dr. Bhaerman.

Dr. Bhaerman and I discussed the general question of teacher attitudes toward technology in education over several lengthy sessions. Then Dr. Bhaerman set out to do the actual writing. While I generally approved of the result, there were points at which I wanted to add comment. Thus, the introduction is written jointly, while the body of the paper is written by Dr. Bhaerman. The material added by me is in italics. -D.S.

INTRODUCTION

Most teachers tend to regard educational technological devices with deep suspicion. Teachers think of education as a more or less personal relationship between them and their students. Programmed materials, canned electronic "lessons," learner-operated machines, and even the older audio-visual aids tend to interfere with the generally parental interest teachers have in the success of their pupils. Hence, resistance to these devices among teachers is high.

A perhaps related reason why teachers are resistant to the new machines is that teaching has a built-in conservative factor. Other professions--medicine, architecture, and various kinds of engineering, for instance--tend to adopt new materials and procedures very soon after they have proved themselves in the laboratory. However, much of the knack of teaching is acquired through observation and imitation, giving heavy emphasis on tradition. Furthermore, it is difficult to establish hard truths about the value of an educational theory or an instructional technique. Thus, it takes a long time for a new method to gain acceptance.

Teachers are not to be "blamed" for their slowness in adopting new methods. Many teachers carry on in a persistent aura of near-desperation. They are saddled with over-large classes, too many classroom hours a week, a curriculum whose relevance to the life of the student, currently or later on, must largely be taken for granted, and with students whose receptivity to schooling is at a marginal level. In desperate situations, most people cling to the safe and known. Under such circumstances, too, it is hardly surprising that new ideas emanate from supervisors and administrators, the administrative apparatus, rather than the grassroots. Thus, new teaching

devices have the double drawback of being untried and of being promoted by educational bosses who often lack credibility with teachers.

In assessing the likely effects which the use of instructional technology would have on the teaching profession, we hold that the organized profession is at a point in time where it still can determine the direction of this unresolved issue. Teachers are controlling more and more of their own destiny in matters affecting their economic security and working conditions. They also are securing a greater voice in educational policy, decision making, and goal determination. If teachers can clearly assess the problems and alternatives facing us, we will be able to *determine* the effects of instructional technology rather than assess the situation with analytical hindsight after the fact.

We have identified three major problem areas where distinct alternatives exist. The choices made will determine the future of the teaching profession for many years to come. These three areas are: (1) the question of educational objectives, (2) the question of educational standards, and (3) the question of the structure of the teaching profession. The first two will be examined briefly while the third, because of its major implications, will be explored in greater depth. However, beyond assessing what the potential effects of instructional technology will be, it also will be essential to explore ways to avoid or overcome their possible corrosive effects.

* * * * * *

The Question of Educational Objectives

The first issue which teachers must face is not particularly difficult to identify nor is it especially a unique one. The problem of educational objectives--the clarification and priority of ends and means--is a recurring one. Yet, I cannot emphasize strongly enough my conviction that instructional media of whatever kind, new or old, offer only means to ends and never ends in themselves. Teachers have been presented with new "hardware," new tools, and new instruments. Nevertheless, it is the goals of education which should remain central and which should determine educational programs and methods, not the other way around.

Unfortunately, the use and evaluation of new instructional technology is to some extent inhibited by the distraction of promotional techniques which often seem more appropriate to Madison Avenue than to education, and which imply a rationale which elevates them to the status of ends in themselves. This is not a new problem, for it has arisen in the past with such "older" media as textbooks. It is imperative, therefore, that use of new technological approaches be based upon their contribution to the outcomes of education. The basic question is not how much use can be made of these devices, but how can the objectives of education be achieved most effectively.

While this paper certainly is not the place to become involved in an extensive discourse on philosophical objectives, several theoretical alternatives must be resolved by teachers if they are to avoid placing instructional means at a higher priority than educational ends. Teachers must have clearly in mind not only the most effective ways to utilize instructional tools at

their disposal but, even more essential, they first should have resolved a number of elemental but extremely significant questions:

- Is knowledge something that can be transmitted, as an object, from one human being to another *or* is knowledge the residue of one's unique and personal experiences?

- Is the goal of teaching the mastery of factual information by means of demonstrations and recitations *or* is teaching a process of arousing personal response in the learner?

- Is the learner conceived as a sensory receiver to be manipulated *or* is he an active and experiencing person?

- Is the teacher conceived as a demonstrator and mental disciplinarian *or* is he provocator and instigator of activity -- mental, emotional and social?

- Is the educational process primarily one of absorption *or* one of self-discovery?

It is my belief that the alternative listed first in each of the five questions might tend to lead teachers toward an overemphasis on technology as an end in itself rather than as one of many methods for achieving educational goals. Conversely, I feel that the second proposition in each case would *tend* to focus technological devices in proper perspective as a means of achieving desired goals.

What Bhaerman means is that educational objectives should be determined by representatives of society and that educational methods should serve those ends. There is some danger that education may become McLuhan-ized.

Companies that invest millions of dollars in the development of new educational appliances are certainly doing so with an expectation of profit. Since many of these appliances not only determine teaching methods but actually are *teaching methods, there is considerable danger that needs of society and the needs of the individual child may become secondary to the profit needs of the educational entrepreneur. And it isn't only big business that has this medium-message confusion. Individuals who earn their living advancing a certain point of view or a certain education theory also have a vested interested in process which could defeat goals. See Bhaerman's paragraphs below.*

Teachers have a choice among two predominant philosophies: the philosophy which stresses the daily *filling* of 25 to 30 buckets in a classroom /or/ the philosophy which stresses the *freeing* of 25 to 30 human spirits. Their choice will determine to a large extent how well they use the new instructional devices or, conversely, whether they are *used* by them.

The Question of Educational Standards

A second problem closely related to the one above was raised recently and perhaps unknowingly by Congressman James H. Scheuer in a speech to the

Council of Educational Facility Planners.[1] Congressman Scheuer pointed out that as a result of the Educational Television Facilities Act, the federal government was provided the seed money to establish state educational television networks. Scheuer remarked that the results have been phenomenal and that in September of this year the state of Kentucky turned on eight transmitters all at once. He also stated that virtually all Southeastern states are building similar networks. Now, this is significant -- in a negative kind of way -- when one realizes that Kentucky in 1967-68 ranked 45th among the states in the expenditure per pupil in average daily attendance. Not surprisingly, the other Southeastern states ranked in significantly low positions on this same scale, e.g., Florida, 30th; Georgia, 38th; North Carolina, 44th; South Carolina, 48th; Alabama, 49th; Mississippi, 50th.[2]

In light of the relevant analysis of Dr. Martin Trow of the University of California at Berkeley, the implications of this should not escape us. Professor Trow[3] suggests that where educational standards are weak, the new technology will more likely be used only as a supplement for classroom instruction. Trow[4] quoted a significant item which appeared in the *National Observer* in the early 1960s when it was reported that on each day in South Carolina, courses in that state's history, and on algebra, French, physical science, geometry, and electronics are fed in on television to nearly one-third of all the high school students in that state. Thus, what Congressman Scheuer said can be interpreted in another light. Rather than cause for joy, there is cause for alarm. In supporting a relatively untested educational approach, one which has not proven itself yet, the federal government may well be reinforcing the existence of relatively low standards of educational excellence.

Along this same line, educators must take a number of similar precautions in what seems to be overeagerness by some to shift to any new or different technological device, however unproven it may be.

Another way of looking at the problem of goals and methods is to take up some of the observations made by Callahan in his study "The Cult of Efficiency in Education" (University of Chicago Press, 1962). I cannot completely agree with Callahan's basic plea that the education of children has nothing to do with efficiency. The schools are not located in the big rock candy mountain. The cost factor cannot be omitted from any equation of educational productivity.

On a unit-cost basis, the American public schools have been marvelously productive. They have achieved a low unit cost with a relatively high mass production by using low staffing ratios, low standards of teaching certification (cheap labor), and by not educating the roughly one-third of the students who are hardest to educate. When our society could absorb large numbers of unskilled workers, and when the fact that the uneducated third had an inversely correlated black racial characteristic was not morally offensive, our mass-production educational system was adequate. This is no longer the case.

We could approach the problem of how to educate most of the "lost third" of the incoming population which our schools do not satisfactorily educate now by (a) using more teachers and better physical facilities; (b) new devices which increase the productivity of educational workers, or (c) by using

a combination of increased staff, better technology, and better staff utilization.

One observation prompted by the above analysis is that individualized approaches to learning may be required for students in the "lost third." Diagnostic and remedial machines may be particularly helpful here. They almost invariably constitute new methods and they get away from adverse personal factors in the pupil-teacher relationship.

Thus, the new educational technology may provide a means for educating the lost third -- but we should not delude ourselves by thinking that education is going to be cheaper as a result. Callahan was therefore right in one sense in decrying "The Cult of Efficiency" because no completely cost-conscious *educational administrator would consider it worthwhile educating these individuals. Educating the lost third -- with or without the new technology -- is going to cost much more money per child than what it costs per child to educate the two-thirds who "make it."*

The current level of education productivity must not only be maintained -- it must be improved. Teachers must seek innovative ways to make the process and practice of education more fruitful. Not all teachers are unwilling to experiment with new instructional devices. And I believe that technology, if used as proper means to worthy ends, has the potential for increasing the productivity of our enterprise. However, productivity is being threatened in cases where teaching staffs are reduced, budgets decimated, and qualifications for entry to teaching lowered. Education must become more expansive with greater financial support for our schools, more qualified teachers for our classrooms, and, perhaps in some cases, more "hardware," but only when such machines have been tested, certified, and empirically validated in terms of being educationally productive.

In a word, standards in such areas as school staffing, class size, teachers' qualifications, and instructional budgets must be maintained at levels where they are high and strengthened where they are low. As with educational objectives, high standards are a priority which must be paramount. When quality standards are established first, statewide television networks will follow in due course as supplements to instruction. But let us not lose sight of quality standards and first priorities any more than we should confuse ends and means.

The Question of the Status and Structure of the Teaching Profession

The technological revolution in education involves forces working both to raise and to lower the status of teachers. And while it appears that lowering the status of teachers is more likely, this is an issue whose directions also can be *determined* by the organized teaching profession.

Professors Biddle (of the University of Missouri) and Rossi (of the University of Chicago) state the alternatives facing us in the following terms: Where teachers are in control of the new technology of instruction, teaching will assume more of the status of a profession and the teacher's activities will be governed more by their own determination than by orders from above; by contrast, where the new media supplant rather than come

under the authority of the classroom teacher, the teacher will have less and less professional status.[5]

Biddle and Rossi project that the new media will provide a variety of new educational roles for both the teacher and supportive personnel. This, they foresee, will lead to increased specialization *within* the profession as we know it now and to the appearance of auxiliary positions in the school tables of organization. Some of these projected roles (planner, scriptwriter, etc.) will be ancillary to the more basic job of instruction, while others are likely to become separate jobs in and of themselves.

If that is all they lead to, that is, increased specialization and auxiliary positions subordinate to the more basic job of instruction, it would be one thing. The problem, however, goes far beyond this.

I welcome the appearance of auxiliary personnel. As a matter of fact, a major part of the American Federation of Teachers' program is geared to this. In the study "A 10-year Plan to Save the Schools: Achieving Nationwide Educational Excellence," which Leon H. Keyserling recently prepared for the American Federation of Teachers,[6] the projection was made that nonteacher instructional staff positions will increase over the next 10-year period from 188,000 to 1,523,000, including 1,100,000 para-professionals, or one for every two teachers. The implications of the concept of specialization are more complex, however, and provoke a more detailed discussion.

A number of educators, to whom I will refer momentarily, have written and spoken extensively on the effects of increased specialization. In fact, Dr. Carroll V. Newsom, now the vice-president for education for RCA, speaking at the meeting of the Council of Educational Facility Planners,[7] even went so far as to say that the specialized use of faculty personnel *itself* is one of the new instructional technologies.

Professor Trow cogently observed a number of possibilities as a result of the increased specialization of the profession:

"The more centralized and extensive the planning of instruction through the new media, the more important will be the planning and administrative staff. These staff people already hold statuses (and earn salaries) higher than those of classroom teachers. The gap will be widened, and the administrative staff will come increasingly to include people directly involved in teaching (as television or "master teachers"), or in developing instructional materials (programmers). But in addition to the widening of status differentials, the rationalization of instruction will centralize power as well. The classroom teacher now has relatively narrow discretion in the shaping of the curriculum and the choice of materials. The new media, if governed from above, will further narrow the scope of his discretion. By thus further reducing the calls on him for other than routine skills and custodial functions, the new media will further lower the status of the nonelite teacher."[8]

Trow projects that the consequences of these innovations also are likely to affect the structure of the teaching profession, "replacing a unitary status by a hierarchy of profession and statuses."

Lindley Stiles and B. J. Chandler[9] make explicit the connection between instructional technology and the development of a hierarchy among teachers:

"Urban schools in the future will offer multiple opportunities for professional service, specialization, and advancement. Although it is to be expected that guild organizations* will exert persistent pressures to prevent the professionalization of teaching services in city systems, it is highly probable that differentiations will be developed in the quality and utilization of teaching competence that will permit outstanding teachers to be rewarded for professional competence and contributions. Examples of such recognition of quality teaching are already available in television teachers, instructional team leaders, and specialist teachers in some school systems. In the future, it is likely that the uniform-scale salaries that educational guilds defend so vigorously will apply only to the lowest echelon of teaching. Others who prove their professional competence will be able to advance within the function of teaching to higher assignments that carry greater professional responsibility and greater financial rewards." [*I think he is talking about us!]

Lastly, Professors Biddle and Rossi offers a number of similar speculations. They predict that as a result of the new technology and as more avenues of specialization appear,

- the status of the teacher will rise;
- the profession of teaching will appear to be less of a craft;
- the teaching career will not be terminal but will provide many avenues for both horizontal and vertical mobility;
- and the status of the "generalist," the traditional classroom teacher, is likely to continue at a low level.[10]

Now, this is surely a mixed bag of speculations. I believe the status of teachers has risen and will continue to rise mainly because of the success of teacher militancy as it is defined in the related concepts of collective bargaining and collective action. Collective bargaining is an orderly democratic process which permits representatives of teachers to negotiate as equals with representatives of their employers. On the other hand, it is only meaningful if teachers have the option of withholding their services in the event that it is impossible to reach agreement on the terms of the written contract. Rossi and Biddle may have oversimplified the problem; it is difficult to hold to the idea that the status of the teacher will rise because of an increase in the avenues of specialization. The reverse is likely to be true, namely, the person we normally think of as a teacher may be submerged in a hierarchy of levels. (On this score, the first point made by Rossi and Biddle seems to contradict their last point. It is difficult to see how the status of the teacher will rise and the status of the "generalist," the traditional classroom teacher, is likely to continue at a low level.) However, it is not difficult to see what *the real problem* is here, namely, the confusion about the issue of "What is a teacher?" The concept of a teacher needs to be clarified and stabilized. The problem, which I will deal with in the concluding pages, is how can these things be done.

That the profession of teaching, because of increased areas of specialization, will appear to be less of a "craft" appears to be splitting hairs. To polarize the teaching process into dichotomous elements always has seemed to me to be a moot question. Is teaching an art or a science? And now, is it a profession or craft? This kind of either/or thinking serves only to cloud the real issues. Lord knows it is difficult to define the teaching process and to reach limited consensus on a definition! (I suppose one could say that teaching is a "professional craft" or perhaps even a "crafty profession!") The heart of the matter is not so much what you call it, but how you view it and, more importantly, how you treat it. That is to say, teaching will be less of a craft and less of a profession, not because of increased specialization, but less of both if we continue to treat it and support it in the substandard ways to which we have become accustomed.

Also, at the heart of the matter is the question of mobility, horizontal and vertical mobility. The latter form, particularly, adds a number of related problems which must be resolved: differentiated staff levels, ranking, and merit pay. That this problem is already at hand is seen in the position taken recently by the Massachusetts Advisory Council on Education, which, during the past year, has been reviewing that state's program of teacher certification and preparation.[11] In the report of the Council, a number of statements were made which I find quite shocking. First of all, a hierarchy is identified:

"Four levels of licenses are suggested: internship licenses for those in training; associate-teacher licenses for beginning teachers; professional licenses for those who demonstrate ability to handle professional assignments independently of supervision; and educational specialists for *high level* teachers." (pp. 13-14)

Then, the personnel policies of school districts, that is, collective-bargaining contracts, are reconceived:

"Policies such as employment qualifications, staffing assignments, salaries, promotion, and tenure, should be related to the new differentiated uses of teaching talents. A key objective should be to provide opportunities for appropriate professional contributions, advancement, financial reward, and professional prestige within the instructional team." (p. 12) "School systems should move as rapidly as possible to adapt all personnel policies to the new differentiations of teaching that qualify teachers for higher levels of certification." (p. 18)

And lastly, vertical mobility is indeed undertaken:

"Failure to maintain the level of performance for licensure could result in nonrenewal, thus disqualification. In some instances, however, when the failure is inability to perform at an advanced professional level, such as professional or specialist, it may be decided to reduce the level of license to that of performance capabilities. Thus, a professional teacher who fails to maintain competence to perform independently might be licensed as an associate teacher and permitted to work under supervision." (p. 72)

A number of significant educational issues are brought to the surface as a result of these three statements; for example, the evaluation of competencies,

the obsolescence of teaching skills, and the renewal of certificates. And while they must be dealt with, the delimitations of time and space and the immediate topic before me force me to withhold discussion of these important issues until another time. The concept of differentiated staff, however, is directly relevant and must be assessed. There are a large variety of differentiated-staff models which have been developed over the past few years. All are similar basically to the Temple City model below:

			NONTENURE MASTER TEACHER DOCTORATE OR EQUIVALENT
		NONTENURE SENIOR TEACHER M.S. OR EQUIVALENT	
	TENURE STAFF TEACHER B.A. DEGREE AND STATE CREDENTIAL		
TENURE ASSOCIATE TEACHER A.B. OR INTERN			
100% TEACHING	100% TEACHING RESPONSIBILITIES	3/5'S STAFF TEACHING RESPONSIBILITIES	2/5'S STAFF TEACHING RESPONSIBILITIES
1-10 MONTHS	10 MONTHS	10-11 MONTHS	12 MONTHS
ACADEMIC ASSISTANTS, A.A. DEGREE OR EQUIVALENT			
EDUCATIONAL TECHNICIANS			
CLERKS			

Illustrated here is the Temple City, Calif., model of differentiated staffing. Temple City capitalizes on functions already existing in many schools, but formalizes them into a four-level *teacher hierarchy:* 1) *The Associate Teacher,* a novice, has a "learning schedule" and less demanding responsibilities; 2) *The Staff Teacher* has a full teaching load, aided by clerks, technicians, and paraprofessionals; 3) *The Senior Teacher,* a "learning engineer" or methodological expert in a subject, discipline, or skill area, teaches three-fourths of the time; and 4) *The Master Teacher* is a scholar-research specialist who teaches two-fifths of the time, but also has curriculum expertise, translating research theory to classroom possibilities.

(From *Florida Schools,* September-October, 1968)

(Note: The latest issue of "Education Recaps"[12] (October, 1968) reports that "teaching" salaries up to $25,000 appear to be a reality in the differentiated teaching staff plan adopted in Temple City. The plan began operating

this fall with a single secondary-level master teacher in social studies. In three years, the plan calls for the entire 4,500-student district to be on the schedule. At that time, there will be six or seven master teachers, and one senior teacher for every eight or 10 staff teachers. It is reported that master and senior teachers will be grouped around five disciplines. It is also significant that the editors of "Education Recaps" enclosed the word "teaching" in quotation marks.)

This scheme illustrated above tells us more clearly than anything most of us can say about the divisiveness which is gradually overtaking what was once considered a cooperative and egalitarian profession. Schemes such as this maintain and extend the disjunction which so often exists between teachers and administrators. I fear that it will not be long before it is impossible to distinguish between senior teachers, master teachers, and administrators, particularly since the various levels of teachers "teach" for varying periods of the calendar year. Such schemes are easy to develop on paper, which probably accounts for their increasing abundance. But it is another matter to carry them out, if one were prone to do so.

In the diagram above it is not at all clear who is responsible to whom, that is, are staff teachers or senior teachers or master teachers in the final analysis responsible for the key decisions needed in the educational life of each child? Or is accountability divided on a two-thirds and three-fifths basis too? The model assumes that "staff" teachers are something less than "learning engineers" (good lord!) and experts in subject matter and curriculum. It assumes that "master" teachers are superior in nearly everything and, hence, should be in charge. Such an assumption denies individual differences because most people are not superior in nearly everything! Surely there must be a workable and realistic alternative to this kind of divisive hierarchical arrangement. Such an alternative should be based upon a legitimate differentiation (if *differentiation* is the answer and I am not at all sure it is). Would not it make more sense to try to build a horizontal arrangement based upon differentiated *assignments and tasks?* While this has not been done to any wide extent, at least it would not tend toward divisiveness as does the hierarchial arrangement. In an alternative model, teachers would be considered on the same level even though they may be performing individualized tasks. While the following diagram is only illustrative of one horizontal model, similar ones can be devised.

Paraprofessionals				Professionals			
Clerks	Educ. Tech-nicians	Assis-tants	Interns	Teachers			
				#1 a media spe-cialist	#2 a specialist in diagnosing	#3 a specialist in instruc-tional techniques	#4 a good old-fashioned "generalist" a renaissance type, the kind we need more of

Bhaerman does a good job, I think, in pointing out the impact of new differentiated-staff proposals on the status of teachers. A point that is not sufficiently stressed, however, is the fact that much of the new educational technology -- that is, the appliances -- cannot be used in the traditional school organization. Diagnostic machines, which can pinpoint why a fourth-grade pupil hasn't yet learned to read, cannot be used by the fourth-grade teacher because they require large amounts of individualized attention, for instance. Programmed materials for older students, while useful for average and above-average readers, cannot be used by below-average readers without a great deal of help from a teacher or someone who is familiar with the materials being used. Thus, added staff will be necessary in spite of ingenious schemes to make small-group instruction possible by accepting very large-group instruction for part of the time, or by self-directed (teacherless) study. The added personnel required for use of the new technology will raise unit cost, unless varying pay grades for staff members are employed. This, in turn, as Bhaerman points out, introduces the hierarchy concept.

At the present time, almost universally throughout the United States, eight-grade students spend five classroom hours a week learning "American History." If, in a class of 30 pupils, six must be sent to a tutor, the cost of teaching that class American History is increased by the salary of the tutor plus the cost and maintenance of whatever technological appliances are used. Thus, a powerful force is generated toward paying the tutor considerably less than the eight-grade Social Studies teacher. At the other end of the scale will be a "specialist" -- a quasi-administrator -- who teaches less and is paid more than the Social Studies teacher. An even more ominous pressure will be generated to give the general teacher more pupils at a time to compensate for the costs of the specialists and the machines.

Finally, a point that Bhaerman does not make enough of, I think, is that the use of differentiated staff requies a large increase in the amount of supervisory cost per teacher. A favorite remark of school principals when confronted by demands for faculty control is, "You cannot run a school by committee." While it might be a good idea to experiment with communal administration, I doubt that it is practical to teach eight-grade American History that way. Somebody must be in charge, like it or not, and I would make the further surmise that Parkinson's law will operate with tidal force to bring about bureaucratic proliferation, with the wind deadening effect.

To make a general rule, teachers will probably not be resistant to the new technology as such. To the extent that it can be shown that new educational appliances will make them more productive, teachers will actually welcome the added equipment. However, teacher resistance will increase as it becomes apparent that use of new technological devices require changes in staff structure, or are paid for with money which seems to come out of working conditions and teachers' pockets.

The length of time one teaches should be determined by contractual arrangement. However, the professional teachers should probably not teach 100 percent of the time, since we should not ignore time needed for on-the-job training and for planning periods. Undoubtedly, some teachers should be specialists and some generalists. Nevertheless, all should be expert in

their "subject, discipline, or skill area." And, it seems to me, that with the aid of competent supervisors, teachers should be able to some degree to translate "theory to classroom possibilities." After all, it is the teacher who is *in* the classroom; hence, it is *he who must translate theory into practice,* not the scholar-research specialist who may be too far removed from the real concerns of a classroom. Just as the schools emphasize or claim to emphasize individual differences among students, the alternative should recognize individual differences in the faculty.

One final but significant point -- the relationship of salary to the levels of teaching. It probably would be ideal if we had the omnipotent wisdom to be able to distinguish degrees of effectiveness among teachers -- and pay accordingly. But the millennium is a long way off and the chances are we will not be around to see it. So we are left with a choice: to pay teachers according to the role they play (but who can judge priorities here?) or to pay teachers according to the level of their academic degree and years of experience (realizing the inequities that often exist here). Until we have found a workable and justifiable alternative, the salary-schedule concept as we know it now is the only meaningful choice we have.

I trust the problem is now in clear focus: the duties of teachers need to be stabilized along lines similar to this horizontal continuum in order to differentiate them from their supervisors and from other adults who play important supportive roles. Even those teachers who train in areas of specialization need not be ranked at higher levels. Specialists are needed in this day and age, but so are generalists who can see more than one side of a problem. Who is to say which is the more significant role? Both should be remunerated according to their level of education and experience, not by their role performance. Remove even one brick from the base of a structure and it will collapse. Likewise, to a large degree, teaching is a cooperative and communal effort and so it should remain. Nothing must be injected to create divisiveness....not even new instructional technology. While we *can use* the new media, when proven that it effectively can meet our goals, let not the new media *use* us.

In short, we should attack the problem at the source: if the majority of teachers are not the most able or skillful, let us get to the root of the problem by identifying, recruiting, and further developing the "raw material" into truly first-class teachers who are able. Instead, we concoct a hierarchy of levels and rewards, thus creating new and even more serious problems.

Conclusion

As I stated at the outset of this paper, I would deal not only with the potential corrosive effects of instructional technology on the teaching profession, but also with ways in which I feel that the corrosive effects could be mitigated. I have attempted to suggest ways in which the concepts of the "teacher" could be stabilized. Let me conclude by offering two positive prerequisites which I feel will be necessary for this stabilization:

1. A reinforcement of our professional (or verbalized) attitude that teaching is a cooperative and fraternal effort, one which calls for centralizing the values of solidarity and unity among the teaching

profession. While teachers may perform different roles, their unified force should be directed toward improving the status of children's learning and of the profession's well-being.

2. A demonstration of courage on the part of both teachers and administrators is necessary in order to encounter such schemes as the vertical hierarchy in the Massachusetts certification plan and the vertical differentiation in the Temple City plan.

Those two plans offered a thesis. We reject them and offer in its place a concrete plan of our own to complement the two attitudinal requirements stated above. Therefore, two specific programs are needed in order to stabilize the status and structure of the profession:

1. A teacher certification arrangement in which the state would require superior college-level preparation for certification, provide for expert supervision of beginning teachers for a period of at least three years, and then remove itself from further certification activity. In turn, local school systems would provide the stimulus, where needed, to encourage teachers to continue their education for improved competence. Presently, in many states teachers must secure additional college credit in order to continue the initial teaching certificate in force or to make it "permanent." This practice involves a type of coercion that does not lead to professional responsibility. The stamina and the dedication to complete three or four years of successful teaching, plus the optimum collegiate preparation necessary for regular initial certification, should be sufficient grounds for extending a certificate. Rather than the multi-levels of certification we offer the concept of certification as a dual-step process with continuing certification granted after a three- or four-year probationary period.

2. An inservice education arrangement in which specialization can be obtained by those who wish it and continued professional growth can be achieved by all. However, inservice approaches must not be more of the same old things. They must be meaningful and significant and, to as complete a degree as possible, they must be personalized and individualized. It is trite to say that teachers must be continuously alert to the many new insights into educational theory, the learning process, and, yes, instructional technology. Teachers obviously must never stop growing or they are dead. A way must be found to assure this growth. The question is not whether they do or whether they do not. It is: What is the fairest, most mature, and most professional way to insure professional growth. Obsolescence of skills can be overcome without the restrictions imposed by rigid certification levels and forced renewal. But the way will not be easy; nothing worthwhile ever is. Courage by teachers and administrators alike is needed.

Brave words! But how to make them a reality? One approach might be to encourage the development of jointly controlled teacher-administrator research and development funds through more imaginative collective bargaining. As things now stand, R & D is carried on by colleges, grant farmers, and institutional research departments. Working teachers are not involved. Perhaps

2 or 3 percent of the operating budget of every school district could be set aside for research by teachers on a released time basis. Such research would have much more credibility and could command much more support from teachers than ideas which come "from the outside."

In dealing with the possible effects of instructional technology upon the teaching profession, it has been necessary to go beyond the initial elaboration and prediction of those effects. To reiterate, I believe the effects of technology are still being determined. The main alternative appears to be a choice between a hierarchial structure of the profession and a flexible, less rigid, and less divisive structure. I trust I have offered a workable guideline in order to achieve the latter goal.

Footnotes:

[1]Congressman James H. Scheuer, "The Federal Interest in Education Technology." Speech to the annual meeting of the Council of Educational Facility Planners, Washington, D.C., Oct. 10, 1968.

[2]*Ranking of the States, 1968.* Research Report 1968-R 1. Washington: National Education Association, p. 55.

[3]Martin Trow, "The New Media in the Evolution of American Education" in Peter H. Rossi and Bruce J. Biddle, *The New Media and Education.* Chicago: Aldine Publication Co., p. 347.

[4]*Ibid.*

[5]*Ibid.*, p. 38.

[6]Leon H. Keyserling, "A Ten-Year Plan to Save the Schools," *Changing Education,* Summer-Fall, 1968, p. 21.

[7]Carroll V. Newsom, "Technology as it Affects Educational Planning." Speech to the annual meeting of the Council of Educational Facility Planners, Washington, D.C., Oct. 10, 1968.

[8]Trow, *op. cit.*, p. 348.

[9]*Ibid.*, p. 338.

[10]Bruce J. Biddle and Peter H. Rossi, "Educational Media, Education and Society" in Rossi and Biddle, *The New Media and Education.* Chicago: Aldine Publication Co., p. 38.

[11]Massachusetts Advisory Council on Education. *Teacher Certification and Preparation in Massachusetts.* Report Number 1. Boston: Massachusetts Advisory Council on Education, June, 1968. 132 pp.

[12]"Education Recaps." Educational Testing Service. Princeton: New Jersey. Vol. 8, No. 1. October, 1968.