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CHOICES IN CONCEPTUALIZING CLASSROOM-ANCHORED
RESEARCH AND LINKING IT TO POLICY/PRACTICE TO IMPROVE
EDUCATIONAL QUALITY IN "DEVELOPING" COUNTRIES

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Abstract

This paper discusses three scientific traditions (positivist, interetivist, and critical) as they inform methodological and strategic choices within a USAID-funded "Improving Educational Quality" project in Ghana, Guatemala, and Mali. These scientific traditions are shown not only to frame choices in posing research questions and selecting data gathering and analysis strategies, but also to orient decision about approaches for linking research to policy and practice and for establishing relationships between researchers and policy-makers and practitioners. Special consideration is given to these issues as they inform classroom-anchored research undertaken by and for educational personnel in "developing" countries.

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Introduction

Educators and policy makers engaged in educational quality improvement efforts face many choices concerning the kind of research and other activities they might undertake to inform their initiatives. For example, colleagues in Ghana, Guatemala, and Mali are conducting research focusing on educational reforms that were identified by educational policy-makers and practitioners in their respective countries as important to study. In their efforts to improve educational quality by using different instructional resources (Ghana), refining a multi-grade school model (Guatemala), and enhancing French language instruction in early primary grades (Mali) – these colleagues encounter methodological choices, including: Should they follow quantitative and/or qualitative research traditions? Should they carry out "true" experiments, assess relationships among variables in a "natural" setting, or develop thick descriptions or cultural analyses of teachers' and students' actions and their meanings? Where should they undertake the research? On what or on whom should the research focus? Who should participate in the research? How should the findings be interpreted and who should be involved in such interpretive work? How can the findings be reported and disseminated, by whom, and to whom, so that they will influence decision making about educational policy and practice?

This paper discusses some of the major methodological and strategic choices available to Host Country Research Teams and U.S. Research Support Teams involved in the "Improving Educational Quality" (IEQ) project, funded by USAID. By drawing attention to such choices² we hope to encourage participants in this and similar projects to engage in dialogue about how to conduct studies and organize projects that will help in enhancing the quality of education in various settings. We want to encourage dialogues, both about the choices presented herein and about other ideas and approaches that colleagues in various contexts may bring to the discourse based on their academic preparation, their experience, and their perceptions of the institutional and societal contexts in which they work.

This paper is more specifically focused on methodological choices in conducting "classroom-anchored" research, that is, research that takes the classroom as the central focus of investigation and also views the classroom as situated in the context of schools and communities, educational systems and societies. Thus, in part, we concur with Hammersley (1986a, p. ix) that: "if we are to understand the work of schools, and to improve or change their role, then above all we have to understand what occurs in classrooms ... where the real business of education is supposed to take place."³ However, as discussed in another IEQ project paper (Adams et al., 1993), one can only effectively undertake and adequately understand efforts to improve educational quality if one considers the proximate and remote environments of classroom activity. According to Delamont (1976): "The classroom has to be seen against the background

of an on-going educational system operating at the school, local and national level" (p. 38) and "against large scale social and economic processes" (p. 20).

In this paper we will first contrast the assumptions which serve as the foundation for three "scientific" traditions or paradigms of social and educational research: positivist science, interpretivist science, and critical science.⁴ These traditions or paradigms serve to organize the choices available to those engaged in classroom-anchored research designed to improve educational quality in developing countries.⁵ To illustrate the assumptions we contrast the kinds of research questions that might be asked in a project like ours when working within the three scientific traditions. Next we consider issues about disseminating research findings, the researcher's role in educational change processes, and the roles that school teachers, administrators, and policy makers might play in the research projects designed to inform decisions about how to improve educational quality. And finally, we caution colleagues involved in translating or transforming research traditions employed in "developed" societies for their use in "developing" countries to be duly modest and always open to alternative ideas.⁶

Assumptions Underlying Research Traditions

We outline the assumptions that the different scientific paradigms make about the nature of knowledge and knowing and about the nature of human activity because we believe that any dialogue about research activity should consider carefully what assumptions those involved in educational quality improvement efforts want to make. To ignore the assumptions of different research traditions opens one up to acting in

ways that contradict what one believes. As Ernest Nagel notes in his essay "Philosophy in Educational Research" (1971: 238): "Although no one can be explicitly aware of all the tacit assumptions one is making in the conduct of any inquiry, it is well to realize that one is always operating within some framework of presuppositions, and to be habitually on the lookout for those that are highly questionable" (quoted in Greene, 1981, p. 5). Here we will briefly discuss some of the major assumptions underlying three scientific traditions of research: positivist or quantitative,⁷ interpretivist or qualitative,⁸ and critical.⁹

The similarities and differences among the three traditions (see Table 1 for summary of key points) indicate that there are real choices in how we approach the process of conducting classroom-anchored research. The differences between positivist

Table 1 about here

and interpretivist science traditions are strongest with respect to the first two elements: "conception of theoretical knowledge" and "conception of the social world." That is, the positivist science tradition seeks to discover general laws of social phenomena (e.g., causal relations between certain teaching behaviors and children's language learning), while the interpretive science tradition is oriented to illuminating people's actions in and interpretations of particular situations (e.g., classrooms in specific community settings).

Also note that the critical science tradition incorporates work that reflects both positions on both elements.¹⁰ In terms of the "scientist's role in the social world," the clearest distinction is between the critical science tradition and the other two traditions, with the former eschewing notions of the possibility of separating technical or scientific and political or ethical issues and commitments and the latter celebrating such separation as a defining characteristic of "science."

Scholars continue to debate the theoretical and practical possibilities of combining approaches and techniques from the different traditions (e.g., Babbie, 1990; Bogdan and Biklen, 1992; Eichelberger, 1989; Eisner and Peshkin, 1990; Soltis, 1984; Vulliamy, Lewin, and Stephens, 1990). As Hammersley (1986b: xix) comments:

There seems to be a growing trend for social scientists to become locked into competing "paradigms," and this includes classroom researchers. ... There is no doubt that classroom researchers face difficult methodological problems, whatever the tradition in which they work. ... Given this, it seems essential to approach these problems with some humility, examining the arguments of those in other traditions with an open mind.

We concur with the necessity of keeping an "open mind." Whether one sides with the compatibility or the incompatibility of the traditions, one needs to make informed choices -- by being aware of the alternatives within and among scientific traditions -- on how to conduct classroom-anchored research and on how to inform and influence educational policy and practice.

Asking Research Questions in the Three Traditions

The choice of tradition(s) has implications for or is implied by the way one frames research questions or, as some say, how one formulates the research (or policy or practice) problem.¹¹ This section discusses this point in two ways. First, we look at the topics of research initially identified in the three core countries in the IEQ project to demonstrate how research questions related to each of these topics could be framed from within the three traditions. Second, we categorize some of the extant classroom-anchored research studies, especially those which have been undertaken in "developing" societies.

The initial topics identified by the IEQ project's Host Country Research Teams in Ghana, Guatemala, and Mali are presented in Table 2 along with some examples of research questions that could be asked from within each scientific tradition. The different

Table 2 about here

questions highlight that in the **positivist science tradition** the focus is on assessing relationships among variables (seen to be objective and factual); in the **interpretive science tradition** the stress is on exploring what individuals are doing and thinking (without presuming that the categories of analysis can be predetermined); and in the

critical science tradition the concern is to understand how what goes on in classrooms, schools, and communities benefits some social groups and not others.¹²

Another way to clarify how the research questions posed reflect assumptions associated with one or another scientific tradition is to examine existing studies. In Table 3 we classify research questions associated with some potentially relevant classroom-anchored research studies in terms of the scientific traditions with which they are most

Table 3 about here

closely identified.¹³ Again we see how different assumptions about the nature of knowledge and knowing and about the nature of human activity shape the kinds of research (policy and practice) questions which might be posed in different projects.

Connecting Research and Educational Policy/Practice:

The Roles of Researchers and Practitioners

Having completed planning and conducting the research project (or preferably before initiating the investigation),¹⁴ one also needs to consider how to communicate and make use of what can be learned from the experience of disciplined inquiry. Too often, even in research conceived of in relation to efforts to shape or improve educational policy and practice, the processes of planning and conducting (design, sampling,

measurement, data collection, data analysis) are viewed to be activities to be completed prior to (and separate from) the processes of interpreting, writing up, and disseminating the findings. More often than not, such activities are done by researchers (in isolation from policy makers and practitioners) and conference presentations, research reports, articles, or books (targeted primarily to an audience of other researchers) serve as the vehicles of dissemination. Like many social scientists, many educational researchers seem to assume "that good science must eventually lead to improved practice" (Whyte, 1991, p. 8). Gitlin et al. (1992, p. 25), for instance, note that traditional research activities "aim to shed light on or capture the essence of a particular event or intervention. This understanding, it is assumed, will then trickle down to the level of practice and inform practitioners on what to do and what not to do."

Gentile (1994), with his tongue placed firmly in his cheek, has promoted what he terms "inaction research," advising educational researchers: "Don't just do something, sit there -- and think!"¹⁵ However, when research (whether introspective/reflective and/or empirical) is undertaken with the specific intent of influencing decisions about policy and practice to improve educational quality, writing a report or even combining this with making oral presentations to the key policy makers and practitioners may not be enough. Without special attention and effort on the part of researchers (as well as policy makers and practitioners), any insights relevant to policy and practice which are derived from research may not be put to use. It is certainly not uncommon for teachers, administrators, and policy makers to criticize the products of researchers' activity as

inaccessible or irrelevant (e.g., Brause and Mayher, 1991), while researchers lament the lack of attention to and influence of their research findings.

We should clarify that research may be used instrumentally and conceptually in the policy and practice arena. "*Instrumental use* refers to documentable use where the [research-generated] information is explicitly employed in the making of a decision, or the solving of a problem. ... *Conceptual use* refers to uses that influence policy makers' [and practitioners'] thinking about issues" (Cooley and Bickel, 1986, p. 119). That is, an interest in influencing policy and practice does not rule out attention to theory (see Vulliamy, Lewin, and Stephens, 1990). For instance, in his discussion of externally funded, policy-oriented research in "developing" countries, King (1981, p. 349) notes that: "Whatever the record on implementation of the results of such research, it is at least arguable that work of a more theoretical nature may equally be implementable (cf. the work of Freire, which ... has reached and affected many people with responsibility for literacy policy)."

In recent years, primarily in "developed" countries, educational researchers in conjunction with policy makers, administrators, and teachers have sought to employ (and write about) strategies for strengthening the links between research and educational policy/practice. In a sense such efforts subscribe to Dewey's (1929, p. 47) dictum that "there is no way to discover what is 'more truly educational' except by the continuation of the education act itself. The discovery is never made; it is always making." We can identify three general models employed in such efforts: decision-oriented research, collaborative action research, and research as collective praxis. Although proponents of

each model have expressed openness and demonstrated and commitment to drawing eclectically on different research approaches and techniques, it would appear that each seems to be more firmly rooted in one of the three scientific traditions we have been discussing, respectively: positivist, interpretivist, and critical.

In their book on the subject, Cooley and Bickel (1986, p. 3) describe **decision-oriented educational research (DOER)** as "research designed to help educators as they consider issues surrounding educational policy, as they establish priorities for improving educational systems, or as they engage in the day-to-day management of educational systems." A key element in this model from the researcher's standpoint is a "client orientation," operationalized through an "on-going educational dialogue" (p. 27) in which the researcher "works hard at trying to understand the information needs of the client and to meet those needs" (p. 36). The DOER model also stresses the "importance of being methodologically eclectic" (p. 41) and the need for "a continuous activity of data collection and analysis, which we refer to as monitoring and tailoring" (p. 57). However, working within the DOER model the researcher works with a client (usually defined as policy makers or administrators, though there is no logical reason to exclude teachers, students, parents, etc.) to provide information (social facts of both quantitative and qualitative varieties) needed by the client to make certain decisions. The researcher is in dialogue with the client, but each has his or her own specified and fairly distinct role: researcher and policy maker or practitioner. The researchers are not directly engaged in making policy or directly involved in educational practice, and the policy makers and practitioners are not active participants in the research process.

Similar to the DOER model, **collaborative action research** (see Corey, 1953; Stenhouse, 1975)¹⁶ is concerned with enhancing the use of research by educational policy makers and practitioners. According to Elliot (1982, p. 1):

Action research might be defined as: the study of a social situation with a view to improving the quality of action within it ... [The] total process – review, diagnosis, planning, implementation, monitoring effects – provides the necessary link between self-evaluation and professional development. (quoted in Winter, 1989, p. 3)

However, collaborative action research offers some contrasts to the DOER model. First, while there is evidence of methodological eclecticism, proponents argue that collaborative action research has more affinity to the approaches and techniques associated with what we have termed the interpretive science tradition (Hustler, Cassidy, and Cuff, 1986; Winter, 1989). Second, and perhaps more importantly, the collaborative action research model entails not only dialogue about, but also joint participation in, research by "researchers" and "teachers" (although there is no logical reason to exclude educational administrators, policy makers, etc.). This model builds on the notion that educational practitioners are normally engage in inquiry and that their practice can be enhanced by making it possible for them to commit more time and energy to a more systematically planned and implemented process of research (Brause and Mayher, 1991; Kincheloe, 1991; Wagner, 1990). Nonetheless, a division of labor still seems to exist. Even though the "practitioner" assumes rights and responsibilities in the research process, the "researcher" is involved primarily as a collaborator in research design, data

collection, and data analysis, remaining somewhat detached from the "professional" and "political" activity of educational policy making and practice (see Whyte, 1991). This is perhaps ironic, because one of the premises of collaborative action research is the "democratic social and political ideal, the ideal of a creative and involved citizenry" (Winter, 1989, p. 4).

The third model, **research as collective praxis**, shares some of the elements with, but is also framed in contrast to, the other two models. In her chapter on "Research as Praxis" Lather (1991, p. 56) comments that: "I am arguing for an approach that goes well beyond the action research concept. ... The vast majority of this work operates from an ahistorical, apolitical value system" (see also Bodemann, 1978; Carr and Kemmis, 1986; Gitlin et al., 1992). Similarly, McTaggart (1991, p. 176) describes a "process of using critical intelligence to inform action, and developing it so that social action becomes praxis through which people may consistently live their social values."¹⁷ Crucial to the model of research as collective praxis is the researcher acknowledging and acting upon her or his political commitments in the context of theorizing and practice with others -- collective praxis -- in a settings including "non-professionals" such as students and community members (Fine, 1989; Gitlin, et al., 1992; Reinhartz, 1984; Vio Brossi and de Wit, 1981). In this way the line between "researcher" and "policy maker" or "practitioner" becomes blurred as those who identify (or are typified) primarily as in one of these roles, in fact, play both. Not only do policy makers, administrators, teachers, students, and community members participate in research, but "researchers" become active participants in the settings working with others to understand and change schools and society.

According to Bodemann (1978, pp. 410-411), the "researcher" in this model: 1) "participates fully, freely and self-critically in the setting;" 2) "observes and renders a description of the facts and 'on-goings' of the setting, but in the context of his [or her] biographical position;" and 3) based on his or her "commitment and the evidence, received and theoretically grounded, he [or she] can actively intervene ... with others who partake in a comparable predicament and with all those who identify with this predicament and who are willing to change it."

Conclusions

This paper represents an attempt to identify and discuss some of the choices that researchers face as they engage in classroom-anchored research in connection with efforts to improve educational quality in developing countries. However, in disseminating this paper we are not seeking to impose one or another set of research assumptions, traditions, approaches, strategies, or techniques on colleagues, whether they are connected with the IEQ project or not. Indeed, within the IEQ project and in the context of activities in Ghana, Guatemala, and Mali, the three scientific traditions are being drawn on in different combinations to guide efforts to conduct research and to link it with policy and practice. Neither are we suggesting that the ideas (and references) presented herein are the only ones on which researchers in and outside this project can and should draw. We concur with Vulliamy, Lewin, and Stephens (1990, p.4) that "while some issue of research design, execution and analysis may be generalizable, others are more specific to the cultural and political context of the research setting ... [and] that

different circumstances lead to different constraints and possibilities concerning the process of research."

We are acutely aware of the problem of "cultural imperialism" through research and other processes (Vulliamy, Lewin, and Stephens, 1990, p. 212). As Diambomba (1981, p. 355) articulates, there is a real problem if research activity in projects similar to IEQ are reduced to:

a mere exercise in the re-creation of 'Western research environments' in the Third World. ... [Such a] drive to recreate Western research appears to be one of the reasons why potential African [etc.] researchers may not do research; fear of non-acceptance of their work by peers overseas or by their local representatives reduces them to almost total inaction.

Our intent in sharing some of what we can distill from different scientific traditions is to encourage colleagues working in various contexts to engage in a dialogue (with each other and with us) about how to conduct research and how to link it with educational policy and practice. We believe that this dialogue will be enriched if the ideas presented here are considered together with ideas that other colleagues bring to the conversation from a variety of other written sources and experiences. We share Shaeffer's (1981) desire to promote informed flexibility and imagination in research activities in the "developing" and "developed" world. Our hope is that such dialogue will not only be helpful to them and their work, but that we may also learn from the ideas about research that are generated through this process.

Endnotes

1. This is an abridged version of a manuscript developed in the context of the Improving Educational Quality Project. This project is being undertaken under contract (No. DPE-5836-C-00-1042-00) with the U.S. Agency for International Development by a consortium including the Institute for International Research (prime contractor), Institute for International Studies in Education of the University of Pittsburgh, and Juarez and Associates. The constructive criticisms provided on earlier drafts of this manuscript by Don Adams, Yetilu Baessa, Ray Chesterfield, and Jane Schubert are gratefully acknowledged.
2. That there are choices in how one goes about doing research is certainly not a new idea. For example, the point was made centuries ago by Aristotle (in De Anima [On the Soul]): "if there is no single and general method for solving the question of essence, our task becomes still more difficult; in the case of each different subject we shall have to determine the appropriate process of investigation" (quoted in Shulman, 1981, p. 8). The focus of this paper is not on the "soul" or "essence" of human beings, but studying "educational quality" may present some of the same challenges identified by Aristotle. As Adams (1993, p. 4) has argued in another IEQ project paper, "even under intense scrutiny the concept of educational quality has remained somewhat elusive, and many persistent questions surround any attempt at definition."
3. Although some progress has been made since the time of Pfau's (1986: 293) writing this, it still is unfortunately the case that "social scientists have only vague ideas about what occurs in the classrooms of most countries of the world and how classroom behaviors vary from one part of the world to another." The IEQ project is committed to expanding and deepening our understandings of classrooms (in context), while also focussing on developing effective strategies for linking classroom-anchored research to on-going efforts directed at improving educational quality.
4. We assume that many readers are familiar with the debates among researchers representing the three scientific traditions. Thus, our discussion here is relatively brief. By providing some illustrations of research questions and identifying references to more in-depth discussions of these issues, we hope to help the reader who may have less previous exposure to such methodological and epistemological discourses. We focus somewhat more on the choices in linking research and policy/practice, because we believe less has been written on these issues.
5. Of course, there are additional choices to be made even if one chooses to undertake investigations solely within one scientific tradition or paradigm. In a more extended discussion (Ginsburg et al., 1993), for example, we outline some of the main strategies, techniques, and issues associated with doing classroom-

anchored research, focusing in more depth on two of these traditions: positivist (quantitative) and interpretivist (qualitative), and considering inter- and intra-paradigmatic choices concerning research design, sampling, measurement, data collection, and data analysis.

6. We place quotes around the terms "developed" and "developing" in describing countries to signal that these are shorthand labels that do not necessarily reflect our analysis of the world system. Other terms that might be appropriate or "rich" and "poor," "dominant" and "subordinate," "First World" and "Third World," "center" and "periphery," or "metropolis" and "hinterland" (e.g., see Zachariah, 1986).
7. The positivist science tradition, what some would label the quantitative research approach, has for many years dominated academic and policy-oriented investigations. As Soltis (1984, p. 6) notes, "there seems to be a basic common agreement within this majority group that educational research must be empirical, objective, and value free – scientific in the positivist's sense." Popkewitz (1981, pp. 6-7) identifies additional assumptions of positivist science: "theory is to be universal, not bound to specific contexts" and theory is developed and tested with reference to empirical examination of causally-related, mathematically quantified variables. There are a variety of sources available to consult concerning design, sampling, measurement, data collection (via observation, interview, questionnaires, tests, and official records) and data analysis in experimental and survey research conducted in the positivist science tradition (e.g., see Babbie, 1990; Borg and Gall, 1989; Campbell and Stanley, 1963; Eichelberger, 1989; Galton, 1978; Gorden, 1980; Hollander and Wolfe, 1973; Irwin and Bushnell, 1980; Jaeger, 1988; Moser and Kalton, 1972; Nash, 1973; Oppenheim, 1967; Porter, 1988; Sudman, 1982; Tuckman, 1972; Yarrow, 1960).
8. In the interpretive science tradition, what some would term the qualitative research approach, "research questions are not framed by operationalizing variables; they are formulated in all of their complexity, in context. ... They are also concerned as well with understanding behavior from the subject's own frame of reference" (Bogdan and Biklen, 1992, p. 2). Popkewitz (1981, pp. 10-13) similarly contrasts interpretive from positivist science, but he also indicates that both traditions share a goal of developing "a descriptive 'neutral' theory about social [and practical] affairs ... [which is] contemplative and hence detached from social situations." And Patton (1990) emphasizes that within the interpretive science tradition research is undertaken "natural settings" and the researcher serves as the "key instrument" in data collection aimed at developing "grounded theory." There are a range of sources available on the topics of research design, sampling, data collection (via observation, interview, documents, and audio- and video-recording), and data analysis in ethnography or other forms of research and evaluation studies conducted in the interpretivist science tradition (e.g., Agar, 1986; Becker, 1958; Bogdan and Biklen, 1992; Denzin, 1971; Dobbert, 1982;

Douglas, 1976; Ely, 1991; Erickson, 1986; Geertz, 1973; Glaser and Strauss, 1967; Goetz and LeCompte, 1984; Hammersley and Atkinson, 1983; Lincoln and Guba, 1985; Miles and Huberman, 1984; Mishler, 1986; Patton, 1990; Reinharz, 1984; Smith, 1979; Spradley, 1979 and 1980; Tesch, 1990; Wolcott, 1990; Wood, 1986).

9. The critical science tradition has a long history but only in recent years has had much visibility in educational research. Those identifying with this tradition "reject the idea of value-free research into human social, political, and educational phenomena as a myth and stress the need for inquiry that takes into account the historical-ideological moment we live in and the influence it has on us" (Soltis, 1984, p. 7). As Popkewitz (1981, p. 15) observes about the critical science tradition: "A critical social science is, at root, normative and substantive as well as formal. ... Conventional distinctions between fact and value, philosophy, politics, and science are not maintained. ... The function of critical [science] is to understand the relations among value, interest, and action and ... to change the world, not [merely] to describe it. There are a number of sources discussing approaches to conducting research in the critical science tradition (e.g., see Anderson, 1989; Lather, 1991; Masemann, 1976; Reinharz, 1992; Roberts, 1981; Simon and Dippo, 1986; Thomas, 1983).
10. Later in this paper we will not discuss separately methodological issues (i.e., sampling, data collection, data analysis) for the critical tradition because of this fact that the critical science tradition includes approaches (e.g., quantitative and qualitative) associated with the other two traditions.
11. The differences in posing research questions – as well as determining research designs, sampling, measurement, data collection, and data analysis – are illustrated as well in a range of volumes offering *post hoc* accounts of the research experience (e.g., see Burgess, 1984; Golden, 1976; Hammond, 1964; Roberts, 1981; Shaffir, Stebbins, and Turowetz, 1980; Stubbs and Delamont, 1976; Vulliamy, Lewin, and Stephens, 1990; Walford, 1993).
12. Research within the critical science tradition often focuses on concerns about unequal relations between gender, racial/ethnic, social class, and national groups. Feminist, liberationist, marxist, and dependency or neo-colonial theoretical approaches may serve to underpin research in the critical science tradition.
13. Readers may also wish to consult these and similar studies for details about how the researchers proceeded to collect and analyze data to address these research questions.
14. See Ginsburg et al. (1993) for a discussion about technical, strategic, and tactical questions in conducting classroom-anchored research within different scientific traditions, specifically concerning research design, sampling, measurement, data collection, and data analysis.

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TABLE 1: KEY ELEMENTS OF THREE SCIENTIFIC TRADITIONS

<u>ELEMENTS</u>	<u>Conception of Theoretical Knowledge</u>	<u>Conception of the Social World</u>	<u>Scientist's Role in the Social World</u>
<u>Positivist Science</u>	universal, context free, "objective"	causal relations among variables (social facts)	neutral, detached, objective inquirer
<u>Interpretivist Science</u>	context-dependent; orientation to "grounded theory" ¹	web of meaning and action, continually being socially constructed	"empathetic neutrality," ² involved subjectively to collect and interpret data
<u>Critical Science</u>	either	either	committed and engaged; seeks understanding to foment progressive social change

¹See Glaser and Strauss (1967).

²See Patton (1990)

TABLE 2. EXAMPLES OF RESEARCH QUESTIONS IN THREE SCIENTIFIC TRADITIONS

Country	GHANA	GUATEMALA	MALI
Topic	Instructional Resources	Multi-grade Schools	French literacy
TRADITION			
POSITIVIST	<ol style="list-style-type: none"> 1. Does more frequent use of textbooks increase student (math, etc.) achievement? 2. Are textbooks more effective than other instructional resources in promoting on-task behavior of students in school? 	<ol style="list-style-type: none"> 1. Which instructional practices in multi-grade schools promote cognitive and socio-emotional development? 2. Do some curricular materials promote creativity more than others? 	<ol style="list-style-type: none"> 1. Are reading and literacy levels enhanced by bilingual (versus immersion) instruction? 2. Which instructional materials promote more positive attitudes toward French language?
INTERPRETIVIST	<ol style="list-style-type: none"> 1. How are texts used by teachers and students in classrooms? 2. How do students and teachers view the instructional value and content of texts? 	<ol style="list-style-type: none"> 1. What happens in multi-grade schools and how do teachers and students view these experiences with respect to cognitive, socio-emotional, and creativity development? 	<ol style="list-style-type: none"> 1. How do teachers and students socially construct French literacy lessons? 2. How do students interpret and develop strategies for taking reading tests?
CRITICAL	<ol style="list-style-type: none"> 1. Are male or female students more likely to benefit from texts being used during instruction? 2. Does the content of texts critique or legitimate existing social inequalities? 	<ol style="list-style-type: none"> 1. Do multi-grade schools promote "development" for some groups at the expense of others? 2. Is liberation or social control more closely tied to the way creativity is defined in classrooms? 	<ol style="list-style-type: none"> 1. Which ethnic or linguistic groups are (dis)advantaged by introducing French in the early grades? 2. What messages about the value of African cultures are conveyed in French lessons?

TABLE 3: RESEARCH QUESTIONS POSED IN RELEVANT STUDIES IN THE THREE SCIENTIFIC TRADITIONS

Scientific Tradition	Research Questions from Cited Studies
Positivist	<p>Which of two instructional approaches (systems) is more effective in developing Venezuelan students' skills in solving textbook problems in science or mathematics? (Bascone and Novak, 1985)</p> <p>What is the effect of different types of rhetorical organization on the second language reading comprehension of non-native speakers of English in the United States? (Meyer and Freedle, 1984)</p> <p>What impact does textbook availability have on student learning in Uganda? (Heyneman and Jamson, 1980)</p> <p>What factors account for the effect that textbook use has on student mathematics achievement in Thailand? (Lockheed, Vail, and Fuller, 1986)</p>
Interpretivist	<p>What do elementary school students in the United States learn in an instructional program designed to develop their ability to confront and solve meaningful, real-world problems? (Davidman, 1978)</p> <p>How is a school-centered curriculum innovation, which was originally conceptualized in a "developed" society, implemented in a secondary school in a "developing" country like Papua New Guinea? (Crossley, 1984)</p> <p>How are traditional educational practices combined with "modern" Western-style schooling in a community in Ghana and what aspects of the situation are viewed positively and negatively by students, teachers, and parents? (Grindal, 1972)</p> <p>How do school administrators, teachers, and community members understand and evaluate school-focused efforts to promote rural community development in the Philippines? (Manalang, 1977)</p>
Critical	<p>What are the differences between the instruction girls and boys receive in reading and mathematics in elementary school classrooms in the United States? Did the differences in instruction correspond with girls' relatively higher verbal achievement and boys' relatively higher quantitative achievement on school examinations? (Leinhardt, Seewald, and Engel, 1979)</p> <p>What gender role messages are sent in the official curriculum (e.g., textbooks) and the hidden curriculum (e.g., school's authority structure, teachers' attitudes and classroom interaction) and which are received and internalized by male and female secondary school students? What implications does this have for the social and cultural reproduction of gender relations in the African society of Togo? (Biraimah, 1982)</p> <p>How is school failure accomplished through teacher-student in Bolivia, Colombia, Peru, and Venezuela, and what implications does this have for the perpetuation of poverty in Latin American societies such as these? (Avalos, 1986)</p> <p>How are students' identities as members of gender, racial, and social class groups drawn upon by them, their teachers, and their parents in socially constructing "successful" and "unsuccessful" school careers in St. Croix, West Indies? (Gibson, 1991)</p>