

1998

# Qualitative-Quantitative Research Methodology: Exploring the Interactive Continuum

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## eCommons Citation

Newman, Isadore and Ridenour, Carolyn, "Qualitative-Quantitative Research Methodology: Exploring the Interactive Continuum" (1998). *Educational Leadership Faculty Publications*. 122.  
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# 1

## Qualitative-Quantitative Research: A False Dichotomy

### Introduction

**B**ELIEVING THAT THE RESEARCH QUESTION was even more fundamental than the paradigm one felt allegiance to, several years ago we began to discuss the qualitative-quantitative debate from that perspective. The dichotomy and the debate disappeared, and the ideas presented here began to develop.

This book describes our stance at a point in time, not the conclusions of our ideas, which continue to emerge, to grow, and to build from our work as researchers and as teachers. While clearly a work in progress, which continues to evolve, the framework of an interactive continuum presented here has been enlightening to colleagues and students who operate within the current world of often-misunderstood and frequently debated paradigm shifts.

At the conclusion of chapter 1, the reader should be able to

1. Describe the history of qualitative and quantitative research methods and the debate about their relative values
2. Describe the typical purpose and outline of qualitative research
3. Describe the typical purpose and outline of quantitative research

## Qual-Quan Research

4. Discuss the advantages and disadvantages of a dichotomy versus a continuum conceptualization of research design

Qualitative and quantitative research have philosophical roots in the naturalistic and the positivistic philosophies, respectively. Virtually all qualitative researchers, regardless of their theoretical differences, reflect some sort of individual phenomenological perspective. Most quantitative research approaches, regardless of their theoretical differences, tend to emphasize that there is a common reality on which people can agree.

From a phenomenological perspective, Douglas (1976) and Geertz (1973) believe that multiple realities exist and multiple interpretations are available from different individuals that are all equally valid. Reality is a social construct. If one functions from this perspective, how one conducts a study and what conclusions a researcher draws from a study are considerably different from those of a researcher coming from a quantitative or positivist position, which assumes a common objective reality across individuals. There are different degrees of belief in these sets of assumptions about reality among qualitative and quantitative researchers. For instance, Blumer (1980), a phenomenological researcher who emphasizes subjectivity, does not deny that there is a reality one must attend to.

The debate between qualitative and quantitative researchers is based upon the differences in assumptions about what reality is and whether or not it is measurable. The debate further rests on differences of opinion about how we can best understand what we "know," whether through objective or subjective methods.

William Firestone (1987), in an article in the *Educational Researcher*, differentiates qualitative from quantitative research based on four dimensions: assumptions, purpose, approach, and research role. Regarding assumptions, Firestone asks: is objective reality sought through facts or is reality socially constructed? Related to purpose, he asks: is it looking for causes or for understanding? To

determine approach, he asks whether the research is experimental/correlational or a form of ethnography. Lastly, related to the researcher's role, he asks whether the researcher is detached or immersed in the setting.

Shaker (1990), in a discussion of program evaluation models, presents them as a metaphorical journey—moving from quantitative perspectives in the past to more recent naturalistic and qualitative assumptions. While positing a chronological continuum, Shaker would not seem to oppose our notion of question-driven research and evaluation. While he describes the “new identity” for evaluation as being “based on naturalistic approaches,” he places this in the context of a “pragmatic commitment to finding methods that yield results in practice as we find it, rather than as we wish it to be” (p. 355).

The qualitative, naturalistic approach is used when observing and interpreting reality with the aim of developing a theory that will explain what was experienced. The quantitative approach is used when one begins with a theory (or hypothesis) and tests for confirmation or disconfirmation of that hypothesis.

It is important here to set the stage for abandoning the dichotomy. To do so, we examine a few of the key events in the chronicle of scientific evolution that established the debate in the first place. As long as one view of how we can explain the workings of the world reigns supreme, there is no debate. The debate rests on a dichotomy characterized by a lessening of the dominance of one paradigm over another, leveling the playing field so that the debate could occur. In fact, the debate may be but one more phase in the ebb and flow of an ever-changing philosophy of knowledge. For example, in *The Enlightened Eye*, Eisner (1991) cautions against the dichotomy and asserts that qualitative and quantitative research can be combined. He warns against qualitative researchers merely adopting a “soft form of positivism” (p. 167).

The genesis of the current qualitative-quantitative debate in educational research occurred as far back as 1844, when Auguste Comte

## Qual-Quan Research

claimed that the methods of natural science could be justified in studying social science (1974; see also Vidich & Lyman, 1994). Science, in this view, is the collection and study of facts that can be observed through sensory input. These are the traditional data investigated by natural scientists—the physicists, the chemists, the biologists. This view holds that *true* science is accumulated through the study of phenomena that can be physically sensed, observed, and counted. The “unknowables,” as Herbert Spencer described them in his 1910 essay, those things that cannot be sensed but might rely on reason or thought, are banished from scientific investigation. Both Comte and Spencer were positivists.

Interestingly, this “positivism” was a move away from a more speculative, more “unknowable” view. It was a move away from relying on theological and metaphysical explanations of the world. It was a move toward what could be “positively” (confirmed through sensory data) determined. The philosophy maintained a grip on social science from the late 1800s through the early 1900s.

In the early 1900s, John Dewey, among others, questioned the absolutism of this position, viewing science as not separate and distinct from problem solving. His pragmatism considered science less rigidly than did the positivists. In his *Sources of a Science of Education* (1929), written some time after his initial speculations, he pointed out that practice should be the ground of our inquiry. Because of the value placed on experience for learning and the emphasis on practice, he appreciated the deeper complexity of what educational and social scientists study. During the same period, a group of scholars who made up what became known as the famous Vienna Circle met and developed a new philosophy of science, logical positivism. Supporting Comte’s positivism, they combined it with the symbolic logic of mathematics. Hypotheses derived using the rigor of mathematics (the symbolic) could be combined with fact gathering (the positivism) to test their confirmability (which was eventually modified to *disconfirmability*). Although counter to an impetus by Dewey to diffuse the positivistic as-

sumptions made by researchers, this hypothetico-deductive system was dominant in the middle years of the 20th century in psychology and sociology. Education, which borrowed traditions of inquiry from these disciplines, was affected as well. The respect for precision in measurement, mathematically systematic tests of hypotheses, and a quest for value-free science solidified this paradigm.

During the 1940s and 1950s, the quantitative paradigm dominated the social science and the educational research scene. Behaviorists and organizational theorists utilized empirical fact gathering and hypothesis testing almost exclusively in studying educational and social phenomena.

In the mid-1960s, while the quantitative perspective continued to prevail, a shift began as skepticism toward the domination of logical positivism and the evident chasm between human social systems and mathematical logic grew. New epistemologies began to emerge that acknowledged, for example, the value-laden nature of human social interactions. That human beings construct reality for themselves and that knowledge itself is transmitted in social ways were beginning to be assumed. Questions arose about the tenability of applying natural science methodology to these complex human dynamics.

In 1962, in *The Structure of Scientific Revolutions*, the most significant work on this issue, Thomas Kuhn explored the shifts in science's dominant paradigms. His doctorate in theoretical physics led him to look back into the history of science as he sought to know more about its foundations. He describes how, by randomly exploring the literature, he was exposed to Jean Piaget and, in the late 1950s, to a historical analysis of social science and psychology. Kuhn's study of methodology drove him to leave physics and become a historian of science. He conceptualizes the notion of paradigms, "universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners," (1970, p. viii) and proposes that competing paradigms emerge chronologically when the dominant one no longer serves the explanatory needs of the scientific

## Qual-Quan Research

community. For the most part, using the context of physics from the perspectives of Sir Isaac Newton and Albert Einstein, Kuhn explains these periods of competition, or scientific revolutions, in the natural sciences. He acknowledges that competing paradigms can possibly co-exist on equal footing following such a revolution, or "paradigm shift," although, he cautions, it may be only rarely possible.<sup>1</sup> He proposes that the predominant paradigm affects researchers not only methodologically but also in how they see the world. Kuhn's conceptualization of "paradigm" has been reinterpreted by others since his work, and many definitions are incorporated in the literature of the 1990s.

The quantitative paradigm continued to reign over social science and, according to Culbertson (1988), prevailed in education until the mid-1980s. At that time the logical positivists were losing supremacy. (The strong traditional bias toward quantitative science might even be based on Americans' preference for facts we can observe and count, a sense that that's what science "is.")

Concurrent with Kuhn's early notions of paradigms in the 1960s, society was undergoing radical changes. While some began to question the efficacy of the positivists' tools in explaining human organizational and social phenomena, education was moving into a more complex social context. Culbertson points to such 1960s and 1970s issues as racial integration, poverty, equal opportunity, schools as tools in global economic competition, the Soviet Union's threat to our math and science preeminence, and the need to account for the success and failure of the nation's children and posits that, in this context of increased complexity, some began to search for policy tools that the quantitative paradigm did not seem sufficiently able to explain. That education served economic, political, and policy ends enhanced the opportunity for scholars interested in the culture of schools to begin to use anthropological strategies in their inquiry. These same interests fed the scholars' attempts to approach their research from the perspective of the critical theorists, as well as that of the feminists. Although always an important issue, the policy makers' interest in the world of classroom prac-

tice grew, and they increasingly expressed concerns that research and practice were unconnected and that this disconnection was in part due to the use of tightly controlled laboratory-like quantitative assumptions. A move among some social scientists in the direction of deriving theory *from* practice, rather than the other way around, characterized this change as well.

Graduate programs preparing educational and social science researchers as well as professional journals have increasingly directed their attention toward qualitative research. Allotting time and space to what had been considered the "alternative" paradigm led to wide discussions in the journals and at professional meetings. The editors of the *American Educational Research Journal*, for example, announced in 1987 that particular emphasis on qualitative methodology would be forthcoming as they evaluated manuscripts. This was a major legitimization of the paradigm for educational researchers. A plethora of books, articles, and presentations on the trustworthiness of the qualitative paradigm materialized. Some extolled the virtues of qualitative research as the only avenue to "truth," while others claimed that only by holding onto the quantitative traditions can we have confidence in our knowledge base. In many forums the debate was manifest. Which is more scientific: the deductive methods of the logical positivists (quantitative researchers) or the inductive methods of the naturalists (qualitative researchers)? Can the results of qualitative research be generalized as are the results of quantitative research? Can science be value laden (qualitative) or only legitimate if value free (quantitative)? What epistemological assumptions are violated by adopting one paradigm or the other?

While to some the debate has ended, to others, especially those we encounter in researcher-preparation programs, the debate has either not yet materialized to the full extent of its fury or continues unabated. Our strong sense is twofold. First, we continue to prepare students for an "either-or" world, a dichotomous world, that no longer exists. We still prepare students who leave our colleges and universi-



## Qual-Quan Research

ties with a monolithic perspective. Either they become well-trained statisticians, or they become cultural anthropologists, methodologically weak in asking research questions and in justifying either one or the other set of strategies. Second, researchers in education and in the social sciences have not yet constructed a way to ensure their success in utilizing both paradigms. The interactive continuum model in this book serves as a kind of framework directed toward both those needs.

The dichotomy of qualitative and quantitative research is one we deny but one we exploit here for heuristic purposes. The dichotomy, while not an ontological construct, does allow us to separate the idea. We slice it thin to examine it and make the case in this chapter that it does not exist in the scientific research realm.

In chapter 2, we elaborate on the notion of the interactive continuum. We discuss the construct of validity, review methods, and address the strengths and weaknesses of both paradigms in chapter 3. In chapter 4, we discuss strategies to increase validity in quantitative and qualitative methods.

Chapter 5 contains approaches to applying the continuum by asking questions to assess whether the research purpose is consistent with the assumptions and methods of that research. We present applications of the model to four articles from education and counseling. In the final chapter, chapter 6, we summarize the interactive continuum, its application, and how its use can enhance educational research by clarifying a *unified* philosophy of science to the novice, as well as by expanding the perspectives of the experienced researcher. We make the case that, rather than there being a dichotomy between qualitative and quantitative approaches, research is based on a unified philosophy of science and can be more appropriately conceptualized as an interactive continuum. This approach can be transformed into an operational model to assist both in critiquing published research and in planning one's own research.

All research in education stands on basic underlying assumptions.

This is true for quantitative methods as well as qualitative methods. To the extent that these assumptions withstand the scrutiny of scientific inquiry, the methods can be supported, taught to novice researchers, and used professionally and ethically without reservation. Since the mid-1980s when quality in all educational professions came under public review, it has become particularly crucial to delineate the foundational bases of educational research. Within the realm of this book, such bases will be examined.

### Qualitative Versus Quantitative: A False Dichotomy

All behavioral research is made up of a combination of qualitative and quantitative constructs. In this book, the notion of the qualitative-quantitative research continuum, as opposed to a dichotomy, is explored on scientific grounds. We believe that conceptualizing the dichotomy (using separate and distinct categories of *qualitative* and *quantitative* research) is not consistent with a coherent philosophy of science and, further, that the notion of a continuum is the only construct that fits what we know in a scientific sense. A secondary theme is equally important; that is, what are known as qualitative methods are frequently beginning points, foundational strategies, which often are followed by quantitative methodologies.

Qualitative research methods are those generally subsumed under the heading *ethnography*. Other headings and names include *case studies*, *field studies*, *grounded theory*, *document studies*, *naturalistic inquiry*, *observational studies*, *interview studies*, and *descriptive studies*. Qualitative research designs in the social sciences stem from traditions in anthropology and sociology, where the philosophy emphasizes the phenomenological basis of a study, the elaborate description of the "meaning" of phenomena for the people or culture under examination. This is referred to as the *verstehen approach*. Often in a qualitative design only one subject, one case, or one unit is the focus

## Qual-Quan Research

of investigation over an extended period of time. According to Glaser and Strauss (1967), qualitative data are often coded a posteriori from interpretations of those data.

Quantitative research, on the other hand, falls under the category of *empirical studies*, according to some, or *statistical studies*, according to others. These designs include the more traditional ways in which psychology and behavioral science have carried out investigations. Quantitative modes have been the dominant methods of research in social science. Quantitative designs include experimental studies, quasi-experimental studies, pretest-posttest designs, and others (Campbell & Stanley, 1963), where control of variables, randomization, and valid and reliable measures are required and where generalizability from the sample to the population is the aim. Data in quantitative studies are coded according to a priori operational and standardized definitions.<sup>2</sup>

It is necessary to adopt some standard by which one can measure whether the qualitative, the quantitative, or a continuum that includes both methodologies is the most effective mode in reaching truth. We assume the standard of science as a way of knowing.

Mouly (1970) asserts that, although there are two ways other than science to "know" something (i.e., "experience" and "reasoning"), only through science can we generalize and provide for theory building. Some would have us believe that we can know something based on "authority." This basis has similarly been discredited because of the frequent inability to verify the facts, as well as the conflicting points of view among authorities. Other philosophers (described in McAshan, 1963) go even further and suggest one can "know truth" also through "serendipity," "intuition," "compromise," and "consensus." Conjecture surrounding how we can know about truth, repeatable and verifiable truth, runs the gamut from "faith" to simple sensory perception. The assumption here is that science, as reflected in the scientific method, is the only defensible way of locating and verifying truth. Therefore, the criteria for comparison of the constructs underlying the dichotomy

(qualitative vs. quantitative) and the interactive continuum (qualitative to quantitative to qualitative, etc.) are their scientific bases

The search for knowledge (or "truth") is the purpose of research.<sup>3</sup> This search and, concomitantly, this research is most effective when built on the scientific method. In the ongoing debate between the positivists and the naturalists we tend to support the idea that the modern-day scientific method is both inductive and deductive, objective and subjective. Design validity is more likely to be built into studies when the researcher is open to both paradigms rather than precluding one or the other. When faced with the question, "Which is better?" we would refuse to answer; indeed, we would be *unable* to answer, given the choices presented. There is no such answer. The better paradigm (qualitative or quantitative) is the one that serves to answer the specific research question.

We began our thinking on these issues over a decade ago. Our thoughts began to solidify in an interactive continuum model in 1985. Others have written about integrating qualitative and quantitative methods. Cook and Reichardt (1979) predates our original work and, like us, they suggest that the researcher's method can be separated from the researcher's worldview. Their book differs from ours in that their ideas are presented in an introductory essay to a collection of essays by research methodologists. Their purpose was to bring together the combined works of many who were then struggling with the issues. Michael Patton (1980) presents a diagram of what he calls "mixed paradigms" in his book, *Qualitative Evaluation Methods*. His conceptualization, like ours, acknowledges that, between the qualitative and quantitative paradigms, there is a continuum of methods. His book, however, addresses qualitative methods only. It is not an exhaustive examination of assumptions, methods of research, and ways to critique research studies as we intend ours to be.

Creswell (1994), too, has authored a volume, *Research Design: Qualitative and Quantitative Approaches*, and he intends it to assist the researcher in making decisions about design. His book seems most

## Qual-Quan Research

closely focused on writing a dissertation proposal, and it is organized in that sequence. It does not include critiquing research as ours does, and he does not present an overall model of his thinking. The book is replete with examples from both qualitative and quantitative studies.

Our book contributes to the current discourse on research methods and assumptions underlying social science research by

1. Depicting an overall model of qualitative-quantitative interactive continuum
2. Suggesting ways to assess quality of published research
3. Providing a strong emphasis on validity

In the last decade, a debate has continually raged as though one or the other paradigm should eventually win. Discounting the debate is not the issue of importance. The key issue, we believe, should be improving the quality of research through an integrated way of viewing qualitative and quantitative research methods. Both paradigms co-exist in the world of inquiry, and together they form an interactive continuum. Operationalizing this model is the focus of the rest of our book.