



Revisiting the Quantitative-Qualitative Debate: Implications for Mixed-Methods Research

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Abstract. Health care research includes many studies that combine quantitative and qualitative methods. In this paper, we revisit the quantitative-qualitative debate and review the arguments for and against using mixed-methods. In addition, we discuss the implications stemming from our view, that the paradigms upon which the methods are based have a different view of reality and therefore a different view of the phenomenon under study. Because the two paradigms do not study the same phenomena, quantitative and qualitative methods cannot be combined for cross-validation or triangulation purposes. However, they can be combined for complementary purposes. Future standards for mixed-methods research should clearly reflect this recommendation.

Key words: mixed-methodology, quantitative-qualitative debate, qualitative methods, quantitative methods, scientific paradigms

1. Introduction

Health care research includes many studies that combine quantitative and qualitative methods, as seen in numerous articles and books published in the last decade (Caracelli and Greene, 1993; Caracelli and Riggan, 1994; Casebeer and Verhoef, 1997; Datta, 1997; Droitcour, 1997; Greene and Caracelli, 1997; House, 1994; Morgan, 1998; Morse, 1991; Tashakkori and Teddlie, 1998). As many critics have noted, this is not without its problems. In this paper, we revisit the quantitative-qualitative debate which flourished in the 1970s and 1980s and review the arguments for and against using mixed-methods. In addition, we present what we believe to be a fundamental point in this debate.

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Some people would say that we are beyond the debate and can now freely use mixed- method designs to carry out relevant and valuable research. According to Carey (1993), quantitative and qualitative techniques are merely tools; integrating them allows us to answer questions of substantial importance. However, just because they are often combined does not mean that it is always appropriate to do so.

We believe that mixed-methods research is now being adopted uncritically by a new generation of researchers who have overlooked the underlying assumptions behind the qualitative-quantitative debate. In short, the philosophical distinctions between them have become so blurred that researchers are left with the impression that the differences between the two are merely technical (Smith and Heshius, 1986).

OBJECTIVE

Combining qualitative and quantitative methods in a single study is widely practiced and accepted in many areas of health care research. Despite the arguments presented for integrating methods, we will demonstrate that each of these methods is based on a particular paradigm, a patterned set of assumptions concerning reality (ontology), knowledge of that reality (epistemology), and the particular ways of knowing that reality (methodology) (Guba, 1990). In fact, based on their paradigmatic assumptions, the two methods do not study the same phenomena. Evidence of this is reflected by the notion that quantitative methods cannot access some of the phenomena that health researchers are interested in, such as lived experiences as a patient, social interactions, and the patients' perspective of doctor-patient interactions. The information presented in this paper is not new in the sense that we are making a "new" case for or against the debate. Rather, based on the paradigmatic differences concerning the phenomenon under study, we propose a "new" solution for using mixed-methods in research that we believe is both methodologically and philosophically sound.

2. The Two Paradigms

The quantitative paradigm is based on positivism. Science is characterized by empirical research; all phenomena can be reduced to empirical indicators which represent the truth. The ontological position of the quantitative paradigm is that there is only one truth, an objective reality that exists independent of human perception. Epistemologically, the investigator and investigated are independent entities. Therefore, the investigator is capable of studying a phenomenon without influencing it or being influenced by it; "inquiry takes place as through a one way mirror" (Guba and Lincoln, 1994: 110). The goal is to measure and analyze causal relationships between variables within a value-free framework (Denzin and Lincoln, 1994). Techniques to ensure this include randomization, blinding, highly

structured protocols, and written or orally administered questionnaires with a limited range of predetermined responses. Sample sizes are much larger than those used in qualitative research so that statistical methods to ensure that samples are representative can be used (Carey, 1993).

In contrast, the qualitative paradigm is based on interpretivism (Altheide and Johnson, 1994; Kuzel and Like, 1991; Secker et al., 1995) and constructivism (Guba and Lincoln, 1994). Ontologically speaking, there are multiple realities or multiple truths based on one's construction of reality. Reality is socially constructed (Berger and Luckmann, 1966) and so is constantly changing. On an epistemological level, there is no access to reality independent of our minds, no external referent by which to compare claims of truth (Smith, 1983). The investigator and the object of study are interactively linked so that findings are mutually created within the context of the situation which shapes the inquiry (Guba and Lincoln, 1994; Denzin and Lincoln, 1994). This suggests that reality has no existence prior to the activity of investigation, and reality ceases to exist when we no longer focus on it (Smith, 1983). The emphasis of qualitative research is on process and meanings. Techniques used in qualitative studies include in-depth and focus group interviews and participant observation. Samples are not meant to represent large populations. Rather, small, purposeful samples of articulate respondents are used because they can provide important information, not because they are representative of a larger group (Reid, 1996).

The underlying assumptions of the quantitative and qualitative paradigms result in differences which extend beyond philosophical and methodological debates. The two paradigms have given rise to different journals, different sources of funding, different expertise, and different methods. There are even differences in scientific language used to describe them. For example, the term "observational work" may refer to case control studies for a quantitative researcher, but to a qualitative researcher it would refer to ethnographic immersion in a culture. "Validity" to a quantitative researcher would mean that results correspond to how things really are out there in the world, whereas to a qualitative researcher "valid" is a label applied to an interpretation or description with which one agrees (Smith and Heshusius, 1986). Similarly, the phrase "research has shown . . ." or "the results of research indicate . . ." refers to an accurate reflection of reality to the quantitative researcher, but to a qualitative researcher it announces an interpretation that itself becomes reality (Smith and Heshusius, 1986).

The different assumptions of the quantitative and qualitative paradigms originated in the positivism-idealism debate of the late 19th century (Smith, 1983). The inherent differences rarely are discussed or acknowledged by those using mixed-method designs. The reasons why may be because the positivist paradigm has become the predominant frame of reference in the physical and social sciences. In addition, research methods are presented as not belonging to or reflecting paradigms. Caracelli and Greene (1993) refer to mixed-method designs as those where neither type of method is inherently linked to a particular inquiry paradigm

or philosophy. Guba and Lincoln (1989) claim that questions of method are secondary to questions of paradigms. We argue that methods are shaped by and represent paradigms that reflect a particular belief about reality. We also maintain that the assumptions of the qualitative paradigm are based on a worldview *not* represented by the quantitative paradigm.

3. Arguments Presented for Mixed-Method Research

Having discussed some of the basic philosophical assumptions of the two paradigms, we are better able to address the arguments given for combining quantitative and qualitative methods in a single study. There are several viewpoints as to why qualitative and quantitative methods can be combined. First, the two approaches can be combined because they share the goal of understanding the world in which we live (Haase and Myers, 1988). King et al. (1994) claim that both qualitative and quantitative research share a unified logic, and that the same rules of inference apply to both.

Second, the two paradigms are thought to be compatible because they share the tenets of theory-ladenness of facts, fallibility of knowledge, indetermination of theory by fact, and a value-laden inquiry process. They are also united by a shared commitment to understanding and improving the human condition, a common goal of disseminating knowledge for practical use, and a shared commitment for rigor, conscientiousness, and critique in the research process (Reichardt and Rallis, 1994). In fact, Casebeer and Verhoef (1997) argue we should view qualitative and quantitative methods as part of a continuum of research with specific techniques selected based on the research objective.

Third, as noted by Clarke and Yaros (1988), combining research methods is useful in some areas of research, such as nursing, because the complexity of phenomena requires data from a large number of perspectives. Similarly, some researchers have argued that the complexities of most public health problems (Baum, 1995) or social interventions, such as health education and health promotion programs (Steckler et al., 1992), require the use of a broad spectrum of qualitative and quantitative methods.

Fourth, others claim that researchers should not be preoccupied with the quantitative-qualitative debate because it will not be resolved in the near future, and that epistemological purity does not get research done (Miles and Huberman, 1984).

None of these arguments adequately addresses the underlying assumptions behind the paradigmatic differences between qualitative and quantitative research. However, Reichardt and Rallis (1994) acknowledge the possibility of contention between the two paradigms concerning the nature of reality by conceding that the two paradigms are incompatible if the qualitative paradigm assumes that there are no external referents for understanding reality. We have argued that the qualitative paradigm does assume that there are no external referents for understanding reality.

Therefore, we propose that in addressing this fundamental assumption, Reichardt and Rallis dismiss their own claim of compatibility between methodological camps.

An interesting argument has been made by Howe (1988) who suggests that researchers should forge ahead with what works. Truth, he states, is a normative concept, like good. Truth is what works. This appears to be the prevalent attitude in mixed-methods research. Howe's argument seems to suggest that only pragmatists, or those not wedded to either paradigm, would attempt to combine research methods across paradigms. But this does not address the issue of differing ontological assumptions of the two paradigms.

A more interesting and complicated issue is the explanation of results from studies using qualitative and quantitative methods which appear to agree. How can the results be similar if the two paradigms are supposedly looking at different phenomena? Achieving similar results may be merely a matter of perception. In order to synthesize results obtained via multiple methods research, people often simplify the situation under study, highlighting and packaging results to reflect what they think is happening. The truth is we rarely know the extent of disagreement between qualitative and quantitative results because that is often not reported. Another possibility which may account for seemingly concordant results could be that both are, in fact, quantitative. Conducting a frequency count on responses to open-ended questions is not qualitative research. Given the overwhelming predominance of the positivist worldview in health care research, this is not surprising. This often translates to the misapplication of the canons of good "science" (quantitative research) to qualitative studies (see Sandelowski, 1986).

Perhaps the only convincing argument for mixing qualitative and quantitative research methods in a single study would be to challenge the underlying assumptions of the two paradigms themselves. A sound argument would be that both qualitative and quantitative paradigms are based on the tenets of positivism, not constructivism or interpretivism. Howe (1992) gives the impression of making this argument by denying there is an "either-or" choice to be made. Rather, he claims, both quantitative and qualitative researchers should embrace positivism coloured by a certain degree of interpretivism, an adjustment which he proposes is made possible by the critical social research model (or the critical educational research model) which eschews the positivist-interpretivist split in favour of compatibility.

A legitimate argument would have been for Howe and others who appear to be leaning toward this position (e.g. Reichardt and Rallis, 1994) to claim that the paradigmatic debate was oversimplified by a positivism-interpretivism split, and that the qualitative paradigm actually espoused positivism. If we take the position that qualitative researchers operate within a positivist world, we could argue that such a position actually negates or undermines the quantitative-qualitative debate in the first place because it does away with the beliefs about reality from which qualitative research arose. We believe, however, that one cannot be both a positivist and an interpretivist or constructivist.

Closely tied to the arguments for integrating qualitative and quantitative approaches are the reasons given for legitimately combining them. Two reasons for this are prevalent in the literature. The first is to achieve cross-validation or triangulation – combining two or more theories or sources of data to study the same phenomenon in order to gain a more complete understanding of it (Denzin, 1970). The second is to achieve complementary results by using the strengths of one method to enhance the other (Morgan, 1998). The former position maintains that research methods are interdependent (combinant); the latter, that they are independent (additive). Although these two reasons are often used interchangeably in the literature, it is important to make a distinction between them.

4. The Phenomenon of Study

It is probably safe to say that certain phenomena lend themselves to quantitative as opposed to qualitative inquiry and vice versa in other instances. Both quantitative and qualitative researchers often appear to study the same phenomena. However, these researchers' definition of what the phenomena are and how they can best be described or known differ. Both paradigms may label phenomena identically, but in keeping with their paradigmatic assumptions, these labels refer to different things.

For the quantitative researcher, a label refers to an external referent; to a qualitative researcher, a label refers to a personal interpretation or meaning attached to phenomena. For example, a quantitative researcher might use a factory record as if it were representative of what actually happens in the workplace, whereas a qualitative researcher might interpret it as one of the ways that people in a factory view their work environment (Needleman and Needleman, 1996). Because there is no external referent with which to gauge what the truth is, there is no interest in assessing the record as representative of the one and only reality in the workplace. Rather, the ways people use and describe it are expected to vary due to people's differing realities based on such characteristics as gender, age, or role (e.g., employer, manager, worker). Another example is surgical waiting lists. To a quantitative researcher, the list is like a bus queue; patients are taken off the list based on the urgency of need for surgery or some other factors. To a qualitative researcher, the key to understanding the meaning of the list rests with determining how it is organized, managed and used by the people who actively create and maintain it (Pope and Mays, 1993).

These two examples demonstrate that although qualitative and quantitative paradigms may use common labels to refer to phenomena, what the labels refer to is not the same. There are differences of phenomena *within* each paradigm as well. However, the differences in phenomena between the two paradigms are philosophical differences, whereas the difference in phenomena within each paradigm are not. Within the quantitative paradigm, we may compare the results of a magnetic resonance imaging (MRI) scan to those of a computed tomography (CT) scan. Although they may appear to reveal different realities, the use of the scans assumes

that there is something to measure that exists independent of our minds. Both scans are trying to approximate or capture the one reality which correlates with the phenomenon of interest. Within the qualitative paradigm, one may compare the results of a phenomenological study to those of a grounded theory study on how nurses cope with the deaths of their patients. These two types of qualitative studies do not assume that external referents for coping skills exist independent of our minds.

Having taken the position that the quantitative and qualitative paradigms do not study the same phenomena, it follows that combining the two methods for cross-validation/triangulation purposes is not a viable option. (Cross validation refers to combining the two approaches to study the same phenomenon). Ironically, in a comprehensive review of mixed-method evaluation studies, Greene and Caracelli (1989) found that methodological triangulation was actually quite rare in mixed-method research, used by only 3 of 57 studies. Combining the two approaches in a complementary fashion is also not advisable if the ultimate goal is to study different aspects of the same phenomenon because, as we argue, mixed-methods research cannot claim to enrich the same phenomenon under study. The phenomenon under study is not the same across methods. Not only does cross-validation and complementarity in the above context violate paradigmatic assumptions, but it also misrepresents data. Loss of information is a particular risk when attempts are made to unite results from the two paradigms because it often promotes the selective search for similarities in data.

5. Further Considerations in Mixed-Method Research Designs

The most frequently used mixed-method designs start with a qualitative pilot study followed by quantitative research (Morgan, 1998). This promotes the misperception that qualitative research is only exploratory, cannot stand on its own, and must be validated by quantitative work because the latter is “scientific” and studies truth. In response, qualitative researchers have increasingly tried to defend their work using quantitative criteria, such as validity and reliability, as defined in quantitative studies. They also increasingly use computer programs specifically designed for analysing qualitative data, such as NUD.IST or Ethnograph, in quantitative (counting) ways. These practices seriously violate the assumptions of the qualitative paradigm(s). For research to be valid or reliable in the narrow (quantitative) sense requires that what is studied be independent of the inquirer and be described without distortion by her interests, values, or purposes (Smith and Heshusius, 1986). This is not how qualitative studies unfold. They are based on the minimum distance between the investigator and the investigated, and seek multiple definitions of reality embedded in various respondents’ experiences. Therefore, it is more appropriate for qualitative researchers to apply parallel but distinct canons of rigor appropriate to qualitative studies (Strauss and Corbin, 1990).

It is difficult to say whether the growing trend of quantifying qualitative research is a direct result of mixing quantitative and qualitative approaches. It does seem to be a result of researchers from the two paradigms attempting to work together, or the desire for qualitative research to be “taken seriously” in the world of positivist research, such as is commonly found in medicine. In our opinion, mixing research methods across paradigms, as is currently practiced, often diminishes the value of both methods. Pressure is being exerted from the quantitative camp for qualitative research to “measure up” to its standards without understanding the basic premises of qualitative investigations. Proponents of the qualitative paradigm need to address this pressure, but “without slipping on the mantle of quantitative inquiry” (Smith and Heshusius, 1986: 10). This pressure will no doubt continue to escalate as combined methods research becomes more common.

6. Our Solution

The key issues in the quantitative-qualitative debate are ontological and epistemological. Quantitative researchers perceive truth as something which describes an objective reality, separate from the observer and waiting to be discovered. Qualitative researchers are concerned with the changing nature of reality created through people’s experiences – an evolving reality in which the researcher and researched are mutually interactive and inseparable (Phillips, 1988b). Because quantitative and qualitative methods represent two different paradigms, they are incommensurate. As Guba states, “the one [paradigm] precludes the other just as surely belief in a round world precludes belief in a flat one” (1987: 31). Fundamental to this viewpoint is that qualitative and quantitative researchers do *not*, in fact, study the same phenomena.

We propose a solution to mixed-methods research and the quantitative-qualitative debate. Qualitative and quantitative research methods have grown out of, and still represent, different paradigms. However, the fact that the approaches are incommensurate does not mean that multiple methods cannot be combined in a single study if it is done for complementary purposes. Each method studies different phenomena. The distinction of phenomena in mixed-methods research is crucial and can be clarified by labelling the phenomenon examined by each method. For example, a mixed-methods study to develop a measure of burnout experienced by nurses could be described as a qualitative study of the lived experience of burnout to inform a quantitative measure of burnout. Although the phenomenon ‘burnout’ may appear the same across methods, the distinction between “lived experience” and “measure” reconciles the phenomenon to its respective method and paradigm.

This solution differs from that of merely using the strengths of each method to bolster the weaknesses of the other(s), or capturing various aspects of the same phenomena. This implies an additive outcome for mutual research partners. Based on

this assertion, qualitative and quantitative work can be carried out simultaneously or sequentially in a single study or series of investigations.

7. Implications

Given that we have returned to debate in a no-debate world, what is the outlook for mixed-paradigm research? As Phillips (1988a) points out, it may be that quantitative and qualitative approaches are inadequate to the task of understanding the emerging science of wholeness because they give an incomplete view of people in their environments. Perhaps in a “Kuhnian” sense, a new paradigm is in order, one with a new ontology, epistemology, and methodology. Alternatively, we have proposed seeking complementarity which we believe is both philosophically and practically sound. This solution lends itself to new standards for mixed-paradigm research. We hope that future guidelines which assess the quality of such research consider this recommendation.

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