

The Functional Paradigms of Teachers

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This article addresses the problem of redirecting research on teaching from an emphasis on *how* classrooms function to one on *why* they function in particular ways. The proposal is based on a reformulation of the concept of "paradigm" as it applies to the study of teaching. The basic proposition is that paradigms should be considered as characteristic of the community of practitioners as well as of the community of scholars. It is argued that an attempt to identify the features of the "functional paradigms" of teachers would help redirect our thinking towards explanatory principles rather than descriptions of classroom functioning.

Illustrative research examples are given to demonstrate how the implementation of educational innovations is a possible strategic area for the investigation of functional paradigms. It is also suggested that an examination of the contrast between the precepts of teacher educators and those of teachers would be a second strategic area. Finally, the issue of how established paradigms are perpetuated through the use of models or exemplars is addressed.

Cet article aborde le problème de la réorientation de la recherche en pédagogie en termes d'une importance moindre à accorder au *comment* les classes fonctionnent, et d'un accent à mettre sur le *pourquoi*. Elles fonctionnent de certaines façons particulières. Le changement proposé s'appuie sur une reformulation du concept de paradigme tel qu'il s'applique à l'étude de l'enseignement. Fondamentalement nous considérons que les paradigmes doivent être envisagés comme caractéristiques des praticiens aussi bien que des chercheurs. Nous soutenons qu'un effort d'identification des particularités des "paradigmes fonctionnels" des enseignants contribuerait à diriger notre réflexion vers des principes explicatifs plutôt que vers des descriptions du fonctionnement des classes.

Nous démontrons à l'aide d'exemples de recherches que la mise en application des innovations pédagogiques constitue un domaine stratégique auquel l'analyse des paradigmes fonctionnels peut s'appliquer. L'analyse comparative des préceptes de ceux qui forment les enseignants et des enseignants eux-mêmes constitue un autre de ces domaines stratégiques. Enfin, l'article aborde la question de la transmission de paradigmes bien établis par le moyen de modèles et d'exemples.

Efforts within the past two decades to investigate classroom processes have yielded many insights into how teachers and students function in ordinary classrooms and, in particular, how the classroom processes and student outcomes relate. At the same time, there have been repeated calls for, and attempts at, theory development in the field (Gage, 1963; Snow, 1973; Dunkin & Biddle, 1974; Doyle, 1978; Winne & Marx, 1977). Unfortunately the research emphasis upon the process-product dimension has made us lose sight of the much more fundamental question of why classrooms function as they do. The preoccupation with the "how" question tends to

narrow the field to a branch of engineering whereby the main issue becomes the search for teachers behaviours that “work,” in the sense of enhancing student achievement. This, in turn, reduces the data base that can be used for theory building and confines our explanatory efforts to accounting for process-product relationships. An example of this is the recent emphasis on what has come to be called a “direct instruction” model of teaching. While this is a convenient model, and it does seem to give an adequate synthesis of the results of the process-product studies, in adhering to this model one risks a further entrenchment of the status quo in the classroom, and the creation of a climate in which innovation becomes impossible. It is certainly too early in the history of teaching research to accept as definitive the idea that direct instruction leads to optimal learning, much less to assume that all classroom instruction is, or ought to be, directed towards learning in the conventional sense.

This article is concerned to refocus attention on various types of classroom functioning. Specifically, an attempt is made to reformulate the concept of a “paradigm” as it relates to the study of teaching. This reformulation involves a shift away from the notion of a paradigm as a guide for research and towards what are called the “functional paradigms” of teachers. The question of identifying such functional paradigms is elaborated using examples from recent studies. These examples illustrate how examining functional paradigms can be useful in guiding theory and how possible “strategic sites” can be found for the study of functional paradigms.

MODELS, PARADIGMS AND THEORIES

Most teaching research is based, either implicitly or explicitly, on a “model” in which classroom processes are seen as determined by various antecedent conditions and classroom processes are assumed to be the determinants of student outcomes. What we may term the “minimal model” for research on teaching thus incorporates what Dunkin and Biddle (1974) call the presage/process/product sequence. Various elaborations of the minimal model may develop, as attempts are made to identify particular variables within each of the three major components of the model. Also, of course, specific research studies may emphasize a component of the model or may concentrate on specific relationships between components. In recent years, for example, the dominant emphasis has clearly been on process/product relationships.

This use of the term “model” implies an organizing framework or schematic representation which identifies the essential elements of the field of investigation. Such models, in fact, are typically represented as schematic diagrams, using the usual blocks, arrows, concentric circles, and the like to capture essential elements and patterns of relationships. There is, however, a second use of the term “model” in relation to the study of teaching. This

usage is represented, for example, in the attempt by Joyce and Weil (1972) to provide a summary of teaching styles and methods. For Joyce and Weil, a model of teaching is not a schematic representation but rather an idealized teaching style, an exemplar for practice. A model for teaching is thus not the same as a model for research on teaching. However, the idea of a model as an exemplar has an important function in the following discussion of functional paradigms.

Recent commentaries on research on teaching have made much use of the term "paradigm" (Gage, 1978; Doyle, 1978). In some instances (Winne & Marx, 1977), the terms "paradigm" and "model" have been used more or less interchangeably. In other contexts, especially in discussing the natural sciences, the term paradigm has been taken as essentially synonymous with theory (or at least with theory on a grand scale). Although important distinctions can be made amongst the notions of model, paradigm, and theory, I do not wish to elaborate on these distinctions. It is more fruitful to explore more carefully the meaning of the term "paradigm" and to distinguish a use of that term serving to reorient our thinking about classroom functioning.

The concept of a paradigm came into general use through the work of Thomas Kuhn (1970). An important extension of Kuhn's ideas, with specific reference to social systems, has been made by Imershein (1977). Imershein has developed the idea that organizational change can be interpreted in terms of "paradigm shift" in the same sense that Kuhn has developed this concept to account for progress in the natural sciences. Before turning to the question of how the concept of a paradigm in the study of teaching can be reformulated, it is necessary to elaborate somewhat on the concept as it is discussed in the works of Kuhn and Imershein.

PARADIGMS AND PARADIGM SHIFT

In his postscript to the second edition of his book, *The Structure of Scientific Revolutions*, Kuhn (1970) attempts to clarify his usage of the term "paradigm." Two distinct forms of usage emerge. First, a paradigm is viewed as that which unites a community of scholars. The second meaning refers to the "shared examples" which characterize a particular branch of science.

Kuhn acknowledges the assertion by his critics that a circularity exists in first using a paradigm to identify a community of scholars and then using the existence of the community of scholars to define a paradigm. This circularity is resolved by arguing that there are means other than a paradigm by which a community of scholars may be identified. In particular, Kuhn introduces the concept of an "invisible college," defined in terms of mutual citations, informal communications networks, and the like, as a means of identifying the members of a particular community of scholars. Once so

identified, then the common problems, methods, and theories of the group can be used to describe the features of the shared paradigm.

Kuhn's second use for the term paradigm is also relevant to this discussion. For Kuhn, who draws most of his examples from the natural sciences, the idea of *shared* examples implies the recognition of a new problem as a further instance of something already familiar. It is thus possible to apply known methods of analysis, general laws or theories to the new problem. This, in fact, is the essence of what Kuhn calls the "puzzle-solving" nature of normal science. The underlying principles do not come under question by the practitioners of normal science. Rather, such practitioners are engaged in solving new puzzles by using familiar principles.

In most of the examples used by Kuhn, paradigm can be taken as nearly synonymous with theory. Nevertheless, there is nothing in Kuhn's exposition to make this equivalence part of the essential nature of a paradigm. In the study of teaching, for example, scholars can be united by a *method* such as direct classroom observation or a commitment to seeking process-product relationships. A paradigm for research on teaching is thus not the same thing as a theory of teaching. And herein lies the problem. As long as communities of scholars are united by paradigms which are nontheoretical in character, the ability to develop theory is seriously impaired.

A reformulation of the use of the term paradigm in research on teaching, however, can set us on a path towards more theoretical thinking. This reformulation is essentially one that directs us to look at the features that unite a community of practitioners rather than the community of scholars who study these practitioners. Fortunately, the groundwork for such a reformulation has been set forth in a paper by Alan Imershein (1977).¹

Imershein's thesis is that members of a social organization can be considered to operate under a shared paradigm in a manner analogous to that of a community of scientists. The paradigm determines the range of behaviour considered acceptable, and sets the rules for the kinds of activities that occur. When faced with an unfamiliar or anomalous situation, members of an organization first attempt to resolve the situation using the rules of existing paradigms. In particular, problems are resolved by moving by analogy from a familiar application of "exemplar" to the new application, in much the same way that normal science engages in puzzle solving. It is only when this form of problem solving breaks down that the pressure arises to reconsider the prevailing paradigm. Imershein illustrates his thesis with an example of organizational change in health care delivery services. However, comparable examples include the reaction of labour unions to technological change, railways to air transportation or, closer to home, teachers to curriculum change.

Imershein argues that in the case of health care, little has developed in the way of explanatory principles to account for problems of change or to predict the likelihood of change occurring. This problem occurs in the study

of teaching when we ask, for example: "Why is the recitation the dominant teaching model?" or "Why do primary school teachers group students for reading but not for mathematics?" Imershein's recommendation that "research on organizations focus more on the structure and use of organizational knowledge" would serve us well in the study of teaching. In particular, this proposal suggests that research on teaching be directed towards identifying what may be called the "functional paradigms" of teaching, and then using such paradigms to help explain classroom functioning.

THE FUNCTIONAL PARADIGMS OF TEACHERS

Following Imershein's line of argument, it is assumed that teachers are, indeed, similar to other communities of scholars or practitioners in that they share common goals, problems, exemplars, routines, etc. which constitute a "functional paradigm." The use of the term "functional paradigm" is meant to convey the idea that the characteristics which unite a community of practitioners are likely to be centered on practical matters.

The notion of a functional paradigm immediately suggests that research ought to depart from its conventional emphasis on differences between teachers, instead focusing on their commonalities. In fact, it might be argued that the conventional approach has prevented us from finding, or even seeking, explanatory principles. To seek process-product relationships, for example, requires a measurement of processes for which some variance can be expected. To seek explanatory principles, on the other hand, implies that we attempt to find what might be invariant across teachers. Indeed, some of the most useful propositions we have about classroom instruction (such as Flanders' rule of two-thirds or Bellack's solicit-respond-react cycle) are notable more for their universal character than for their variance.

Again analogous to science is the idea that the essential features of a functional paradigm can be made more explicit by examining the anomalies that exist within the system. In science such anomalies are usually observed phenomena unaccounted for by the prevailing paradigm. For example, early particle optics was unable to account for the phenomenon of interference. In a social context, a parallel can be found perhaps in attempts to implement changes in the prevailing system which represent a challenge to the prevailing paradigm. This suggests that the context of implementation of innovations may represent a "strategic site" for the study of functional paradigms. The essential features of such paradigms are much more likely to be laid bare under conditions of change. This point may be illustrated by reference to a few specific studies.

SOME RESEARCH EXAMPLES

In a recent study (Crocker, 1979) some 90 teachers and principals in 30 schools were interviewed in an attempt to assess the impact of an elemen-

tary science curriculum project sponsored by the Department of Education in the State of Queensland, Australia. The project was aimed at promoting a set of guidelines for science teaching incorporating scientific processes, first-hand experiences, pupil use of apparatus, discovery learning, and other features that have become the stock in trade of science curriculum developers and teacher educators. At the same time, an attempt was also made to encourage school-based decision making about the specifics of the science curriculum. This was in keeping with a general policy of the Department of Education to decentralize much of the decision making about curriculum. This combination of aims was fortuitous because it afforded a unique opportunity to probe the thinking of teachers as they confronted both the curriculum principles at hand and the need to decide about adopting or developing their own programs. Some of the results of that study help to identify the features of the functional paradigm of this group of teachers.

First, schools most commonly chose to adopt a commercial science program. Often, this choice was made without reference to compatibility with the guidelines. Rather, decisions were made on the grounds of manageability, ability to strike a deal with a publisher, existence of student textbooks, and the like. The alternative of developing a program was rarely chosen, and when it was the program tended to consist of a catalogue of topics to be covered rather than a set of activities emphasizing processes, discovery, and other components of the guidelines.

Teachers expressed a strong desire for a high degree of prescription in the curriculum, whatever its source. At the same time, teachers wished to be allowed to choose among suggested topics and activities, and particularly, to be able to opt out of activities judged inappropriate. The desire for prescription contrasted with teachers' perceived freedom, under prevailing conditions in the system, to teach science in any way they saw fit. Despite the guidelines, and the existence of consultants, project staff members, and inspectors, all concerned with the teacher's activities, teachers appeared not to feel compelled to treat science in any particular way. The only limitation was that they did not believe they had the option of not teaching science at all. Here, the existence of timetable guidelines issued by the Department of Education was regarded by teachers as a prescription for the teaching of some form of science.

Teachers expressed considerable opposition to group work, discovery learning, pupil use of apparatus, and other aspects of science teaching central to the guidelines. Teacher objections were based on management, discipline and control, perceived inability of most students to operate without direct teacher guidance, concern for efficiency in covering content, and similar considerations. In short, the governing principles used by teachers in their view of curriculum were entirely at variance with those of the curriculum developers. While this may seem a major source of dissonance between the groups, teachers were not especially concerned about this incom-

patibility, since, as already mentioned, they perceived themselves free to treat science as they wished, notwithstanding the guidelines, as long as they could demonstrate that it was being taught.

It is tempting to interpret these findings simply in terms of "autonomy in the classroom" as the basic feature of the functional paradigm of teachers. However, results from other studies suggest that autonomy may be subject specific. For example, interviews conducted during the Teaching Strategies Project² indicate that teachers are much more constrained in mathematics by the mandated curriculum than in other subjects such as science or social studies. The functional paradigm is thus linked to perception of the relative strength of the curriculum mandate in different subjects (and possibly also in different grade or school system contexts).

What does emerge, however, is a concern with content coverage, management, and clarity in the curriculum mandate, as elements of the functional paradigm. In addition, the prevalent view was that students must be subject to direct instruction and that many students could never learn without direct teacher intervention. To understand these perceptions is to understand the nature of the gap between teachers and curriculum developers. Beyond this, these perceptions help account for a number of aspects of classroom functioning, including teacher dominance, whole class teaching, limited use of nonprint materials, and the like.

Concern for slow learning students was a theme that emerged from the Queensland study. This theme was even more evident in the Teaching Strategies Study interviews. Teachers gave many indications that this was one of their overriding problems. Most teachers indicated, in one way or another, that they needed to give special attention to such students. Interestingly enough, however, this concern tended to manifest itself directly, as in grouping or differentiated materials, only in the teaching reading. In particular, differentiation rarely occurred in mathematics, despite the commonly held view that many students experience serious mathematical difficulties. Unfortunately, the data did not establish whether teachers share the conventional wisdom about student difficulty in mathematics. What is clear is that the functional paradigms of teaching provide for explicit differentiation of students in reading but not in mathematics.

In a study that examined classroom processes more directly, Oakley and Crocker (1980) looked at teacher/student interaction in elementary science classes involving laboratory activities by students working in pairs. In particular, differences in teacher/class, teacher/group, and student/student interactions were examined. The investigators encountered some difficulty in locating classes operating in this manner, despite the fact that the science curriculum used in the local school system included the small group work as one of its essential features. This again illustrates the contrast between teacher paradigms and those of curriculum developers.

The important finding of that study in the context of this discussion is

that teacher/class and teacher/group verbal interactions were essentially the same in nature, while student/student interactions were quite different. In both teacher/class and teacher/group interactions the teacher did most of the talking, the characteristic solicit-respond-react cycle was evident, and students clearly cast themselves in a role subordinate to that of the teacher. The pervasiveness of established teacher and pupil roles was quite evident, despite the major change in the surface features of the class setting. Moving to small group work in elementary science is, in itself, a problem. Once group work began, teachers clearly attempted to orchestrate the work much as if each group was a whole class.

A further example is offered by Elliott's (1977) account of an action research project intended to explore problems of implementing an inquiry/discovery approach to teaching. The project was especially concerned with having teachers reflect upon the problems associated with such an innovation. This study was thus an excellent site for investigating functional paradigms. Forty teachers were invited by Elliott's research group to take part in a complex round of conferences, observation, and feedback in order to explain the meanings attached to inquiry/discovery teaching and to identify behaviours that prevent such an approach from becoming operational in the classroom.

The study suggested, first, that teachers engage in characteristic behaviours interpreted by students as conveying an expectation of teacher-directedness. This generalized expectation can be a source of dissonance if an attempt is made to change. In fact, one can hypothesize that students can "read" the functional paradigm of the teacher in order to conform to this paradigm. Going even further, to the extent that there are commonalities in the functional paradigms of the teachers with whom a student has contact, during, say, the elementary school years, a powerful expectation effect is likely to be created. This is analogous to Kuhn's argument that established scientific paradigms are self-perpetuating in that these paradigms are encoded in the textbooks, lectures and the other apparatus which transmit scientific knowledge.

The major part of Elliott's report consists of a series of hypotheses about the factors contributing to change in teacher practices. These hypotheses concern teacher self-monitoring, reducing the influence of teachers' personal identity on behaviour, access to other teachers, teachers viewing themselves as researchers, and the like. In short, inherent in these hypotheses is a prescription for paradigm change on the part of teachers. While Elliott's study does suggest that such paradigm change is possible, the study also points to the intensive effort necessary to bring about such change. Unlike the constantly reinforced established paradigm, competing paradigms receive little attention under ordinary classroom circumstances or even under the ordinary process of curriculum innovation.

A third example is a study by Sharp and Green (1975). The setting is

a British "open" primary school. This study illustrates how teachers' functional paradigms reflect their views of students and of students' family circumstances, teacher power within the school, the consonance of teachers' views of schooling with the prevailing ethos of the school, and similar factors. Again, the study points to the gap that can arise between the goal and the reality, with teachers interpreting the aims in terms of their own functional paradigm. In this case, teachers behaved in similar ways in the classroom, despite different professed views on open education. The desire for structure and direct teacher involvement in student activities seems to override the more diffuse prescriptions for classroom behaviour inherent in the open education model. Again evident is the concern of teachers that many students are simply poor learners. This study suggests that teachers perceive the problem's source in the family backgrounds of students. A possible hypothesis is that the attribution of learning failure to home circumstances may be an important facet of the functional paradigm of teachers.

CONCLUSION

The premise of this article is that prevailing paradigms for research on teaching have led to a research mode favouring the question "How do classrooms function?" rather than "Why do classrooms function as they do?" While the first question can be answered empirically, the second requires theoretical insight as well as empirical data. Perhaps we now know enough about the "how" question to begin to find explanations for classroom functioning. It is especially important to move in this direction to understand the limits of possible change or the structural alterations required to change classroom functioning, and ultimately to go beyond incrementalism to improved teaching.

The basic proposition developed here is that we should redirect research towards identifying what I call the functional paradigms of teachers. Much can be learned from Kuhn's approach and from Imershein's analysis, both in substantive and methodological terms. The assumption is that teachers' reasons for engaging in certain patterns of behaviour can be discerned by tracing the factors considered important by teachers for classroom functioning. Certain common concerns, such as content coverage, slow learning students, the importance of management considerations, and the like were evident from given examples. Further research, which addresses directly the problem of teacher paradigms, would no doubt reveal such elements.

The self-perpetuating nature of prevailing paradigms is an issue of considerable importance. Scientific paradigms become self-perpetuating through the practice of normal science and the mechanisms for the transmission of knowledge. Similarly, one would expect that the perspectives of teachers would be strongly influenced by those responsible for training new members of the profession. On the other hand, conventional wisdom

holds that teachers are, in fact, little influenced by teacher education, and are more likely to teach as they themselves were taught. It might be argued that teacher education institutions challenge the established paradigms of the profession. For example, consider elementary science where notions of discovery learning and first-hand experiences have long been held as basic to the teaching of science. These principles, however, clearly conflict with the established teaching principles.

There is, of course, a fundamental difference between the perpetuation of scientific paradigms and those of a profession like teaching. New members of a scholarly community tend to remain within the setting of that community as their careers become established. A physicist, for example, will continue to work in a laboratory, read the same journals, and interact with the same colleagues or ones of a similar persuasion. Teachers, on the other hand, find themselves in a different setting upon completion of the teacher education program. This setting is familiar, since all teachers have been former students in elementary and secondary schools. The conditions for perpetuating an established teaching paradigm are likely to be stronger than any pressure for paradigm change that might occur in teacher education.

As the above research examples illustrate, the implementation of innovations offers a "strategic site" for the study of functional paradigms. The teacher education setting may offer a second such site. If the differences between practising teachers and teacher educators could be fully elaborated, this could shed considerable light on the functional paradigms of both groups. Again, the point is that the essence of a paradigm is best illustrated by contrast with a competing paradigm. This may account for the difficulty in using studies of classroom processes to explain these same classroom processes. No point of contrast is available. The few studies which attempt to examine classroom processes in the context of educational innovation (Stallings & Kaskowitz, 1974) have been more powerful than more conventional descriptive studies.

Certain studies have shown the possibility of implementing curriculum and organizational changes in schools, provided such changes can be accommodated within the existing paradigm or a sufficiently strong support system can bring about adoption of a new paradigm. The Follow-Through studies in the United States offer a case in point. It seems from these studies that a wide variety of teaching models can be implemented, if certain structural changes (e.g., the provision of teacher aides and resources for materials) are brought about. This brings us back to the earlier point about models of teaching. The adoption of a new paradigm requires, first, that such a paradigm be available. Equally important, for the new paradigm to become established requires "exemplars" of how the paradigm can solve problems of practice. It seems highly unlikely that a diffuse idea like "open education" or "discovery learning" could be adopted by practitioners in

the absence of specific exemplars of how such ideas work. Diverse "models of teaching," ranging from direct instruction to open classrooms, can be implemented under restricted conditions, with select samples of teachers. It is the wider introduction of such innovations that meets the competition of the established paradigm and fails because of lack of support from the broader community of practitioners. The notion of a model of teaching is thus the same as an "exemplar." Teachers functioning under a particular paradigm offer a model or exemplar for their newer colleagues, and the model is thus perpetuated. It is only in the face of overwhelming problems, along with the presence of an alternative paradigm, complete with its own exemplars, that change is likely to occur.

NOTES

- ¹ The author is indebted to Glen Postle of the Darling Downs College of Advanced Education for first drawing his attention to Imershein's paper.
- ² The Teaching Strategies Project is a long-term study of teacher perceptions and classroom processes conducted by members of the Institute for Educational Research and Development, Memorial University of Newfoundland. Further information on this project may be obtained from the author.

REFERENCES

- Crocker, R. K. *From curriculum to classroom: An interview study of teacher perceptions of curriculum change in primary science*. Brisbane: Queensland Department of Education, 1979.
- Doyle, W. Paradigms for research on teacher effectiveness. In L. S. Shulman (Ed.), *Review of research in education* (Vol. 5). Itasca, Illinois: F. E. Peacock, 1978.
- Dunkin, M. J. & Biddle, B. J. *The study of teaching*. New York: Holt, Rinehart, and Winston, 1974.
- Elliott, J. Developing hypotheses about classrooms from teachers' practical constructs: An account of the Ford teaching project. *Interchange*, 1977, 7, 2-22.
- Gage, N. L. Paradigms for research on teaching. In N. L. Gage (Ed.), *Handbook of Research on teaching*. Chicago: Rand McNally, 1963.
- Imershein, A. W. Organizational change as paradigm shift. *The Sociological Quarterly*, 1977, 18, 33-43.
- Joyce, B. & Weil, M. *Models of teaching*. Englewood Cliffs, N.J.: Prentice-Hall, 1972.
- Kuhn, T. S. *The structure of scientific revolutions*. Chicago: University of Chicago Press, 1970.
- Oakley, W. F. & Crocker, R. K. An exploratory study of teacher interventions in elementary science laboratory groups. *Journal of Research in Science Teaching*, 1980, 17, 407-418.
- Sharp, R. & Green, A. *Education and social control*. London: Routledge and Kegan Paul, 1975.

- Snow, R. E. Theory construction for research on teaching. In R. M. W. Travers (Ed.), *Second handbook of research on teaching*. Chicago: Rand McNally, 1973.
- Stallings, J. A. & Kaskowitz, D. H. *Follow-through classroom observation evaluation, 1972-73*. Menlo Park, Calif.: Stanford Research Institute, 1974.
- Winne, P. H. & Marx R. W. Reconceptualizing research on teaching. *Journal of Educational Psychology*, 1977, 69, 668-678.
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