

# The nature of inquiry: Linking quantitative and qualitative research

Views of research that dichotomize qualitative and quantitative methods and the paradigms in which they are couched reflect a limited interpretation of the process of inquiry. In this article, the authors propose that inquiry, regardless of the inquirer's chosen paradigm or method, is governed by six pursuits that integrate qualitative and quantitative research methods. Recognition of the synthetic nature of inquiry is essential to fuller explanation and understanding of questions and problems relevant to nursing.

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**Q**UANTITATIVE methods are presumed to be the methods of choice for empiricist research, while qualitative methods are considered appropriate for research conducted within the phenomenologic/hermeneutic paradigm. Methodologically grounded theorists differ somewhat from ethnographers who differ somewhat from hermeneuticists, and so on. However, all of these qualitative researchers ascribe to the ontologic and epistemologic assumptions of phenomenology/hermeneutics. (When we refer to phenomenologists/hermeneuticists, we are referring ontologically to all researchers using qualitative methods.) Some authors would argue that these paradigms and their respective methods are mutually exclusive.<sup>1</sup> However, the articulation of the interrelationship between quantitative and qualitative modes of inquiry has been addressed extensively in the research literature.<sup>2,3</sup>

Review of the nursing literature demonstrates notable arguments for plurality in

nursing inquiry. The traditional dichotomy between quantitative and qualitative methods—a dichotomy with historic purpose that initially demanded segregation of methods to separate studies<sup>4</sup>—is evolving toward a more neutral distinction, facilitative of the integration of methods. Knafl and Howard,<sup>5</sup> for instance, discussed the complementarity of both approaches and made an eloquent case for the conjoint conduct of both in the advancement of nursing science. Stevenson<sup>6</sup> described a research trajectory involving both qualitative and quantitative approaches to systematically build nursing knowledge and enhance its utilization in nursing practice. Nagle and Mitchell<sup>3</sup> argued for theoretical diversity in nursing practice and research.

More generally, Ellis<sup>7</sup> wrote of the increase of philosophic inquiry in nursing. Still, the nature of the articulation of qualitative and quantitative methods and of their respective paradigms remains a point of contention within the community of nurse researchers.

Dzurec and Abraham<sup>8</sup> combined their respective backgrounds as hermeneuticist and statistician to show a fundamental analogy between qualitative and quantitative research. In this article, that analogy is extended, and consistencies between quantitative and qualitative methods are further explored. Most important, the authors demonstrate that as inquirers, as interpreters of data—whether those data are qualitative or quantitative—researchers are engaged in a subjective, phenomenologic/hermeneutic endeavor. There is reason to reject the traditionally presented dichotomy between quantitative and qualitative research methods and their respective paradigms. The distinction serves little purpose and perhaps

limits nursing knowledge, as the nature of inquiry itself necessarily melds the two traditions.

## REVIEWING THE ANALOGY

As Guba and Lincoln noted,<sup>1</sup> qualitative and quantitative methods and their respective umbrella paradigms differ in their ontologic, epistemologic, and methodologic ends. Nevertheless, Dzurec and Abraham<sup>8</sup> showed a fundamental analogy between these two seemingly divergent methods. They compared the scientific tasks embedded in qualitative research, which is typically guided by the phenomenologic/hermeneutic paradigm, and quantitative research, typically guided by the empiricist paradigm. The authors concluded that few real differences exist at the level of research outcome.

The findings generated by both quantitative and qualitative research are based in description, probability, and inference. Quantitative researchers depend particularly on the assumptions of probability to make statistic, inferential claims regarding the hypotheses they pose in their research. Alternatively, qualitative researchers depend particularly on description to develop narrative inferences, often expressed as working hypotheses<sup>9</sup> or theoretical statements. Yet, the work of these two groups is not mutually exclusive.

Empiricists attempt to answer questions similar to those addressed by phenomenologists; both researchers use strategies that are quite analogous at the basic level of inquiry. Like empiricists, phenomenologists integrate safeguards into their research to limit fallible inferences.<sup>10</sup> Like phenomenologists, empiricists necessarily make in-

terpretive, narrative statements regarding the implications of their data. Both researchers attempt to construct explanatory arguments from their data, that is, to argue about why outcomes have occurred.<sup>11</sup>

In all instances of research, meaning is not inherent in raw data. Instead, meaning is a product of scientists' perceptions: their conceptualization of the research problem, the theoretical set in which they couch the problem, and the implications of the research that they impose for the direction of knowledge. Empiricists, using statistical methods and subjective inference, will suggest what their data mean in terms of a preestablished conceptual framework. Phenomenologists will suggest meaning on the basis of their views of reality.<sup>12</sup> Clearly, and perhaps contrary to common belief, the views of reality espoused by these two groups of scientists are not diametrically opposed.

Both empiricists and phenomenologists recognize the integral nature of human being and environment. Phenomenologists tap this reality by recognizing either the need to bracket<sup>13</sup> or by recognizing the notion of being in the world.<sup>12</sup> Using multivariate techniques, the empiricist is also equipped to study human-environmental integrality. Through consideration of multiple dependent and independent variables simultaneously and comprehensively, complex phenomena can be studied in their inherent richness, thus more accurately reflecting the reality to be described by the researcher, or more accurately reflecting what is considered to be truth.

Both empiricists and phenomenologists converge in their approaches to the interpretation of data. Like statisticians, phenomenologists follow prescribed sets of opera-

tions to foster auditability and credibility,<sup>10,14-18</sup> although one could argue that the specific operations differ according to the particular qualitative approach used. Like phenomenologists, empiricists approach data sets, albeit through statistical rather than narrative analysis, by selecting and using techniques intended to impart maximal meaning and by subjectively manipulating data so that findings are useful in terms of their views of reality. (Some specific examples are given by Abraham and associates,<sup>19</sup> Kruskal and Landwehr,<sup>20</sup> Laessig and Duckett,<sup>21</sup> and Marascuilo and Levin.<sup>22</sup>)

It is apparent that although the implementation of specific techniques may be unique to a particular method, the objectives, scope, and nature of inquiry are consistent across methods and across paradigms. In fact, the relevance of research findings is, in actuality, a very subjective matter. All research is an effort to fulfill cognitive needs, to perceive, and to know. These needs emerge from curiosity about the world as expressed in a desire to understand it and from an incessant attempt to gain a sense of mastery over self and world. Consequently, if differences among researchers exist, it is not because they aspire to different ends, but because they have operationalized their methods for reaching those ends differently.

## THE NATURE OF INQUIRY

The traditional dichotomy between quantitative and qualitative research is an outgrowth of narrow definitions of the term "science." Through its evolution, this term, intended to mean systematized knowledge, has been confused with scientism, the practice of adopting a prescribed set of methods and assumptions for all investigation.

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***The logical positivist or empiricist paradigm continues to dominate nursing research.***

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Within nursing, as within other disciplines, research evolved within the context of the methods and assumptions of logical positivism, a philosophy of science that evolved to extend knowledge.<sup>17</sup> In the context of this evolution, nurse researchers were encouraged to lose sight of the original meaning of science as systematized knowledge. Like many researchers, nurse researchers have come to believe that the essence of science is objective verification, systematically achieved through collection of sensorily perceptible data. Mathematic and statistic procedures are readily applied to these data through the assumptions of description, probability, and inference, in an effort to predict and control phenomena.

The logical positivist or empiricist paradigm continues to dominate nursing research,<sup>3</sup> and the debate continues regarding whether methods more subjective than those espoused by practitioners in this dominant paradigm can be taken to be scientific. However, the methods of one paradigm are no more inherently scientific than are the methods of the other. The quality of a research paradigm and its inherent methods is a function of the researchers' comfort with its assumptions.

We propose that researchers can trust in the skill and knowledge of the philosophers who developed the assumptions of these paradigms. Both sets of assumptions, empiricist and phenomenologic, are trustworthy. In that frame of mind, researchers are in

a position to focus on the nature of inquiry itself.

We contend that the nature of inquiry—its scope and its objectives—is of constant form across paradigms. At the fundamental level, inquiry is couched in a human desire to understand and explain behavior and events, their components, antecedents, corollaries, and consequences. We propose that inquiry is governed by six pursuits that are relevant to, and integratively link, qualitative and quantitative inquiry.

## **THE THESIS OF INQUIRY**

### **The pursuit of mastery over self and world**

Inquiry is intended to provide understanding about the animate and inanimate environment and human beings' place in it.<sup>23,24</sup> The goal of inquiry is to achieve unity with or control over the environment. Mastery is attempted by researchers from both traditions: by empiricists through use of methods such as multivariate analysis and by phenomenologists through narrative description. To attain mastery is to make a subjective, research-based decision about one's relation to the world. This understanding serves the purpose of enhancing knowledge of the environment and about the ability—whether real or illusory—to predict events and behaviors, to avoid the undesirable, and to pursue enticing outcomes.

### **The pursuit of understanding through recomposition**

Inquiry is focused on understanding and advanced by explanation. As the essence of existence in the world becomes seemingly more clear, old views are discarded, and more suitable and appealing conceptualiza-

tions of self and world are substituted. Such activity is discussed by Kuhn<sup>25</sup> and Capra<sup>26</sup> as thought experiments or paradigm shifts. These shifts can be observed in both research modes. For example, within the quantitative mode, Einstein redefined space, time, and motion in the context of the theory of relativity.<sup>27</sup> Similarly, and from a more qualitative perspective, Salmon examined space, time, and motion, describing philosophy and geometry as twin approaches.<sup>28</sup> Recomposition is subjective, research-based activity that speaks to one's relation to the world.

#### **The pursuit of complexity reduction to enhance understanding**

Phenomena in the animate and inanimate environment are complex. Although it would be optimal to study those phenomena in their fullness, they can only be understood through summary and synthesis. While phenomenologists would argue that they strive to enlarge description rather than to reduce it,<sup>16</sup> it is also true that they, like all researchers, are limited in perceptual and information-processing abilities. "The understanding of the knower must be adequate to the thing known."<sup>29(p30)</sup> However, the limitations of human physiology dictate that knowledge will be limited. Multivariate statistical techniques such as factor analysis and cluster analysis serve to reduce complexity of phenomena and allow for human exploration and understanding. Identification of themes is the qualitative analogue of multivariate statistics such as these. Whether by quantitative or qualitative methods, complexity reduction is aimed at discarding uninformed redundancy in data and at determining what information leads most directly toward new knowledge. What counts

as appropriate knowledge is a subjective, research-based decision.

#### **The pursuit of innovation**

As inquirers, researchers strive to optimize their approaches to exploration, understanding, and knowledge. Creativity is inherent in inquiry. In the absence of innovation, inquiry would probably become afunctional and vanish. The presence of paradigm shifts in inquiry attests to scientists' need to pursue innovation.<sup>2</sup> Innovation and creativity are subjective activities, often based in and building on previous experience, including research experience.

#### **The pursuit of meaningfulness**

Through inquiry we are able to make appropriate distinctions among phenomena on the basis of selecting and defining characteristics of those phenomena and then to describe how individuals relate to those phenomena. Such pursuit contributes to the ongoing refinement of the paradigms within which we inquire and contributes to the ability to share information in a meaningful way with others. Inquiry is focused on conceptual meaningfulness. The intent of inquiry is to produce readily understandable and hopefully unambiguous outcomes. Through programs of research and within disciplinary matrices, these outcomes are generally couched in a larger theoretical or conceptual framework from which they gain credence. Meaningfulness is a shared conception, a function of researchers' integration of hard data and experience.

#### **The pursuit of truthfulness**

Governing the above pursuits are the desire and scientific responsibility to unearth "truth." It is important to note that within

both paradigms, generalizability is at issue. For example, for empiricists, pains are taken to ensure that what is determined as true is not extended beyond the limits of the study design. Similarly, for phenomenologists, narratives are selected and cohesive,<sup>11,18</sup> presented so that they are auditable and credible<sup>1,10</sup> and never intended for broad generalization. Yet truths are sought. All researchers recognize the tenuous nature of "truth," aware that attempts to describe reality are just that, nothing more. Research findings represent a "best guess" about truth. Truth, while grounded in research findings, comprises subjective interpretations of human beings' relation to environment.

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The dichotomy historically proposed to characterize qualitative and quantitative research is, quite simply, a characteristic of a relatively ill-refined understanding of the process of inquiry. Inquiry integrates qualitative and quantitative methods. Inquiry is constituted by researchers' attempts to master the world through conceptual recomposition, complexity reduction, and innovation. The outcomes of inquiry are meaning and truth, expressed through the interpreta-

tion of quantitative and qualitative data and couched within the interpretive framework of disciplines, which are constituted by various theoretical and conceptual frameworks.

Inquiry is inherently hermeneutic. As one interprets, one is engaged in a phenomenologic/hermeneutic endeavor.<sup>30</sup> In research, this hermeneutic endeavor necessarily incorporates scientific data, both qualitative and quantitative, as researchers answer the questions posed in their research and present implications of the findings for the discipline.

Despite the ontologic, epistemologic, and methodologic trappings of either empiricist or phenomenologic/hermeneutic paradigm, inquiry is a subjective, exploratory process through which researchers and practitioners come to know. Modes of research that are seemingly dichotomous are quite similar at the suboperational, inquiry level.

The researcher who recognizes the breadth of philosophies of science and the synthetic nature of inquiry and who acknowledges that theories about truth and truth itself are not identical can also recognize and acknowledge the fundamental congruence of quantitative and qualitative modes of inquiry. This recognition is essential to the explanation and understanding of questions and problems relevant to nursing.

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