Teaching: *A Practice of Art and Laws*[1]

Ted Ward

Purpose of the speech:

1. Compliment, encourage and congratulate the efforts which are now culminating in the graduation of the first group of interns from the South Macomb Center. (Emphasize the contribution of this form of teacher education to the overall pattern of teacher education in Michigan and the U.S.)
2. Lay groundwork for summer of next year for study and planning with administrators in this center. (Particular reference to LSI-related clinic-school projects—in terms of ideas which might be generated and pursued in planning sessions with superintendents and principals during the summer.)

Art and Laws

We have contented ourselves with the observation that teaching is an art. This is true in the same sense that any profession demands a transcendent wisdom and insight which goes beyond the "craft and trade" skills. But teaching is an art based upon a science.

In the field of medicine the relationship between the science base and the artful practice can be more easily seen. It is obvious that the physician must observe the natural laws which control the human organism. In order to observe these laws, he or she has to know what they are. In order to learn what they are and how to deal with them he or she goes to medical school.

It need not be so different in education. We deal with human learning in the same sense that the medical practitioner deals with human health. Our problems are to maintain and extend learning, to identify and treat learning difficulties. In doing this we are subject to whatever basic ways govern the functioning of human learning. Aldous Huxley: "Facts do not cease to exist just because they are ignored."

On the other hand, the search for these laws has not been very productive. Teachers still must rely heavily on judgments which are empirical. What a teacher discovers by "experience" is what he or she trusts. Consequently, we operate on "hunches" and make our decisions on the basis of habits of thought which we have built up through "experience." Fortunately, in the better teachers these hunches are usually pretty adequate if we use the pragmatic criterion of achievement of an intended consequence. But how much better our decisions would be if we had more scientific knowledge about learning to go on. Where will be get it?

The educational practitioner has waited for someone else to provide the scientific data from which to build his or her art. It's as if we haven't recognized that the people on the firing line—teachers and administrators, practitioners in an applied science are themselves an essential component in the research system. For ever so long we've said such things as, "Why don't we put into practice those things we *know* about learning?" We sometimes glibly add, "Research gives us so much to go on." While it may be true that outside research does give us something "to go on that can be put in practice, few of us seem to be very sure just what it is.

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[1] Ted Ward. Teaching: A Practice of Art and Laws. Address at the South Macomb Center Banquet to honor the first group of interns from the Center, June 5, 1964

Organizing what we do "know" at some level of confidence is a very difficult task. Much research, as we noted earlier, simply has no direct transfer value.

The Problems in Learning Research

We are reminded that Ernest R. Hilgard (Stanford) in his *Theories of Learning* (1956) cautioned, "There are no laws of learning that can be taught with confidence." This is a frightfully flat statement. What has all the effort in psychological research gained for us?

Learning research has been assumed to be the exclusive province of psychologists. But their curiosities tend to spin off tangentially to the large issues in human learning. The excitement of learning stimulates their search; they explore for the sheer satisfaction of diminishing the vast unknown. This is classical scholarship at its best, and it matters very little how much transfer value to significant problems such research may have. Classical researchers will argue that the fragmented research in animal learning is necessary because human subjects should not be "tampered with." They will further rationalize that their work is necessary because it may ultimately lead to insights into human behavior. But some of us are skeptical.

If the real-life decisions abut how to meet the learning needs of boys and girls could only wait until all the evidence is in! But they don't wait; "Rome is burning!" The emphasis on the *applied science* Let's look back at the way medicine got where it is today.

The Clinical Cycle

What we need to bring this about is to establish the sort of relationships between methodology, practice, and evaluation that exist in the medical teaching hospital. At the heart of the "clinical" concept in medical education is the training for a cyclical behavior of the practitioners. They become not researchers, *per se*, but components in a research-and-practice system. They see methodology not as a body of precepts or eternal truths but as a set of hypotheses which, as medical practitioners, they will continue to evaluate with their colleagues. The payoff for this approach is best seen in the subsequent years of their continued development in the practice of medicine. As a new procedure, drug, or instrument emerges from the research laboratory, physicians study the evidence and determine the change in their methodology it suggests. In the clinical setting this means a shift in hypotheses to test the new idea. And the medical practitioner does not work alone in this testing; teams of professional colleagues in the hospital centers and university clinics serve as operator-evaluators. Their findings constitute the most important and distinctive sort of medical literature: the clinical report.

To those of us in the clinic-school project there seems to be a very real possibility of bringing about the sort of routines for constant methodological improvement in education that would be parallel to the clinical research in medicine. This is not to suggest that a person can simply walk into a school and begin to do clinical research. First there needs to be an added dimension of professional training that sees methodology as sets of hypotheses. And, of course, in order to bring this about there must be developed a group of highly professional teachers, consultants and administrators who can commit themselves to the idea that the applied science base in education can be developed and implemented.

Here is where you become a vital element in these ideas.

A Possibility

The solution is apt to come as a by-product of a different sort of training—a training which makes the teacher an evaluator of hypotheses. It might work something like this: somewhere in the total system would be someone engaged in constant review of the literature. (There could be several involved in this constant search, but for convenience here we shall use the singular). His or her task is to identify research findings which suggest new procedures—let's call this the identification of new hypotheses. This activity involves determination that there is enough similarity between the remote situation in which the research took place and the local situation for which the new hypothesis is designed; it also involves careful discussion among the local practitioners to determine what hypothesis is truly reasonable on the strength of the research. Now comes the most difficult part: teachers aren't accustomed to modifying their procedures, as a group, in order to put a new procedure to an action test. But this is what we need. One teacher trying a new idea is rarely sufficient; the Hawthorne effect sets in, ego involvement clouds judgment and the small experimental sample rules out generalized conclusions. What a difference there is when a *group* of teachers tries an idea! The combined insights are much more conclusive, the peculiarities of various pupil groups cancel spurious effects and the resultant decision to discard or accept the hypothesis is itself a decision for action. And it wouldn't be necessary to resort to statistical designs in order to get the useful conclusion that the new hypothesis is or isn't a better basis for the particular decision.

And just what does this have to do with learning research? In the first place, it suggests a set of conditions in the field environment where there is more consciousness of the practitioner's role as an implementer and evaluator of methodology; and an awareness that methodology consists of hypotheses about the applications of research. This could be very important in the fact of the growing need for mechanisms to enable more rapid social change. Getting research into practice has always been a problem in professions until deliberate mechanisms for trial, demonstration, and dissemination are set up. Second, the clinical environment can be tapped for deliberate experimentation; perhaps not high-risk laboratory exploration, but the sort of field-testing that new instructional technology needs.

So where to begin? Inasmuch as the training procedures and the data gathering go hand-in-hand in a clinical environment, we have begun with the problem of training teachers and pre-teachers who remarked, "I've heard for so long that teachers operate on hunches—I wish I could see what those hunches are." We propose to deliver to them a magnificent collection of these near-hypotheses before a year goes by. Perhaps then they and their laboratory research colleagues can relate their knowledge more appropriately to the weaknesses and strengths of the hunches about learning we are operating on in the Grand Rapids and South Macomb centers. Learning researchers need to be challenged to put their ideas in the form of positive suggestions and this is one way to stimulate them to do so.

But there are also some new sources for useful hypotheses. Goodwin Watson is one educational psychologist who has made a significant attempt to pull a few dependable central threads out of the maze of psychological research. His fifty points in *What Psychology Can we Trust?* (half of it in January 1963 NEA Journal) are psychological propositions with high relevance for education, with which "few knowledgeable psychologists of any 'school' would disagree." He sets forth and briefly elaborates points which have real implications for teaching.

A much more elaborate member of this same new family of literature is *Human Behavior, An Inventory of Scientific Findings*[2] by Berelson and Steiner. This magnificent volume ticks off point after point about human behavior, including much good material on learning, citing the major studies which give evidence about each point. Here is a ready made starting point for checking out a set of teachers' hunches against established data in order to refine them into reasonable hypotheses. Perhaps in a few years we can take a second step from the Berelson-Steiner platform and organize a volume on what we really know about learning and what we find that it means in educational practice.

The internship is the ideal place to research the applied science questions. So much has already been learned in the internship centers. The cooperative climate already exists; the readiness to examine issues and to seek better ways has already been so well demonstrated. The clinic-school project proposes to mobilize campus and field forces for a continued increase of the scientific base for the art of teaching.

My last major section looks even farther into the future: **We Want to Look Ahead With You.** What will the future be like? We have real ideas for the future. The School Services Center idea and the intense interest of the Learning Systems Institute in the clinic-school project rises in part from a hope that we can establish field-testing sites in the clinic-schools for important development of new instructional system components. I like to think that we can develop teaching materials production and testing centers among the clinic-school network. What might we expect in the future

1. More portions of the professional training moved to the field.
2. More close public school-college ties. (We are learning important lessons right here!)
3. Less isolated R & D work

The Need to Design for Efficiency

A tighter linkage must be developed between what is purposed and what is attempted in education. The concept of efficiency is not inappropriate to this "tightening" process. A social or industrial institution where the processes run counter to the purposes will be neither effective nor efficient.

Public education is fortunately more effective than it is efficient. How much more effective it could become if the efficiency were improved! For so long we have thought in terms of a "money equals quality" formula. The extension of this thinking produces the current notion that the only way to improve is to spend more money. This isn't necessarily so.

Significant improvements can be expected from efforts to take up the inefficient slack in public education. Rising enrollments have forced universities to depend more on educational television: efforts to more wisely deploy high school faculties has led to team teaching. In many cases the consequences of wise "economizing" have included increases in quality.

It is patent that practical educational innovation must be cost-conscious. This generation of tax payers is not likely to go much higher in their willingness to pay, yet more and more students confront the schools. The Institute sees this as a challenge, not a barrier.

Human resources are our most costly essential instructional resource. The wise deployment of the human in various instructional roles is the key to economy. The role of the "teacher" will require diligent theoretical and applied study. But it cannot be avoided. The sad fate of technological instructional advances has almost always been their accretion to the teacher role as *supplements*. Yet teachers themselves cry out for relief from some of the burden of their patchwork roles!

"Teacher" is not the only concept which must undergo change.

An efficient instructional system must be built from the "hard-nosed" answers to the question, "Exactly what is the learning to be gained?" These answers will be based upon a complete knowledge of the alternatives currently available among species of instructional components: What ways do we have to instruct for this learning? What learner characteristics must pertain? What are the results of clinical tests of the alternative procedures? In the course of the research needed to derive this sort of information it is likely that a number of new instructional systems or components of systems will be discovered or created.

The second task, therefore, is to develop concepts of instruction and instructional components which consider measures of effectiveness for particular learning problems and weigh these in terms of efficiency.

The Need to Evaluate Outcomes

Education as we know it in the United States, is essentially a social institution with imputations of human characteristics: emotional, generalized, adaptable, reasonably versatile and somewhat stubborn. And we like it the way it is! Or as least we like its good points! We resist thinking scientifically about the factors underlying instructional decisions.

Perhaps not being able to face up to the weaknesses of American education is a defensiveness born of kinship. Good or bad, it has served us well. But now we must look at the side. The outputs are not all good.

The American public has faced up to the inadequacies better than to the negative consequences. The First World War draft told of the intellectual deficiencies of those who had escaped the school's influence; the Sputnik incident dramatized our complacency about the need to modernize our curricular structure. These were inadequacies—they were faced hastily and forthrightly and "corrective" measures were promptly taken. But all along we have had large numbers of negatively influenced people—drop-outs" whose presence has been rarely discussed in polite company. These *products* of our schools are just now becoming a serious threat to the economy. So in this decade we begin frantic efforts to develop techniques for remediation and prevention.

The "drop-out" problem is but one example of the negative output of the school. Others can be found in those who "learn math", yet "hate" math". We still lack conceptual tools to evaluate the school in terms of inputs and outputs. This has not seemed very important.

We must seek an alternative to the standard procedure in school evaluation wherein we say, "You tell us what you are trying to do, we'll tell you how well you are doing it." Perhaps a better technique might be to say, "Don't tell us what you are *trying* to do until we look at what you are *actually* doing."

The third task, therefore, is to develop evaluative procedures which reckon the educational outputs of the school in terms of latent and manifest consequences, in terms of "positive and negative learning," so-called, and in terms of input-output relationships.

Summary

Our changing society and the increasing international tensions challenge the contemporary school beyond its capacity for change. The processes of change currently employed are essentially Darwinian. And they are too slow. Tomorrow promises acceleration of change in society. The School of Tomorrow must be characterized by a high degree of flexibility. This flexibility will be based on a tight linage between purposes and instructional procedure. Modifying, adding or deleting an objective will be immediately reflected in corresponding instructional system alterations. The human "teachers" will be serving as distinctive components in a man-machine network of instructional procedures.

The need for shift toward this sort of an instructional system demands that a number of schools ally themselves with appropriate research agencies to conduct the exploratory work which will ultimately culminate in the School of Tomorrow. In this project and toward these goals, Michigan State University *Needs You*!