Researchers use five different approaches as they try to learn more about what makes a good teacher.
The quantitative approaches are the Process-Product Approach, the Aptitude-Treatment-Interaction Approach, and the Carroll Model Approach. The qualitative approaches are the Ethnographic Approach and the Cognitive Information-Processing Approach.

Quantitative Approaches

The three quantitative approaches to research on teaching share several goals and assumptions. First, the object of the research is to discover laws or law-like statements about the relationship between teacher behavior and student achievement. These laws are expected to be applicable over a wide range of circumstances, that is, the search is for general laws. Second, there is an emphasis on observable behavior, particularly that of the teacher. Third, researchers analyze the act of teaching into many component parts or variables, with examination of only a few of these variables in any single study. Finally, the generally accepted criterion of excellence for research findings is the replication of those findings in subsequent studies.

The Process-Product Approach differs from the other quantitative methods in that research questions are more concerned with the average amount of learning or achievement accomplished by a group than with measuring, predicting, or explaining individual differences in learning due to teacher behavior. Researchers in this tradition are more interested in what teachers and students have in common than how they are different.

A typical process-product study consists of operationally defining a teacher behavior variable (such as teacher praise) or set of variables, counting the frequency with which that behavior occurs in many classrooms for a fixed period of time, and statistically correlating the frequency of teacher behavior with average student achievement scores measured at the end of the observation period. A statistically significant positive correlation between, say, teacher praise and reading achievement, would suggest that the more effective teachers use more praise. Experimental designs have also been used in which the teacher behavior of interest is controlled at specified levels rather than allowing it to vary naturally. From such experimental studies it is possible to draw strong inferences about the cause-effect relationship between teacher behavior and student achievement.

Researchers who use the Aptitude-Treatment-Interaction (ATI) or the Carroll Model Approach are concerned with adapting teaching to individual differences in students, but in distinctly different ways. ATI researchers believe that their research will identify instructional methods (treatments) that are particularly suitable for students who have specific personal characteristics (aptitudes). The guiding question for ATI research is, "Which teaching method is best for which kinds of students?" In contrast, researchers in the Carroll Model tradition believe that the single most important factor in explaining, predicting, and controlling student achievement is time for learning. Therefore, this kind of research primarily investigates ways for teachers to optimize the amount of time that each student spends on each learning task, with the goal of maximizing achievement for all students. Implicit in the Carroll Model Approach is that the effects of student aptitudes of interest to ATI researchers can be wiped out by the powerful treatment of differential, individualized learning time.

We have learned a great deal from primarily quantitative research on teaching in its various forms. Process-Product, ATI, and Carroll Model researchers have described classroom interaction systematically and in great detail. We have seen the great natural variation in what teachers do and, especially through training experiments, have learned a great deal about how to change and shape teacher behavior. But mul-


3 John B. Carroll. "A Model of School Learning." Teachers College Record 64:723-33; 1963. In his seminal paper, Carroll proposed that school learning can be accounted for in terms of five factors, all of which are expressed in units of time. More recent research and development in this tradition include the work of Benjamin S. Bloom and his colleagues on mastery learning. David Wiley and Annegret Harnischfeger's policy research on length of the school day and school year, and the work of the staff of the Far West Laboratory for Educational Research and Development Beginning Teacher Evaluation Study.
tiple studies of a few teacher behavior variables have turned up inconsistent results, and no general laws of the sort once hoped for have emerged from this body of work.

In the face of this situation, many quantitatively-oriented researchers remain undiscouraged. Attempts have been made to re-interpret this body of literature using statistical techniques such as a meta-analysis in which the results of many different studies of ostensibly the same variables are combined to permit more general and global conclusions than are possible from a few studies. Others advocate greater sophistication in classroom observation instruments including the tracking of individual students in their interaction with the teacher. Still others suggest that experimental rather than correlational research will sort out the causal links between teacher behavior and student achievement. The quantitative research going on today is an order of magnitude more sophisticated than studies conducted five or ten years ago.

Qualitative Approaches

Other researchers on teaching have responded to the disappointments of primarily quantitative research in a different way. Rather than asking "What works?" or "What works with whom?" this new school of thought asks "What is happening here and why?" The main goal of this kind of inquiry is understanding the reasons why teaching as it is as it is. This primarily qualitative research comprises the Ethnographic Approach and the Cognitive Information-Processing Approach to research on teaching.

Like the primarily quantitative paradigms, these two approaches share some assumptions and values. Teacher and students are seen as purposive agents whose thoughts, plans, perceptions, and intentions influence their behavior and moderate the effects of behavior. The social context in which teaching and learning take place is considered an important source of explanation for classroom phenomena. Much of this research is descriptive rather than prescriptive, and the description depends, in part, on teachers' and students' reports of their thinking, reasoning, and understanding of a given situation.

The Ethnographic and Cognitive Information-Processing Approaches differ in their disciplinary heritage and in some of their methods of inquiry. Ethnography has its roots in anthropology and was developed and used to study cultures, particularly foreign cultures. The methods of participant observation, field work, use of informants, and derivation of hypotheses from analysis of field notes have been refined and modified to fit the more familiar context of American schools. The ethnographer is committed to studying a whole social system by portraying it in terms credible to and understandable by participants in that system. Indeed, major questions in most ethnographic studies have to do with locating the boundaries of the "whole" and identifying the web of meaning shared by teachers and students.

In the Cognitive Information-Processing Approach, there is a great deal of interest in basic psychological processes thought to occur in the mind of the teacher that organize and direct his or her behavior. The implied model of teaching is that the teacher is a rational and intelligent individual faced with a very complex situation. The way that a teacher or any other rational agent deals with complexity is to simplify it in some rational and adaptive way. In the language of cognitive psychology, the teacher enters a complex task environment and simplifies it by defining some small part of it as the problem space within which he or she will work. The basic psychological processes that affect how a teacher simplifies a task environment include judgment, decision making, attention, and short-term and long-term memory. Most of these basic processes have been investigated in the psychology laboratory, but none have been thoroughly studied in realistic and complex educational settings.

Basic psychological processes like teacher judgment and decision making do not operate in a vacuum. Researchers using the Cognitive Information-Processing Approach must attend to the psychological and ecological context in which basic processes are embedded. The psychological context for teacher judgment and decision making is made up of the teacher's implicit theories or beliefs and values about

7 A special issue of Anthropology and Education Quarterly 8(2); May 1977, is devoted to exploring qualitative/quantitative research methodologies in education.
new from ERA Press
BUILDING MOTIVATION
IN THE CLASSROOM
by
Robert C. Hawley & Isabel L. Hawley

A STRUCTURED APPROACH TO IMPROVING STUDENT ACHIEVEMENT in academic work using the Hawley Comprehensive Motivation Planning Cycle. Covers both the theoretical background and the practical application of this proven approach. Over 100 specific suggestions for establishing a positive learning climate, setting direction, accomplishing tasks, and evaluating progress. A valuable tool for teachers at all levels.

ORDER FORM
To: ERA Press, Box 767, Amherst, Massachusetts 01002
Please send me copies of BUILDING MOTIVATION IN THE CLASSROOM at $9.95 per copy, plus $1.00 for postage and handling.
□ My check for is enclosed.
□ School purchase order # is enclosed.

Name __________________________
Address __________________________ (zip) ________

My identification of five approaches to research on teaching is somewhat arbitrary and personal and you may come up with a sixth or seventh approach or combine two or three of mine into a single approach. My purpose is to communicate the way that I categorize approaches to analysis of teaching in the hope that the concepts, distinctions, and methods of analysis will be helpful to you as you seek answers to theoretical and practical concerns. Educational research and practice cannot help but profit from a multiplicity of recognized and complementary ways of studying teaching.
