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This article raises questions concerning the focus of research in teacher effectiveness.

Research in teacher effectiveness: A case of mistaken identity

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A common sense notion in teacher education goes something like this: "to discover the things we ought to teach teachers, we need to discover those teaching behaviors which seem to make a difference in student achievement and student satisfaction and teach them to teachers." As Francis Fuller and Oliver Bown have it in their contribution to the 75th NSSE Yearbook, we need to discover "what kinds of interventions by what kinds of interveners in what contexts elicit what responses from what subjects."

These discoveries will be made by using the methods of empirical science. Empirical science, the wonder-working steed, which has discovered so much about nature, will produce the necessary information about men and society.

As Robert Merton describes them, the social sciences have as their goal the discovery of theory. This theory is defined as "clear, verifiable statements of relationships between specified variables."² The unspoken assumption in the search for theory in the social sciences is that human endeavors are similar to natural events and therefore can be reduced to the same sorts of laws and theories as natural events. The lynchpin of this analogy is the notion that human behavior, like the behavior of molecules and atoms, is determined by external forces. Once all of the requisite conditions are met to boil the water, there is a high probability that the water will boil; once all of the requisite conditions are met for the student to learn, the student will learn. The task for the educational researcher, then, is to discover the requisite conditions for learning.

In teacher education, some researchers have been looking for those teaching behaviors which are associated with student gain and student satisfaction. One convenient compendium of such research is Dunkin and Biddle's *The Study of Teaching*.³ In this work may be found discussion and summaries of some hundreds of observational studies of classroom teaching. While this book is a worthwhile contribution to the literature of teacher education, it suffers from the difficulties that seem to plague research in teacher effectiveness—inconsistent results. It is common to find entries like the following in the summary tables:

- 1) Teacher's use of questions is unrelated to pupil attitudes, and, in contradiction, it is also found that higher teachers' use of questions is associated with more positive pupil attitudes.⁴ (Dunkin and Biddle, p. 139).
- 2) Experimental treatment given to teachers is unrelated to the amount of pupil initiation. In contradiction it is also found that Experimental treatment given to teachers increases the amount of pupil initiation.⁵ (Dunkin and Biddle, p. 141).
- 3) Teacher indirectness is unrelated to cognitive level of classroom discourse. In contradiction it is also found that greater teacher indirectness is associated with higher cognitive levels of classroom discourse.⁶ (Dunkin and Biddle, p. 115).

The general explanation given by social scientists for problems has two parts. Dunkin and Biddle describe the methodological problems—problems of sampling, research design and the like—and hope that as more work is done, these problems will be lessened. The other part of the explanation is historical. We have not discovered Newtonian laws for the social sciences as yet because we haven't been working at it long enough. In Merton's words, "Between twentieth century physics and twentieth century sociology stand billions of man-hours of sustained, disciplined, and cumulative research."⁷

It will be the purpose of this essay to suggest that some of the contradictory results in research on teacher effectiveness are rooted not solely in methodological or historical factors. Rather, it will be suggested, the contradictory results have their origin in a conceptual muddle which will not be resolved by methodological sophistication or by more investments in man-hours. The suggestion of the muddle is based on the work of Richard Taylor in his book *Action and Purpose*.⁸ It seems to me that Taylor provides us with a valuable insight into the nature of human action and purpose. His insights seem especially germane to discussions about teaching.

The Muddle

Science deals with facts. The theories of physical science explain relationships between facts. Heating a pan of water makes the water molecules move faster. (Or, when the pan of water is heated, the water molecules move faster.) In order for the scientist to create his clear statements about the relationships between the specified variables, he must be able to translate the verbal description into a factual description. Water becomes H₂O and heat becomes degrees Celsius. A statement about H₂O needs less inference than a statement about water. Low inference statements mean that investigators can be more or less certain that they are dealing with the same quantities as other investigators. So much HCl (of a certain

standard of purity and concentration) will react with so much CU (of a certain purity) to form so much H₂ and so much CuCl and so much heat.

The ability to reduce general statements to tangible quantities is crucial to scientific investigations. The social scientist who wishes to use the methods of empirical science must abide by its canons. Researchers in teacher effectiveness recognize this imperative. Investigators of "higher order questions" or "teacher indirectness" recognize that they must reduce these general statements to tangible quantities. The variables must become "low inference" variables. This is done by reducing the general statements like "higher order questions" to certain behaviors—to movements which signal "higher order question" or "teacher indirectness." In the Flanders Interaction Analysis Categories system, for example, one category of indirect teacher influence is described as follows: "praises or encourages students action or behavior. Jokes that release tension, not at the expense of another individual, nodding head or saying "uh huh?" or "go on" are included."⁹

Richard Taylor makes a distinction between human movements and human actions. Movements are events like the beating of a heart or the growth of hair. Such movements can obviously be reduced to tangible quantities. For example, it is known that the pH of normal blood ranges from 7.39 to 7.41. The CO₂ combining power (venous plasma) is 50-70 ml/100 ml of blood = 21 - 30mEq/L.¹⁰ Taylor distinguishes such movements from purposeful human action. Unlike movements, human actions are goal directed. "My heart beats" describes a movement. "I am reading a novel" describes an action which is directed toward a goal—"I want to read the novel." My movements to get a book are means to my goal but they are meaningless in and of themselves. Actions have intentions behind them. Intentions cannot be discovered by observing one's movements:

They are notions that are **read into** a situation . . . and never concepts that are empirically **derived** from any situation. They are, in fact, derived entirely from one's own understanding of himself as a purposeful being. But one never **observes**—notes, notices, infers from signs—that he himself is trying to accomplish something, that it is striving toward an end or a goal. He sometimes knows that he is, but not **that way**.¹¹

Here then is the muddle. Events which may be purposeful—like teacher use of higher order questions—are treated as though they are simple movements. When an investigator reduces the concept of "higher order question" to its low inference movements, he misses the intention. Indeed, it is impossible for him to discover the intention no matter how careful he is to define and describe the movement. The contradictory results about higher order questions reported in Dunkin and Biddle might come from the undiscovered intentions of the teachers and the students in the studies. As recently as 1976, higher order questions were still giving investigators problems. Barak Rosenshine commented that "The lack of significant

results for complex or higher level questions has puzzled all the researchers, and has led us to conclude that we need to rethink what is meant by types of questions and their effects."¹²

A more careful definition of "higher order" questions in purely behavioral terms will never solve the problem of what a "higher order" question is. Of all human endeavors, language is at once the most human and the most dependent upon the intentions of both speakers and listeners. While much language "behavior" is little more than formulaic—we communicate with each other in unambiguous formulae—it is difficult to carry on much communication that is interpretable in terms of pure formula. A simple question when judged by its syntax (inversion of the subject and verb) may or may not really be a question. "Isn't it a nice day?" "Am I going to the store for a carton of milk?" Without an understanding of purpose or intentions on the part of the speaker (an understanding that does not come from empirical evidence), much language becomes an uncomprehensible verbal hash.

—The shooting of the hunters was terrible.

—My love is like a red, red rose.

—His sins were scarlet but his books were read.

The failure of translating computers perhaps exemplifies the problem of attempting to rely on purely behavioral information in the interpretation of language.

Does intention really make a difference to the common sense notion set forth at the beginning of this essay? What difference does it make if we can identify certain behaviors that seem to be associated with student success if we don't perhaps know what the behavior is?

It makes a great deal of difference. If one is going to operate by the canons of empirical science, one must operate by them. Unless a general concept can be translated into low inference behaviors, then it is impossible to know whether one has that behavior. So long as general conceptions about human behavior can only be partly translated (into movements rather than into actions), it is impossible to know what one is observing.

Consequences of the Muddle

The danger in all of this is perhaps in the promise that someday teaching will be based on research of the sort reported in Dunkin and Biddle. What if research continues to show no positive effects from higher order questions? Will colleges of education begin to teach their students to ask only factual questions (for which there is support in the research literature)? The focus of research in teacher effectiveness shifts over the years. In the 1960's research was looking for teacher effectiveness in terms of affect, indirectness and the like—the intentions of the time. More recently, research is "finding" that the best teaching is direct and carefully structured. Is the research simply reflecting once more the shift in intention in a country interested in "back to basics" and accountability? So long as we ignore human purpose, research becomes a mask, a cloak, a way to make desires into facts—desires which may be pure or foul. Science becomes dogma.

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Footnotes

1. Francis F. Fuller and Oliver Bown, "Becoming a Teacher," in **Teacher Education: The Seventy-fourth**

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2. Richard J. Bernstein, **The Restructuring of Social and Political Thought**, (New York, 1976), p. 9.
3. Michael J. Dunkin and Bruce J. Biddle, **The Study of Teaching**, (New York, 1974).
4. *Ibid.*, p. 139.
5. *Ibid.*, p. 141.
6. *Ibid.*, p. 115.
7. Bernstein, *op. cit.*, p. 8.
8. Richard Taylor, **Action and Purpose**, (Humanities Press, Atlantic Highlands, N.J., 1973).
9. Dunkin and Biddle, *op. cit.*, p. 102.
10. David N. Holvay and others, **The Merck Manual of Diagnosis and Therapy**, (Rahway, New Jersey, 1972), p.370.
11. Taylor, *op. cit.*, p. 243½.
12. Barak Rosenshine, "Recent Research on Teaching Behaviors and Student Achievement," **Journal of Teacher Education**, Vol. XXVII, No. 1, (Spring 1976), p. 63.