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| AUTHOR | McDonald, Frederick |
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ABSTRACT

Only as psychologists participate in all aspects of teacher-training programs can a laboratory be created to test how psychological ideas are translated into teaching actions. Psychologists have information, ways of thinking, and ways of attacking problems that will improve teaching, but that information has to be learned to be used by the teacher. Understanding how people learn to think psychologically is and should be one of the major tasks of a psychologist. This task assumes even greater importance when the people are teachers whose work has numerous and significant psychological components. Research on this problem has both great theoretical and practical value. Theoretical order must be brought to the field so that we can do the kinds of experiments that will enable us to describe teaching behavior and its effects more precisely. The complex problems include study of the verbal discourse of the teacher, the emotive characteristics of teacher-student interactions, how teachers choose their profession, how this choice and its consequences relate to their personal development, and how complex teaching strategies are conceived and carried out. A twofold sequence is required: (1) conceptualizing how a psychological principle might be applied in teaching behavior and (2) devising the training method by which the application will become part of the teacher's behavior. (JS)

STANFORD CENTER FOR RESEARCH AND DEVELOPMENT

IN TEACHING

Research Memorandum No. 24

# Training Teachers as a Research Tool

by

Frederick J. McDonald

Stanford University

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School of Education
Stanford University
Stanford, California

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Although the question, "How do teachers learn to apply psychology to teaching?" is a perennial one and despite surveys which show that teachers think psychology is not very valuable for teaching, few changes have been made in how teachers are taught psychology. Two aspects of this situation are most distressing. First, no one, including those who bemoan taking psychology courses and are loudest in decrying their irrelevance, has ever clearly stated what is meant by the cliche, "is practical for teaching." Second, psychologists themselves have been unimaginative and desultory in their approach to the problem of the relevance of psychology to teaching. Most psychologists are seemingly uncommitted either to resolving it or to demonstrating that it is a pseudo-problem.

The question about what is practical for teaching ought not to be decided counting subjective impressions of value. By this test, most of a teacher's formal education is irrelevant to his teaching. Nor is it likely to be profitable to determine more precisely what it is teachers want or what it is that they think will help them. Teachers will continue to be suspicious of the practicality of psychology until it can be more prescriptive. Psychology probably will never be practical in the narrowest sense of prescribing rules for every contingency of classroom teaching; hence, will usually be criticized by those teachers who feel they need the minute and almost daily guidance of psychological seers.

Much of this criticism may stem from the attitudes toward teaching conveyed by psychologists. Many psychologists, and I am one of them, recoil at any suggestion that we specify instructional procedures. Specifying what to do in teaching is seen as tantamount to selling out to faddism, or as reverting to dispensing nostrums. Although this attitude in its most enlightened form has much to commend it, it cannot be allowed to create the impression that being specific

about what psychologists will and should recommend to teachers is beneath us.

Either psychologists are interested in improving instruction, where improvement is synonymous with being able to guide instructional practices concretely or they are not. Most of us interested in education are interested in improving instruction; hence, we must convey that our reluctance to lay out detailed lines of action for teachers represents how we see our present state of knowledge but does not represent our goals. What we cannot do today, we most certainly hope to be able to do tomorrow. We ought to strive mightily to correct false impressions of our purposes. We ought to eschew pseudo-scientific poses and academic double-talk.

The only viable position is to say that we have information, ways of thinking, and ways of attacking problems that will improve teaching. But here we fall into a trap if we are not careful. To have information which if used would improve teaching is not the same as improving teaching. That information has to be learned to be used by the teacher.

Therefore, irrespective of how developed psychology may be in terms of its propeudetic value for teaching, the basic problem remains--how is what we know learned in a way that it is used? This is an intriguing psychological question in itself. One can only wonder why so few psychologists have become interested in it.

My position on this problem is that understanding how people learn to think psychologically is and should be one of the major tasks of a psychologist; that this task assumes even greater importance when the people are teachers whose work has numerous and significant psychological components; that research on this problem has both great theoretical and practical value.

You will probably accept my assertions about the importance of this task if you believe that psychology as a science is likely to and ought to influence the everyday affairs of men. It is not necessary to support this position by elaborating analogies to the relations between the physical sciences and engineering or to those between the biological sciences and medicine, valid as these analogies may be. This is simply a belief, a conviction, that is at the core of the professional role of the psychologist. Although personal preference may dictate that one emphasize the scientific aspects of the psychologist's role, some among us must be deeply committed to this professional aspect of our role.

I hasten to add that this committment to making psychology relevant ought not to be interpreted as naive translation of psychological ideas into layman's language, nor as "bringing Christianity to the natives." It is not an excercise in spiritual uplift, nor a program for enlightening the masses. Rather, it stems from the observation that most human problems, particularly the problems of teaching and learning in the schools, are inherently psychological. They ought, therefore, to absorb the attention and to stimulate the interests of many psychologists.

My last assertion, that studying how teachers learn to use psychology is of theoretical and applied value, may be less obvious. The value of this research to applied problems also rests on the assumption that applying psychology to teaching will improve teaching. However, even if it would not, studying how any body of knowledge may be translated into teaching actions is of practical value because such research should improve the quality of teacher training.

Assume that after years of studying how teachers learn to use psychology we discover that psychological knowledge is worthless in teaching. Yet our work would not have been wasted. We would have learned how to train teachers to use professional knowledge.

Consider the nature of the psychology being learned. It contains propositions about how we perceive other persons and how this perception affects our behavior. Even if everything psychologists have to say on this topic were false, knowing how to train teachers to perceive differently would be necessary. We deny this statement only if we believe perceptions do not influence teaching behavior.

The psychology being taught also contains propositions about how people learn. Clearly, such knowledge, whatever its source, must be learned and used by teachers. I need not extend the illustrations. The point is that some kind of professional knowledge will be needed by teachers. How this knowledge is acquired is a problem amenable to the research strategies and techniques of psychologists. Whatever we learn about teaching psychology to teachers should be generalizable to teaching any relevant professional knowledge.

Studying the training of teachers has even greater theoretical importance. Teaching behavior appears to be complex sets of skills embedded in equally complex sets of decisions. The analysis of what these skills are and how they relate to learning is itself a challenging problem.

The teacher's verbal discourse provides a relevant example of the complexity. This discourse is patterned. Many suggestions on how to improve teaching (Sanders, 1966) are statements about the ways in which teachers ought to speak. We do think of a teacher's verbal behavior as a set of complex linguistic habits. What is the pattern or structure of these habits? Practically nothing is known about their topology.

Some hint of this complexity and hope for its elucidation appear in studies being conducted in the Explaining Project directed by N. L. Gage at the Stanford Center for Research and Development in Teaching. Most of this research has been generated by studying the behavior of twenty teachers, ten of whom were judged to

be the most and ten the least effective among a larger group. Mean pupil achievement scores on a test given after these teachers had lectured to their classes on the same topic were used to make the selection. Videotaped recordings were made of their lectures which were subsequently transcribed. Detailed analyses of both the verbal and nonverbal components of the teaching behavior of these teachers were then made.

Dell (1968) made computer analyses of these teachers' verbal discourse. His technique consisted in analyzing the words used by each teacher, counting the number of times these words occurred in each of a set of dictionaries developed for these analyses. He found a -.86 correlation between effectiveness rating and the number of vague words used--the most effective teachers used the fewest number of vague words.

Rosenshine (1968) counted a large number of verbal and nonverbal behaviors for those teachers. He chose categories for which there was some reason to believe they would discriminate the most effective from the least effective, although some of these categories had no more to support their supposed utility in teaching than the long-held belief of teachers that such behaviors "worked." Rosenshine found that frequency of "explaining links," gestures, and movements discriminated between the two groups.

The extent of our ignorance in this area is apparent when we have to test the beliefs of teachers. This is not a slur on these beliefs; but, when the major concepts analyzed in an area of investigation are those derived from commonsense conceptions, you can be almost certain that knowledge about the phenomena being studied is primitive and unsophisticated.

Another symptom of how little we know is that we are obliged to use the empirical-inductive method as our research strategy. Only when theoretical order is brought to this field, and there is some hope theory may bring such order (see McDonald, 1968), can we do the kinds of experiments that will enable us to describe teaching behavior and its effects more precisely.

These examples illustrate one kind of extraordinarily complex psychological problem that can best be studied by studying the verbal discourse of the teacher. Other equally complex problems are the emotive characteristics of teacher-student interactions; how teachers choose their profession and how this choice and its consequences relate to their personal development; how complex teaching strategies are conceived and carried out. Can anyone doubt that the study of these problems has theoretical importance for understanding human behavior? Their practical importance is equally obvious.

The studies cited can be used to make the major point of this paper and to extend the idea that I have been developing--that teaching is theoretically and practically important. Recall Dell's obtained correlation between effectiveness and vagueness (-.86)If it is replicated, this item of information will shortly appear in the lectures of educational psychologists and in textbooks in educational psychology. There will be much pious clucking about being less vague, buttressed by citations of "RESEARCH."

But the important problem has not been resolved. How do we train teachers to be less vague? It may be that simply telling teachers to be less vague will be an effective training technique. This seems most unlikely; even if it were so for this instance, it certainly would not be for all the other items of information and principles that we teach in a course in psychology. This training problem is a distinctive psychological problem which we psychologists have simply ignored. It too is replete with problems of theoretical and practical importance.

Recent research will provide a relevant illustration (McDonald and Allen,1967). We began to manipulate modeling and feedback variables to find which combinations were most effective in training teaching behaviors. To conduct our experiments, we had to choose some teaching behavior to be learned as the dependent variable. We selected easily observable behaviors thought to be highly relevant to pupil learning. For example, we trained teachers to reinforce students for participating

in class dialogues. Subsequently, we trained for acquiring various kinds of questioning behaviors and other techniques such as using nonverbal cues to elicit discussion. We call these various behaviors the technical skills of teaching. Their development by analysis and by attempting to train for their acquisition represents another way to attack the problem of identifying the critical teaching skills discussed previously.

One of our earliest observations, which is of practical importance, is that many trainees already possessed the relevant skill at the beginning of their training period. Although one expects a range of performances on behaviors to be learned we were not quite prepared to find that some individuals had reached criterion level performances. The consequence of this observation has been to stimulate our thinking about what the components of teaching skills might be and how they might be acquired in circumstances other than teacher-student interactions. Another consequence is that our experiments will now be conceptualized in terms of aptitude-treatment interactions. Finally, we are about to embark on individually prescribed training programs.

Each of these consequences starts a program of theoretical and experimental analysis more sophisticated than the work out of which it grew. They lead to substantial practical modifications of the teacher-training program. Thus, we learn more about teaching behavior as a complex skill, more about how it is learned, and more about how to create effective practical programs.

Our experimental work has been to find ways to 'make psychology practical.' Our work thus weds research to practical development and in the process we are learning ways to show the uses of psychological principles. The development of an experimentally-based training program has been the laboratory in which we have studied how to teach psychology so that it is used.

In one of our first experiments we found that a feedback condition in which an experimenter cued a teacher on positive instances of the desired behavior while viewing his videotaped teaching performance was a highly effective training condition. The behavior being learned was an application of reinforcement principles. In this case, the teachers were being rewarded for rewarding students for participating in teacher-student dialogues. In the most effective treatment teache were also cued on those places where they might have used the desired teaching behavior. Thus, the teacher trainees were being given practice and feedback on applying a psychological concept to teaching.

It may be of some interest to determine which is more effective, giving a description of the behavior to be learned and the related principles and evidence, or using a training technique similar to the experimental condition described. But, recall that many trainees already have the behavior in their reper toireso that we must be clear on what is to be learned in either case. Thinking about this problem should lead us to state what we expect the specific effects to be of describing the principles of reinforcement and applying them by giving examples. The outcome might reasonably be expected to be some increase in ability to use the concept independently across situations different from the training conditions; in other words, this aspect of instruction should produce transfer of training. The performance training is practicing the application. Without practice and feedback the trainee has no way of assessing his skill in applying the concept.

In other research we have studied the effects of various kinds of models on the learning of a teaching skill. The skills being learned are forms of questioning behavior which are presumably the components of inquiry-type teaching strategies We are in the midst of a series of studies to ferret out the most effective combination of conditions involving videotaped and written models. Videotape models of

verbal behavior are not uniformly effective, nor de we know how to use written or spoken instruction in a highly effective way.

Again, we are forced back to the question of what is being learned. Perhaps the initial training should be simply to produce questions without a class actually being present. Thus, the form of the question would be what is being learned, as well as distinctions among various types.

The second skill to be learned is how to combine these questions into strategies when questioning in a classroom. This second problem is more difficult because we have no formal way of conceptualizing these questioning strategies.

However, despite the problems involved in this research, it is clear that what it forces us to do is to think about what is being learned and how it can be learne Many different kinds of training techniques and conditions may be generated but they must be tested to see if learning of a specific teaching behavior occurs. Eac represents an attempt to think through how psychology might be applied and what needs to be done if teachers are to use the application.

A twofold sequence is required. First, we must conceptualize how a psychological principle might be applied in teaching behavior. Some of the ideas that we communicate in our courses will apply to how teachers plan, others to how they execute their plans, and still others to how they evaluate the effects of their teaching. In each case we should be able to specify how a principle or concept or fact may be used.

The second stage is probably more difficult--to devise the training method by which the application will become part of the teacher's behavior. The training research which I have described illustrates the possibility of attacking this problem, but it has been concerned with a limited range and one kind of teaching behavior. It does illustrate what we can learn if we become deeply involved in research on the training of teachers.

I propose that participating in all aspects of teacher-training programs, rather than being avoided by psychologists, become the means by which a laboratory for testing how psychological ideas are translated into teaching actions is created. We cannot expect to find psychological concepts applied systematically if we do not participate in those very processes which require application, the teaching activities of the teacher trainee.

I hasten to point out that our function in these programs should be what is most appropriate to our professional role, that of doing research on the processes of training. In this way, we can attack directly such diverse problems as how people learn complex skills and make complex decisions while we study both the utility of psychology when applied, and how people learn to apply it. One could hardly imagine a richer diet of research possibilities, challenging theoretical problems, and opportunities to make a practical contribution to the improvement of education. One can only wonder how such opportunities have been overlooked for so long.

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