Lakatos Revisited

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In this paper Imre Lakatos' ideas on "Falsification and the Methodology of Scientific Research Programmes" are revisited and reviewed. It is suggested that Lakatos' framework offers an insightful way of looking at the relationship between theory and research that is relevant not only for evaluating research programs in theoretical physics, but in the social sciences as well. Winch's notion of a social science is used in order to illuminate why and how Lakatos' model should be adjusted. As an example of how Lakatos' framework might be applied to the social sciences, and specifically to education, research on teacher thinking is analyzed using a Lakatosian framework. His ideas of a 'hard core' and 'protective belt' are used to argue that the body of work on teacher thinking can be viewed as a research program, separate from the research program on teacher behavior.

Dans cet article, les idées de Imre Lakatos sur la "falsification et la méthodologie des programmes de recherches scientifiques" sont étudiées d'un autre angle et passées en revue. Il est suggéré que le travail de Lakatos offre une façon perspicace d'examiner la relation entre la théorie et la recherche, non seulement pertinente pour l'évaluation des programmes de recherches en physique théorique mais également ceux en sciences sociales. La notion de Winch d'une science sociale est utilisée afin d'éclairer pourquoi et comment le modèle Lakatos devrait être rajusté. Comme exemple sur comment le travail Lakatos peut être appliqué aux sciences sociales, plus précisément en éducation, la recherche sur la pensée des enseignants est analysée à l'aide d'un cadre Lakatosien. Ces idées "hard core" (dur) et "protective belt" (zone protectrice) sont utilisées pour appuyer le fait que l'ensemble du travail sur la pensée des enseignants peut être vue comme un programme de recherche distinct du programme de recherche sur le comportement des enseignants.

Understandings of Theory in Educational Research

In planning a lesson on theory for a graduate course in qualitative research methods, I recently sought examples of different ways theory can be used in educational investigations. An established theory can be used to generate research questions, which are then investigated within the framework of the existing theory. The theory may be modified based on the results of investigations. One can come to a study informed by disciplinary perspectives and the theoretical understandings embedded in them but without a specific theoretical framework. Research questions and data analysis will be influenced by those perspectives. One can generate research questions from the field, and seek theories that explain the findings afterwards. If appropriate theories are not found, one may even construct a new theory which will then be tested and modified through further research (Goetz & LeCompte, 1984). As I searched for appropriate material on the issue of theory and research, I recalled my doctoral thesis of 11 years ago (Court, 1988) and consulted it to see if it offered usable examples. I was pleased to meet again there with an idea which fascinated me then and seems on renewed acquaintance still useful: Lakatos' approach to assessing bodies of research and to understanding the connections between theory and research. My students responded very positively to this presentation in class, saying that it helped them to put ideas related to the difficult notion of theory, an idea used in a number of different ways in education (Thomas, 1997), into perspective.

Thomas (1997) identifies several uses of the word theory and suggests that they be conflated into a continuum in which formal theory exists at one end, personal theory, working hypotheses and hunches in the middle, and practice at the opposite end. He worries about the constriction of creative ideas that formal theory may place on researchers, as well as a kind of meaningless looseness that the idea of personal theories allows. Clearly the notion of theory can be conceptualized in a number of different ways. What is perhaps most important is that writers define their terms rather than assuming a common understanding.

I believe that Lakatos' work offers one useful framework for the discussion of theory and, within that framework, for the understanding and evaluation of educational research. In this paper I will summarize Lakatos' views, attempt to respond to some possible

criticisms, suggest how his ideas, which originated in theoretical physics, can be applied to the social sciences, and finally give an example from educational research.

Lakatos' Views on the Methodology of Research Programs

In a now famous paper entitled "Falsification and the Methodology of Scientific Research Programmes" Imre Lakatos (1965) argued that scientific theories cannot be evaluated in isolation, but should be seen in relation to the theories which precede and supersede them. Such series of theories form what Lakatos calls research programs.

Lakatos argues against several influential schools of thought. One idea he disclaims is the positivistic notion that any claim must be testable and its truth provable or it is meaningless. For many years in science this was the prevailing view, and because of it much creative speculation was disallowed.

Lakatos claims that Kuhn (1962) and Polanyi (1958) argue that scientific change from one dominant theory to another is a kind of "mystical conversion" which is not governed by the rules of reason but by "the psychology of discovery." Lakatos calls this "truth by consensus" and attempts to discredit the idea. He shows his scorn for the "sociology of knowledge," which he says serves as a "cover for illiteracy" when he retells a story recounted by Polanyi (1958, pp. 12-14) about how the audience of scientists at the 1925 meetings of the American Physical Society remained firmly committed to Einstein's theory despite the remarks of the society's president that he had overwhelming evidence for the opposing theory of ether-drift. Polanyi suggests that psychological, rather than rational factors were responsible for the scientists' commitment to Einstein's theory. Lakatos, however, reconstructs the *series of theories* of which ether-drift was an earlier and Einstein's a later member, and his "reconstruction makes the tenacity of the Einsteinian research programme in the face of alleged contrary evidence a completely *rational* phenomenon and thereby undermines Polanyi's 'post-critical'-mystical message" (Lakatos, 1965, p. 163).

In Lakatos' view Kuhn and Polanyi present scientific revolutions as something like religious conversions, with change occurring through the "psychology of discovery," whereas Lakatos himself agrees with Popper (1959) that scientific change is rational and

occurs via the "logic of discovery." Lakatos states that all scientific theories are fallible, but that we can neither prove nor disprove any of them. This leads to the question, if no theory can be disproved, then on what grounds can we ever eliminate any theory? In Lakatos' view we must eliminate some theories or there will be chaotic proliferation.

To ensure the survival of only the fittest theories, their struggle for survival should be made severe and a theory should be considered acceptable or scientific only "if it has excess empirical content over its predecessor (or rival), that is, only if it leads to the discovery of novel facts" (Lakatos, 1965, p. 116).

Lakatos calls a series of theories *theoretically progressive* if each new theory "has some excess empirical content over its predecessor, that is, if it predicts some novel, hitherto unexpected fact" (1965, p. 118). He calls such a theoretically progressive series of theories *empirically progressive* "if some of this excess empirical content is also corroborated, that is, if each new theory leads us to the actual discovery of some new fact" (p. 118).

These are different criteria than the empirical demand that a satisfactory theory must accord with observed facts. In Lakatos' scheme, the criteria for judging a series of theories is that each succeeding theory should produce new facts. A series of theories is connected by a continuity which welds the theories into a *research program.*

A research program may be appraised, even after its elimination, for its heuristic power, that is, how many new facts it produced and how great its capacity was to explain the refutations and anomalies that arose during its growth. The history of science, Lakatos claims, has been and should be the history of competing research programs.

Lakatos also describes what he calls the "negative heuristic" or "hard core" and the "positive heuristic" or "protective belt" of research programs. These are connected with methodological rules in the following way: the hard core of the program consists of the "irrefutable," unquestioned assumptions which may not be challenged and which thus tell us what paths of research to avoid. This is why Lakatos calls it the negative heuristic. The positive heuristic tells us which paths of research to pursue. Since the hard core must be protected

> we must use our ingenuity to articulate or even invent 'auxiliary hypotheses,' which form a protective belt around this core .... It is this protective belt which has to bear the brunt of tests and get adjusted and re-adjusted, or even completely replaced, to defend the thus-hardened core. (p. 133)

A research program is successful, Lakatos says, if all this leads to a *progressive problemshift* (each new theory has excess empirical content over its predecessor and predicts new facts). He offers as an example of a successful program Newton's gravitational theory, the hard core of which was Newton's three laws of dynamics and his law of gravitation. Early on many scientists gave counterexamples to Newton's theories but "Newtonians turned, with brilliant tenacity and ingenuity, one counter-instance after another into corroborating instances, primarily by overthrowing the original observational theories in the light of which this 'contrary evidence' was established" (p. 133). This is an instance of how the "protective belt" works to protect the hard core.

To sum up, Lakatos says that:

> The negative heuristic specifies the 'hard core' of the program which is 'irrefutable' by the methodological decision of its protagonists; the positive heuristic consists of a partially articulated set of suggestions or hints on how to change, develop the 'refutable variants' of the research programme, how to modify, sophisticate the 'refutable' protective belt. The positive heuristic of the programme saves the scientist from becoming confused by the ocean of anomalies. (p. 135)

Response to the Critics

There are criticisms of Lakatos' system. Perhaps the most basic is that it is simply impossible to capture the true nature and working of science in such a system.

> Science does not observe any methodological rule, and cannot do so if it is not to destroy itself. The only universally observed rule is that anything goes, so that any methodological model is as much a caricature of science as one of its rivals. (Mokrzycki, 1983, p. 45)

In this view, models that systematize science tend to discover things retrospectively that fit their particular parameters. I see two problems with this criticism. First, Lakatos was not claiming some sort of

conscious use of methodological rules by scientists. Rather, upon viewing retrospectively the development of ideas, the formulation and the lifespans of theories, he saw how ideas and people influenced one another, how ideas interacted, opposed and built on one another, and conceptualized those processes (as well as simplifying them, as any model does) as methodological rules. Second, retrospective understanding is not unacceptable. Historians of all kinds engage in it as they distill, summarize, and search for relations between past events and ideas. As long as this does not lead to over-simplification or actual revisionism, it can help us understand and learn from the past as well as plan for the future.

One could also argue against Lakatos' notion that some theories must be eliminated in order to avoid "chaotic proliferation." In this view chaos is not a negative or undesirable state, and in fact has underlying order (see Prigogine & Stengers, 1984 for a discussion of Heisenberg's uncertainty relation, on which this view of chaos is based). I do not see why this view need stand in opposition to the fact that, in our search for understanding, we seek out or create intellectual frameworks in which we organize ideas. Such frameworks are always somewhat artificial, but they can lend us a kind of objectivity, help us order our thinking, and actually enable the kind of reflection and creative leaps which help us to go beyond them.

Again invoking Heisenberg's uncertainty relation, it can be argued that competing or opposing theories *do* exist, and that this is not an unhealthy state of affairs. In its extrapolations beyond quantum physics to broader fields of knowledge, Heisenberg's principle can be said to describe

> the wealth of reality, which overflows any single language, any single logical structure .... The irreducible plurality of perspectives on the same reality expresses the impossibility of a divine point of view from which the whole of reality is visible. (Prigogine & Stengers, 1984)

In terms of the social sciences this notion is in tune with the phenomenological view of multiple realities. Nevertheless, we do try to make order out of chaos in our quest for understanding, and I suggest that Lakatos' rational, orderly system has much to commend it as a way of understanding the development of theory and the relation of research studies to theory and to each other. Lakatos himself stresses that the history of science is the history of competing

research programs. The elimination of some of the competing theories in a field occurs as some prove more useful. A classic example of this is the domination of the field of psychology by behaviorism until the 1950s. The behavioral model of the mind was paramount until it began to prove inadequate to explain some significant psychological phenomena. In 1957 Skinner published *Verbal Behavior*, in which he tried to account for the acquisition of language according to behavioral theory. Noam Chomsky's (1959) review of the book showed that behavioral theory could not account for language acquisition, and that effectively ended the domination of behavioral theory.

An additional point is that we can, as free agents, choose to examine and evaluate research programs using Lakatos' framework without necessarily "buying in" to the need to reduce the number of competing theories. His framework offers a useful lens through which to view, conceptualize, and evaluate a sea of research and theory. Not to put too fine a point on the nautical metaphor, we want to check the cargo that ships, and fleets of ships, are carrying, and to know that they are seaworthy. Those with problems in either area should probably be recalled, but otherwise, it's a big sea with room for several fleets.

Application to the Social Sciences

While Lakatos has concerned himself with natural scientific theories, he intimates that this discussion is relevant also to the social sciences. The clash between his own and Popper's ideas on one hand, and the ideas of Kuhn and Polanyi on the other,

> is not about a mere technical point in epistemology. It concerns our central intellectual values, and has implications not only for theoretical physics but for the underdeveloped social sciences and even more for moral and political philosophy. If even in science there is no way of judging a theory but by assessing the number, faith and vocal energy of its supporters, then this must be even more so in the social sciences: truth lies in power. (Lakatos, 1965, p. 93)

Lakatos offers another way of examining and evaluating successive theories, as logical progressions within a research program. On this view a new theory should be accepted over an old one if it predicts

and leads to the discovery of new facts. This is what Lakatos calls "the logic of discovery."

In order to apply these ideas, as Lakatos suggests we can, to the social sciences, we need a broader and more flexible concept than the notion of facts. (Even in science the idea of facts is not unproblematic: in theoretical physics, for example, facts may not be the best term to use in discussions of waves and particles that we will likely never see.) I believe we can speak usefully of information, understandings, and concepts rather than facts.

Peter Winch, in his fascinating little book *The Idea of a Social Science* (1958) argues that the methods of empirical science can not be applied willy nilly to the social sciences. He says that human behavior is rule-governed, and that rules have a social setting. A natural scientist, according to Winch, is looking for regularities in order to make generalizations.

> Now if the position of the sociological investigator (in a broad sense) can be regarded as comparable, in its main logical outlines, to that of the natural scientist, the following must be the case. The concepts and criteria according to which the sociologist judges that, in two situations, the same thing has happened, or the same action performed, must be understood *in relation to the rules governing sociological investigation*. But here we run against a difficulty; for whereas in the case of the natural scientist we have to deal with only one set of rules, namely those governing the scientist's investigation itself, here *what the sociologist is studying*, as well as his study of it, is a human activity and is therefore carried on according to rules. (pp. 86-87)

Understanding these rules means having some knowledge of the concepts and context in which they are carried out. Thus,

> A historian or sociologist of religion must himself have some religious feeling if he is to make sense of the religious movement he is studying and understand the considerations which govern the lives of its participants. A historian of art must have some aesthetic sense if he is to understand the problems confronting the artists of his period; and without this he will have left out of his account precisely what would have made it a history of *art*, as opposed to a rather puzzling external account of certain motions which certain people have been perceived to go through. (Winch, 1958, p. 88)

This is not unlike Feuer's (1995) point when he says

> In the social sciences, man is studying himself. And his basic attitudes towards himself, his hopes, loves, fears and hatreds, reflect themselves in what we may call his meta-sociological convictions. These, in turn, express themselves in a choice ... between modes of social analysis. (p. 421)

If in the social sciences man is studying himself, his own social institutions, with an intimate knowledge of social context and concepts, how can such research, and the theorizing connected with it, be compared with research and theorizing about physical properties, particles, or waves? How can a system such as Lakatos', rooted in physics, be applicable to, for instance, education?

Lakatos says that we need a method for assessing theories and bodies of research, perhaps especially in the social sciences where empirical proofs are elusive. The very fact that we are studying ourselves and our own institutions, that our work is so deeply connected with our experiences and our values, requires us to stand back and assess our work in a somewhat detached manner. Without such assessment we sometimes run the risk, as Lakatos warns, of assuming a theory is good because it is popular. We see this in education, especially at the school and local administration levels, where "bandwagon" theories, unsupported by sufficient research, sweep into town and are uncritically embraced until their weaknesses begin to show in practice. While this is certainly an implementation problem as well, the basic problem is often that an innovation is accepted without sufficient theoretical grounding. For example, in many school districts "whole language" ousted the teaching of phonics in the primary grades during the 1980s, until classroom-based research suggested a more balanced approach.

Lakatos' model offers a vehicle for evaluation which may enable us to understand better (as Winch paints it) the researcher and his subject and the social contexts in which they act.

An Example: Evaluation of Literature on Teacher Thinking

The example given here is a summary, inevitably inadequate, of what took 100 pages or so in my dissertation. That work included, as well as analysis of the literature, analyses of central concepts such as decision, values, and reflection. Identification and analysis of central concepts should be a part of the evaluation of a body of research, but space is not available in this paper to include these conceptual

analyses. Nor are all the research studies originally reviewed included here. The present aim is to provide enough detail to show how Lakatos might be used to examine a body of educational research. As will be seen, I took some liberties with Lakatos' model. In the example described below, I analyze research into teaching and use Lakatos in the following way:

The notion of "hard core" is used largely as Lakatos defined it, as the basic unquestioned assumptions which determine the kind of questions that can and cannot be asked and which methodologies may be used. The "hard core" of a program of research on teaching will center on the conception of teaching inherent in the program (The nature of the "hard core" of the teacher research program will become clear later in this discussion). In terms of the "protective belt," I view this as the shift to new 'sensitizing concepts' (for instance, from 'decision making' to 'practical knowledge') which change the focus of the research and thus allow new questions to be asked, but do not change the hard core.

In the dissertation I analyzed the literature on teaching up to 1988 using a Lakatosian framework. I argued that until the 1960s, researchers had focused on teachers' overt behaviors. I defined the study of teacher behavior as a research program, which gave way after about 1970 to a new research program focusing on teachers' thinking.

In describing the basic assumptions of the two research programs, on teacher behavior and on teacher thinking, I described the hard core of each program:

> The investigation of teacher behavior can be seen as a research program which, while it may not be supplanted, is at least rivaled by a research program that emphasizes teacher thinking. These two research programs have some rather different basic assumptions (the "hard core"). The teacher behavior program assumes that we can know and understand most of the important things about teaching from observing teachers' overt actions. The teacher thinking program, on the other hand, assumes that we need to ask teachers about their thoughts as well as observing their behaviors. The teacher behavior program does not give a major focus to the context of teaching, assuming that to a large extent teacher behavior can be understood without the details of context and judged according to a standard set of criteria. The teacher thinking program assumes that teacher behavior can best be

> understood in the varying classroom context, and criteria for judging behavior to be effective or ineffective, appropriate or inappropriate, will vary according to context. As well, the teacher behavior program assumes that specific teacher behaviors can increase student achievement, and that there is a standard set of teaching skills, while the teacher thinking program takes the view that because teaching and learning are complex it is seldom the case that a few particular teaching actions will correlate highly with a few particular measures of student learning, and that because teachers bring different abilities and experiences to their teaching, they will have different styles and methods and exhibit different skills.
>
> Having made these statements, they must now be qualified. Setting up a teacher behavior/teacher thinking dichotomy is useful in that it gives, rather starkly, something of the different flavors of these two research programs. However the portrayal is too stark and in fact people involved in either of these research programs may share some assumptions with each other. Despite the importance given to context in teacher thinking studies, for instance, the fact remains that there is a more or less standard set of criteria by which we judge effective and ineffective teaching (see, for instance, Borich, 1988, Chapter one: "What is an effective teacher?"). Without standards, no evaluation is possible. Nevertheless, while the assumptions of both programs may not be mutually exclusive, and while it may not be entirely accurate to state them as starkly as was done above, there is definitely a basic difference at the heart of the two programs. The teacher behavior program seeks to discover what acts teachers perform in classrooms, and so obviously the underlying assumption is that these acts or behaviors are of fundamental importance. The teacher thinking program seeks to understand the thinking that motivates teachers' acts and decisions and the classroom context in which they take place, and the underlying assumption is that acts are, if not unintelligible, at least not particularly meaningful or enlightening without reference to thinking and to context. (Court, 1988, pp. 33-35)

The "negative heuristic" (or "hard core") of the teacher behavior program disallowed studies related to context, teachers' thinking, and values, and when these questions began, nevertheless, to arise

(perhaps with the shift to qualitative research methods), they heralded the beginning of a new research program.

In the dissertation I identified the "hard core" of the teacher thinking research program as the implicit conception of teaching and attempted to explicate this through analysis of the literature. The "problemshifts" in the "protective belt" were identified as the moves from studies of teacher decision-making, to teachers' practical knowledge, to teachers' reflection on practice.

I took the approach of laying out what I called "a defensible conception of teaching" (which perhaps represents the "hard core" of my own view of teaching). That included learning conditions developed from Hirst and Peters (1970) – teachers must do their best to bring about learning in students – and a moral condition – teachers must accord students dignity and respect. I compared this with the implicit conception of teaching in the teacher thinking research program and argued that studies of decision making and practical knowledge met the learning conditions but met the moral conditions to a much lesser extent, because these studies investigated teachers' knowledge but put little stress on values. (Not to confound morals and values: values are principles believed in and held dear; morals are concerned with actual behavior. Dewey (1932) says that "Moral theory begins, in germ, when any one asks, Why should I act thus and not otherwise? Why is this right and that wrong?" (p. 5). The connection is that in order to act morally one must reflect on, assess, and wisely choose one's values.) Values being to some extent tacitly held, I then argued that studies of teacher reflection might give more access to values, and that a "progressive problemshift" might be discernible in this progression.

The fact that I laid out this 'defensible conception of teaching' (my own, "hard core," as it were) and compared it with the conception embedded in the "hard core" of the teacher research programs (as opposed to merely identifying the hard cores of the research programs) is a significant deviation from Lakatos' model. My own values have been inserted into the analysis. This can be seen as an illustration of Winch's point about the involvement of the social science researcher with his or her material. More than the natural scientist, social scientists are present in their work. We want to investigate what is, but this is intimately tied with who we are.

Teacher decision making, identified by Shavelson in 1973 as "the basic teaching skill," was explored by researchers in terms of interactive and planning decisions, content of decisions and precursors or stimulants to decisions (e.g., Morine & Vallance, 1976; Marland, 1977; Clark & Peterson, 1986; Hargreaves, 1979: Sutcliffe & Whitfield, 1979; Marx & Peterson, 1981). As in studies of teacher behavior, the emphasis here is on the doings of the teacher, but the view is more three dimensional, involving context, interactions with students, and responses to changing classroom conditions. Without being explicitly stated, the assumption that the purpose of teaching is to bring about learning runs through these studies. The studies generally center on instructional and management decisions. The probing of teacher thinking that is done illuminates their thinking in those areas. Value questions, though sometimes mentioned, are not explored. Decision making studies had largely ceased by 1980, seeming to have come to a dead end. Investigation of teachers' reasons for their decisions never became a major focus in this work, yet this would seem to be a key issue in understanding teachers' thinking. It may be that decision is not an adequate vehicle for this investigation. Reasons for decisions arise from the knowledge, beliefs, and values that teachers hold, and the ways these are expressed in context. This broader field was explored in the shift to a new sensitizing concept, personal practical knowledge. In this sequence we see research in the "protective belt" beginning to affect the "hard core:" a new view of the teacher is emerging.

Hargreaves (1979) saw ahead to this new research focus when he spoke of "uncovering the common sense knowledge which becomes tacit in the decision making itself" (p. 75) and stated that in making decisions teachers not only use skills but reveal their values. "Values are embedded in classroom practice; but because there is no simple correspondence between 'abstract' values and everyday practice, it is a research task to analyze precisely how values are, often tacitly, embedded in action" (p. 80). Elbaz (1981) undertook the first groundbreaking study of personal practical knowledge, building her conception of personal practical knowledge, and of the relation between theory and practice in teachers' work, on the thinking of McKeon (1952), Schwab (1973), Schön (1983) and Polanyi (1958). Elbaz sought to understand the nature of teachers' knowledge as expressed in the professional context but as grounded in the personal.

One of Elbaz' ideas, the notion that teachers express tacit knowledge and values in metaphoric images, was further developed by Clandinin (1986). Clandinin (1987) and Connelly and Clandinin (1985, 1986, 1987) also developed during this period the notion of "narrative unity," with teachers revealing their personal practical knowledge through the telling of their stories. This body of work, as well as concurrent studies of teachers' classroom routines (Leinhardt, Weidman & Hammond, 1987), offered new access to teachers' thoughts, their knowledge, and values, but were perhaps too descriptive and not analytical enough. These studies addressed values more directly than previous work but did not probe the issues. Since values were not a major focus, the "hard core" of the teacher thinking program remained unchanged: knowledge and learning are the concerns of the teacher in this conception; the moral condition is not adequately met. That this moral dimension is mentioned can be seen as a change in the "protective belt." It is *as if* value questions have been addressed, but they in fact remain unprobed and the apparent taboo in the "hard core" that disallows such investigation remains unchallenged. Yet this is an important area.

> Many questions arise in the investigation of teachers' values. In what ways do teachers' values clash with institutional values? How are teachers' 'contextualized' values related to the 'abstract' values they openly express? How can contextualized values be made explicit so that they can be examined? Do the values that teachers hold change with teaching experience, or are they quite stable throughout a teacher's career? .... If teachers are to reflect on their practice, reflecting on the values they hold and how and to what extent those values find expression in their practice would be a useful vehicle for teachers to change their practice. (Court, 1988, pp. 133-134).

Oberg recommended that specific instances of classroom practice be analyzed.

> These are the overt manifestations of beliefs and values underlying teachers' actions that are often implicit and difficult to verbalize .... When verbalized they sometimes become detached from their referential action, and we find a discrepancy between what teachers say they believe and aim for, and the beliefs and aims that are implied in their professional actions. Only after describing and analyzing actual instances of practice does the teacher begin to delve

> beneath observable behaviors to the meaning of her actions. (1986, p. 3)

The idea of teachers reflecting in a focused way on their practice brings teachers into an equal partnership with researchers in the study of teacher thinking. Thus this next move, to reflection on practice, offered not only new access to values and knowledge, but represented new empowerment of teachers, as well as a methodological shift. Shulman (1987) described reflection as

> What a teacher does when he or she looks back at the teaching and learning that has occurred, and reconstructs, reenacts and/or recaptures the events, the emotions and the accomplishments. It is that set of processes through which a professional learns from experience. (p. 19)

This new thrust, seen especially in studies of pre-service and beginning teachers, also became a central focus in teacher education from the late 1980s onward (for instance, Grimmet & Erickson, 1988). At the time the dissertation was completed this was not yet a large body of work. Here is a summary of the doctoral work, together with the conclusions reached 11 years ago. This will bring us back to the Lakatosian framework and hopefully fill in some of the gaps in the present summary.

First of all, the thesis explicated a conception of teaching, with both learning and moral conditions, drawn from Hirst and Peters. It was argued that a defensible conception of teaching must view the teacher both as a purveyor of knowledge and as a moral agent treating students with respect. This conception was used as a basis on which to evaluate research on teaching. A framework based on the work of Imre Lakatos was then used to examine research into teaching. Research into teacher behavior was identified as a research program, the "hard core" of which was the view of the teacher as an active agent, working through standard teaching behaviors to bring about learning in students, with little reference to the context of teaching. Notions of the teacher as a moral agent, as well as teachers' thoughts, feelings, and values, were not investigated in the teacher behavior research program.

The analysis then began to systematically examine successive research foci which probed teacher thinking, rather than or as well as behavior. This was seen as a separate research program because it viewed the teacher as a thinking (not simply a 'behaving') agent

acting in a context. However, the conception of the teacher which formed the "hard core" of this research program was still rooted in the learning conditions, without investigating the teacher as moral agent.

Critical examination of the literature on teacher decision making showed that this literature was almost entirely concerned with the learning conditions, and that the conception of teaching which underlay this work portrayed teachers as active, thinking professionals who struggle with questions related to content, method, materials, and level of students, as well as with questions related to classroom management. Classroom management, it was suggested, was related to control and to institutional standards for order. Since no attempt was made in that literature to follow up on value questions that arose, and since teachers were not questioned as to their moral values or their non-moral values and beliefs which may have ramifications in the moral realm, it was concluded that the conception of the teacher underlying this work did not portray the teacher as having a large area of moral responsibility and as struggling with value questions. Thus the moral condition was not met in this conception.

Literature on teachers' practical knowledge was then examined. Studies of routinization and expert-novice studies had a different research focus, or sensitizing concept, than decision studies, but were found to have the same underlying conception of the teacher. Again, questions related to values arose but were not pursued. Studies of teachers' personal practical knowledge illuminated values more than previous research, but because values were submerged in the mix of knowledge, beliefs, and values that these authors called "personal practical knowledge" there was still no probing done into value questions. The move to the study of personal practical knowledge could be, it was suggested, a "progressive problemshift" because this work did raise new questions and give, because of the 'personal' nature of the data reported, new insight into teachers' thinking. However the move to the study of personal practical knowledge did not affect the "hard core" of the teacher thinking program. The conception of the teacher remained rooted in the learning conditions. Since issues related to values were mentioned in this work it was *as if* some work on values had been done, but in fact despite rich description there was little analysis. Thus this was a change in the "protective belt" only, and the "hard core" of the teacher thinking

program, which seemed to contain a taboo against the investigation of values, remained protected and unchanged.

The next focus in research on teaching was reflection on practice. At the time of the dissertation I concluded that this focus appeared to hold considerable promise for the study of teachers' values, and to involve not only a "progressive problemshift" but a genuine methodological shift, in that the teacher could be seen as an equal partner in reflective conversations with the researcher. I predicted then that this shift could indeed change the "hard core" of the teacher thinking program.

The present paper does not analyze the reflection on practice studies. It remains for someone else to investigate those, as well as the focus which has now largely supplanted reflection, that of narrative and the telling of personal stories. Casey (1995) provides an extensive review of the work on narrative. She says that

> Narrative research, in all its various manifestations, is deeply implicated in contemporary conflicts over theory, metholodolgy and politics in scholarly investigation. Rather than providing evidence of a paradigm shift, however, an examination of these unruly developments would more likely confirm the arrival of a postparadigmatic age: New configurations emerge while earlier formulations persist, and various versions deconstruct and recombine. Nevertheless, I believe it is possible to perceive some complex patterns of growth and change in this area. (p. 211)

My view, which awaits confirmation through detailed analysis of the literature on reflection and on narrative, is that there has been a fundamental change in the conception of the teacher (the "hard core" of the program) and that we may be in the midst of a new research program, 'teacher as person,' perhaps. The three research programs, teacher behavior, teacher thinking, and teacher as person, may even be seen as an empirically progressive series of theories in that each has generated new questions and new information about teachers and teaching.

Closing Thoughts

In this paper I have tried to show how Lakatos' ideas on research programs could be adapted and used to evaluate bodies of research in education. I have suggested that his notions of a research program's

"hard core" and "protective belt" are useful concepts, as are the ideas of "progressive problemshifts" and "empirically progressive series of theories." Shifts should be seen as progressive if they produce new information and questions, rather than new facts. Winch's understanding of a social science helps to illuminate the way Lakatos' framework can be adapted, making room for the personal involvement of the social scientist with his or her material. In my example of teacher thinking, I have stressed values, clearly an important part of the investigation of teachers' thinking and also an area of great interest to me.

Another interesting point that came to light as I reflected on these issues is the connection between theory, research questions, and research methodology. In terms of teacher thinking, to what extent did the move from studies of teacher behavior, which in some ways were simpler methodologically, to studies of teacher thinking, encourage development of new research methodologies that allowed access to teacher thinking? Or, since in fact those methods already had a long tradition in other social sciences, did the generation of new kinds of questions finally encourage the borrowing and development of those methods in education? Did the use of qualitative methodologies have to wait until the research program on teacher behavior had, in effect, neared the end of its life? What is the relationship between the development of theory and the development of research methodology?

In his critique on the use of theory in education, Thomas (1997) says that

> Theory in properly conducted science ... is open to attack, tenuous, and devised in such a way that it is falsifiable. By contrast, in education, theory is often taken as creed-like. There is the tendency not only to treat theory as something to be refuted – or even as tenuous, as a loose statement of where we are now – but to treat it as sacred text, something to be cherished and protected. (p. 96)

Thoughtful use of the ideas of Lakatos in evaluating educational theories could help us guard against both the constriction of creative thought that Thomas fears and against the chaos that Lakatos describes as a result of the uncritical proliferation of too many theories. If, as suggested in the Casey quote above, we are in a "post-paradigmatic age" where "new configurations emerge while earlier

formulations persist, and various versions deconstruct and combine," perhaps there is a greater need than ever to be critical, to be discerning, about educational theory and research. Child development theory, learning theory, theories of educational administration and leadership, and the bodies of research associated with them, to name a few, could be usefully examined using a Lakatosian framework. This of course does not mean trying to turn the clock back to a "paradigmatic" age. To borrow a final phrase from Winch (1958, p. 2), "My only aim is to make sure that the clock is telling the right time, whatever it may prove to be."

REFERENCES

Borich, G. (1988). *Effective teaching methods*. Columbus, Ohio: Merrill Publishing Co.

Casey, K. (1995). The new narrative research in education. *Review of Research in Education, 21*, 211-253.

Chomsky, N. (1959). A review of Skinner's *Verbal Behavior*. *Language, 35*, 26-58.

Clandinin, J. (1986). *Classroom practice: Teacher images in action*. London: Falmer.

Clandinin, J. (1987). *Developing rhythm in teaching*. Paper presented at the American Educational Research Association Meeting, Washington DC.

Clark, C. & Peterson, P. (1986). Teachers' thought processes. In M. Wittrock (Ed.), *Handbook of research on teaching* (pp. 255-296). New York: MacMillan.

Connelly, F.M. & Clandinin, J. (1985). Personal practical knowledge and the modes of knowing: Relevance for teaching and learning. In E. Eisner (Ed.), *Learning and teaching the ways of knowing*. 84th Yearbook of the NSSE. Chicago: University of Chicago Press.

Connelly, F.M. & Clandinin, J. (1986). Rhythms in teaching: The narrative study of teachers' personal practical knowledge of classrooms. *Teaching and Teacher Education, 2*(4), 377-387.

Connelly, F.M. & Clandinin, J. (1987). *Teachers as curriculum planners: Narratives of experience*. New York: Teachers College Press.

Court, D. (1988). *Questions of value: An inquiry into the nature of research on teacher thinking*. Unpublished doctoral dissertation, University of British Columbia, Vancouver, British Columbia, Canada.

Dewey, J. (1932). *Theory of the moral life*. New York: Holt, Rinehart & Winston.

Elbaz, F. (1981). The teacher's practical knowledge: Report of a case study. *Curriculum Inquiry, 11*(1), 43-71.

Feuer, L. (1995). *Varieties of scientific experience*. New Brunswick, NJ: Transaction.

Feyerabend, P. (1993). *Against method* (3rd ed). London: Verso/New Left Books.

Goetz, J. & LeCompte, M. (1984). *Ethnography and qualitative design in educational research*. San Diego, CA: Academic Press.

Grimmet, P. & Erickson, G. (1988). *Reflection in teacher education*. New York: Teachers College Press.

Hargreaves, D. (1979). A phenomenological approach to classroom decision making. In J. Eggleston (Ed.), *Teacher decision making in the classroom*. London: Routledge & Kegan Paul.

Hirst, P. & Peters, R. (1970). *The logic of education*. London: Routledge & Kegan Paul.

Kuhn, T. (1962). *The structure of scientific revolutions*. Chicago: University of Chicago Press.

Lakatos, I. (1965). Falsification and the methodology of scientific research programmes. In I. Lakatos & A. Musgrave (Eds.), *Criticism and the growth of knowledge* (pp. 112-165). Cambridge: Cambridge University Press.

Leinhardt, G., Weidman, C., & Hammond, K. (1987). Introduction and integration of classroom routines by expert teachers. *Curriculum Inquiry, 17*(2), 135-176.

Marland, P. (1977). *A study of teachers' interactive thoughts*. Unpublished doctoral dissertation, University of Alberta, Edmonton, Alberta, Canada.

Marx, R. & Peterson, P. (1981). The nature of teacher decision making. In B. Joyce, C. Brown & L. Peck (Eds.), *Flexibility in teaching: An excursion into the nature of teaching and thinking*. New York: Longman.

McKeon, R. (1952). Philosophy and action. *Ethics, 62*(2), 79-100.

Mokrzycki, E. (1983). *Philosophy of science and sociology: From the methodological doctrine to research practice*. London: Routledge & Kegan Paul.

Morine, G. & Vallance, E. (1976). *A study of teacher and pupil perceptions of classroom interaction* (BTES technical report 75-11-6). Farwest Laboratory for educational Research and Development, San Francisco, CA.

Oberg, A. (1986). *Encouraging and recounting reflections on practice*. Paper presented at the Annual meeting of the Canadian association for curriculum studies, Winnipeg, Manitoba, Canada.

Polanyi, M. (1958). *Personal knowledge*. London: Routledge & Kegan Paul.

Popper, K. (1959). *The logic of scientific discovery*. Toronto: University of Toronto Press.

Prigogine, I. & Stengers, I. (1984). *Order out of chaos: Man's new dialogue with nature*. New York: Bantam.

Schön, D. (1983). *The reflective practitioner*. New York: Basic Books.

Schwab, J. (1973). The practical 3: Translation into curriculum. *School review, 81*, 501-522.
Shavelson, R. (1973). What is the basic teaching skill? *Journal of Teacher Education, 24*, 144-150.
Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1-22.
Skinner, B.F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts.
Sutcliffe, J. & Whitfield, R. (1979). Classroom-based teaching decisions. In J. Eggleston (Ed.), *Teacher decision making in the classroom*. London: Routledge & Kegan Paul.
Thomas, G. (1997). What's the use of theory? *Harvard Educational Review, 67*(1), 75-104.
Winch. P. (1958). *The idea of a social science*. London: Routledge & Kegan Paul.

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