Continuing conundrums in communication between qualitative and quantitative paradigms in health research

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doi: 10.7358/neur-2012-012-pett

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Abstract

Despite concerted efforts, there remains a residue of shared spoken and unspoken prejudices from the qualitative-quantitative debates of the 1970's and 1980's. In this discussion, we examine both the source and content of these conundrums and posit the need for greater use of mixed methods research in the health sciences. An exemplar that has used mixed methods in health sciences research is presented.

Keywords: Quantitative vs. Qualitative paradigms; Mixed methods research

1. Introduction

Scientific inquiry in health equity research has primarily operated within the boundaries of two paradigms, or ways of viewing the world (Mendlinger & Cwikel, 2008): qualitative and quantitative. Cwikel (2006) has suggested that these paradigms can be thought of as lampposts under whose light we might search for lost keys. If this is the conceptual framework within which we choose to investigate, the light illuminates the type of answers we can find and how we find them. We fail to explore the unknown that lies outside the circle illuminated by the lamppost. The paradigm selected dictates the theories tested and the methods by which data are collected and analyzed.

One such world view, the qualitative paradigm inductively builds knowledge about the meaning of illness and health for the people we call patients in

the healthcare system. Those insights from patients can serve to direct healthcare interventions and increase empathy of healthcare providers. In contrast, the quantitative paradigm offers a mode of inquiry that can be used for deductive research, when the goal is to test theories or hypotheses, gather descriptive information, or examine relationships among variables. Such quantitative data have the potential to provide statistical evidence to begin to establish (probable) cause and effect about health, illness, and care modalities.

Together qualitative and quantitative paradigms can provide extremely useful insights into best practice approaches to health research programs. Yet, despite their many common goals, there continues to be gaps in communication between the faculty and students who learn and work together on qualitative and quantitative health studies.

What is the problem? This discussion of the methods' merits and drawbacks has gone on for more than 50 years, if not centuries (Johnson & Gray, 2010). The purpose of this article is to examine these continuing conundrums and to argue that purveyors of these contrasting and, at times, conflicting methodologies need to find shared space for civil discourse. It is only in this way that educators and students on both sides of this discussion can be "respectfully and dialectically engaged in dialogue toward enhanced, reframed, or new understandings" (Greene & Hall, 2010). We will posit the need for greater use of mixed methods research in the health sciences and will examine a research exemplar that has utilized a "concurrent triangulation mixed methods design" to evaluate the extent to which cognitive function and knowledge affect self-care among heart failure patients (Dickson, Lee & Riegel, 2011).

2. The continuing conundrums

It is not our intent to present an extensive background history into either the qualitative/quantitative debate or the origins of mixed methods research. The interested reader is referred to several excellent discussions on these topics (e.g., Johnson, Onwueghuzie & Turner, 2007; Tashakkori & Teddlie, 2003; Tashakkori & Teddlie, 2010). Some writers might even argue that we have moved beyond the qualitative vs. quantitative debate, and can now freely use mixed-methods designs to carry out relevant and valuable research (Teddlie & Tashakkori, 2012). If so, why aren't we using mixed-methods designs more often? While there has been a dramatic increase in recent years in the use of mixed methods research in the health sciences (Ivankova & Kawamura, 2010), there still remains, in our opinion, a residue of spoken and unspoken prejudices from the quantitative-qualitative debates that took place during

the 1970s and 1980s. Moreover, it could very well be that the philosophical stances of the two paradigms are too divergent to be successfully integrated on specific research topics (Wiggins, 2011).

3. What the nay-Sayers share in common

Some researchers would argue that the two philosophical foundations, their assumptions and methodological approaches are incompatible, that they do not study the same phenomenon. Therefore, it would be inappropriate to mix quantitative and qualitative methods. Further, these nay-Sayers would argue that researchers who attempt to combine the two divergent methods are flirting with inevitable failure due to the fundamental philosophical differences in the underlying systems (Howe, 1988; Tashakkori & Teddlie, 2003 and 2012). That is, *one paradigm precludes the other* "just as surely as the belief in a round world precludes belief in a flat one" (Guba, 1987).

Those who support the incompatibility argument would also point to the disparity in philosophical approaches to data collection that exist between the two paradigms. That is, qualitative researchers use ethnographic prose, historical narratives, first-person accounts, photographs, life histories, and biographical and autobiographical materials, among others while quantitative researchers rely more on mathematical models, statistical tables, and graphs (Denzin & Lincoln, 1994).Given the disparities between the two methodological camps, we are left with the stalemate presented in Figure 1 and wonder whether a successful marriage can indeed be formed from such divergent paradigms.

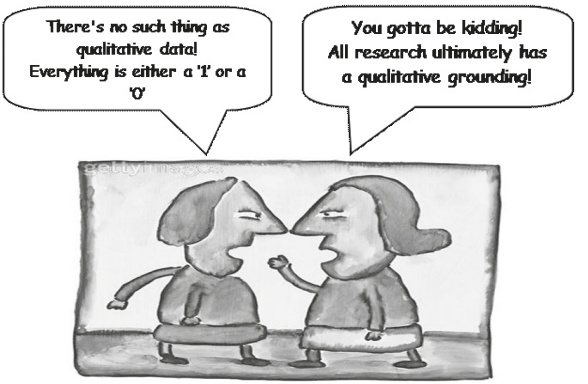

Figure 1. Alas, those continuing conundrums …

4. Do we speak the same language?

The communication challenges that exist between the "quals" and the "quans" may be the result of a lack of understanding about each other's philosophical base. It also could be inherent in the contrasting language spoken by both camps.

In their discussion of major issues and controversies involved in the use of mixed methods in the social and behavioral sciences, Teddlie and Tashakkori (2003) point out the language barriers that exist between the two paradigms. As an example, the authors outlined the types of validity that could be potentially discussed in both qualitative and quantitative research. Table 1 lists a few of these types of validity that the authors identified.

The authors point out the difficulty of forming a lasting "marriage" between the two paradigms when the language barrier is so strong. With the increased interest in mixed methods research, Tashakkori and Teddlie (2012) suggest that not only is "bilingualism" a critical attribute if the two paradigms are to be successfully integrated; "trilingualism" that includes the language of mixed methods research is a more valued skill.

Table 1. Examples of types of validity reported in qualitative and quantitative research (Teddlie & Taskakkori, 2003)

Examples of validity by type of paradigm	
Quantitative	Qualitative
Internal	Catalytic
Statistical conclusion	Crystalline
External validity	Descriptive
Construct validity • Convergent • Discriminant • Factorial	Evaluative Generalizability Interpretive Ironic
Measurement • face • content • criterion-related • predictive • concurrent • jury • systemic	Neopragmatic Rhizomic Simultaneous Situated Theoretical Voluptuous
… Plus a number of others	… Plus a number of others

5. How does the academic environment contribute to this rocky "marriage"?

The academic environment may contribute to the rocky "marriage" between qualitative and quantitative methodologies. Faculty members are often recognized for their paradigm preferences with some espousing the attributes of qualitative inquiry while others eschew the merits of quantitative methodologies. Within graduate programs especially, it is common to observe faculty members heatedly discussing which paradigm should come first in the curriculum and which should be given priority. Typically the side that is taken in these "discussions" is based more on paradigm preference (and prior education) than on curriculum logic. As a result, quantitative inquiry traditionally dominates the educational hierarchy with mixed methods approaches relegated to the periphery.

Graduate students seek out faculty and traditions with which they feel most comfortable. Munhall (2007) has observed that some students are naturally qualitative researchers while others are naturally drawn to quantitative research. Their talents, capabilities and interests position them to excel in one kind of thinking. Whether by nature or nurture, students who align with a particular research tradition are encouraged to take only those courses that fit their designated research tradition (e.g., advanced statistics instead of discourse analysis or vice versa). Without the introduction of mixed methods approaches, students' research careers remain "monolingual" rather than "multilingual". Cultivating a second or third epistemological "language" requires a concerted effort by students and faculty.

The question for faculty members, then, is how do we reframe our conversations from continuing conundrums to a civil cohabitation as we teach graduate students about the merits of both qualitative and quantitative methodologies? Better still, how do we generate enthusiasm about the thrills made possible through mixed-methods research? Faculty members need to attend to our divergent languages, increase dialogue, and look more to combining rather than getting a toe-hold up in comparison to "the other". Rather than guard our own terrain and emphasize distinctions, a more productive path may be in acknowledging those differences and, in particular, welcoming mixed methods research in our own research areas and graduate curricula.

6. Why not mixed methods research in the health sciences?

Without a doubt there are different philosophical and methodological assumptions that serve as the foundation for quantitative and qualitative research. Yet, just because the two philosophical foundations are different does not mean that they are necessarily incompatible or mutually exclusive. We suggest that we move closer to using a model of mixed methods research as a logical alternative to our "either" … "or" qualitative vs. quantitative paradigms. While this approach may be wrought with challenges, we believe that a mixed methods approach in the health sciences offers the opportunity to meld the advantages of both paradigms.

Many varying definitions of mixed methods are available in the literature not all of which are in agreement (e.g., Johnson, Onwuegbuzie & Turner, 2007; Leech, 2010; Morse, 2010; Morse & Niehus, 2009). Johnson et al. (2007) offer a composite definition of mixed methods: mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoint, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration.

Morse and Niehus (2009) have further defined mixed methods designs as "A scientifically rigorous *research project*, driven by inductive or deductive *theoretical drive*, and comprised of a qualitative or quantitative *core component* with qualitative or quantitative *supplementary component(s)*". Neither the qualitative nor the quantitative are "privileged" with one method consistently dominant over the other. Which method is dominant depends on the question and the theoretical drive of the study …

The Morse and Niehaus definition suggests that one paradigm is *supplementary* to the other and that the core component could differ depending on the study's specific research aims. Other writers (e.g., Teddlie & Tashakkori, 2009) indicate that the two paradigms could also be complementary and conducted with neither component subservient to the other. Again, the direction that the process takes very much depends on the study aims.

7. When should mixed methods be used?

Advocates of mixed methods designs agree that researchers need to be cautious about when to use the approach (Leech, 2010). Typically mixed methods are used when the quantitative or qualitative approaches, by them-

selves, are inadequate to gain a complete understanding about a research problem or question. For example, a researcher may want to examine an issue from multiple perspectives, e.g., obtain a macro picture of a health care system while seeking micro information from those who utilize that system in order to develop a more complete understanding a given issue. A researcher may also seek to compare, validate, or triangulate results, and to examine processes/experiences along with outcomes (Plano Clark, 2010). The researcher's goal may be to develop a survey instrument, an intervention, or a program informed by qualitative findings (Plano Clark, 2010). A quantitative phase could also be followed by a qualitative phase, the intent of which may be to help determine the best participants with which to follow up or to explain the mechanism behind the quantitative results (Plano Clark, 2010).

8. How should a mixed method approach be designed?

There are a number of excellent resources available to assist the investigator in designing and conducting mixed methods research (e.g., Creswell & Plano Clark, 2011; Creswell et al., 2011; Morse & Niehus, 2009); to outline the steps to designing such a study would be inadequate given the limited space of this article. Rather we would like to examine one exemplar that has been reported in the health sciences literature (Dickson, Lee & Riegel, 2011) in which the investigators examined how cognitive function and knowledge affected heart failure self-care. This exemplar was chosen, not because of its topic but because of the authors' thoughtful use of quantitative and qualitative paradigms in combination to best answer their research questions.

In their introduction, the authors indicate that despite extensive patient education, few heart failure patients master self-care. They further suggest that impaired cognitive function may help to explain why patient education is ineffective. The investigators used a concurrent triangulation mixed methods design to explore how knowledge and cognitive function influence heart failure self-care. To justify their choice of mixed methods research, Dickson et al. (2011) argued that understanding heart failure self-care requires the integration and in-depth exploration of multiple variables known to influence self-care. For that reason, they used quantitative and qualitative data in combination to determine overlapping or different faces of this complex relationship in order to achieve a more in-depth understanding of the self-care construct.

Forty-one adults with heart failure participated in interviews about self-care and completed standardized instruments measuring knowledge, cognitive function and self-care. Quantitative measures of self-care, knowledge and cognitive function as well as qualitative data about HF self-care practices obtained though semi structured interviews were collected at the same time. Figure 2 outlines their mixed methods approach to combining both the quantitative and qualitative paradigms.

The authors explained that the quantitative and qualitative data were collected in the same data collection session (thus the description, "concurrent"). Consistent with their study aims the authors determined that each paradigm would be given equal focus. Triangulation was used to strengthen the validity of their findings. The authors explained that the essence of triangulation is that methods consist of independent assessments of the same phenomenon. Investigators conducted qualitative and quantitative data analysis separately, blinded to the corresponding data for each patient from the alternate method. The analyzed data were integrated during the interpretation phase using triangulation methods to assess concordance between the qualitative and quantitative results. Both qualitative and quantitative evidence related to self-care and knowledge were compared using an interactive approach rather than maintaining independence.

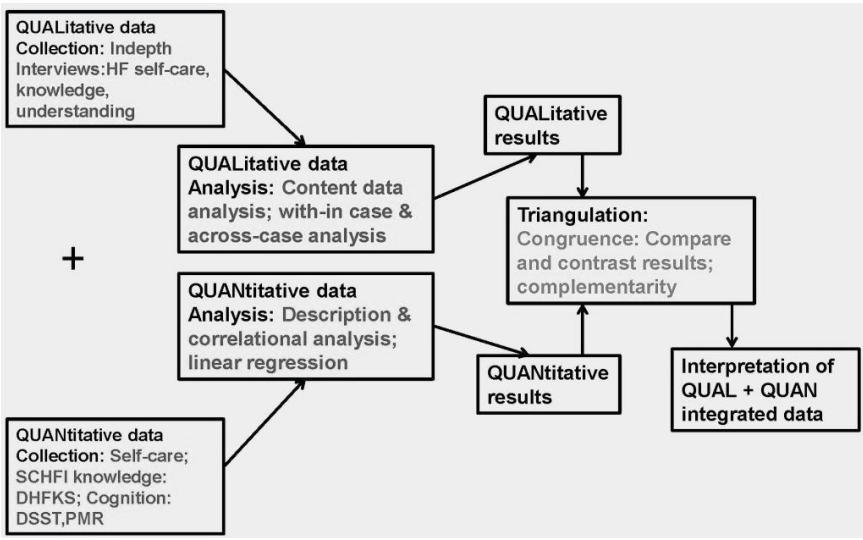

Figure 2. Dickson et al's (2011) approach to their mixed methods deign

The authors argued that they were able to validate evidence of self-care and knowledge and could identify cases where there was inconsistency. Themes that had emerged from the qualitative analysis (e.g., accounts of decreased cognitive function, knowledge deficits and lack of understanding) were re-examined across cases to understand the results of their quantitative findings. The mixed methods approach provided insight into the reasons why self-care was poor among many persons with HF despite evidence that the patients had knowledge about routine maintenance and management practices. The qualitative data revealed that lack of understanding, not lack of knowledge, was a key driver in self-care. Some who were inconsistent in self-care also had evidence of mild cognitive impairment. The advantages of mixed methods as a research technique to study clinical phenomenon were clearly evident in this study. Quantitative methods did not explain the gap between knowledge and self-care practices. By integrating the qualitative results with the quantitative findings, a more complete and nuanced description of the relationships emerged.

9. Methodological challenges in conducting mixed methods investigations

It is not always appropriate to combine qualitative and quantitative methods to access phenomena that health researchers are interested in (e.g., lived experiences as a patient or patients' perspectives of doctor-patient relationships) (Sale & Lohfeld, 2002). The phenomenon under study may not be the same across methods. Sale and Lohfeld (2002) also argue that loss of information can occur when attempts are made to unite results from the two paradigms because the tendency can be to selectively search for similarities rather than dissimilarities in data. Researchers who hold different philosophical positions may find mixed methods research to be challenging because of the tensions created by their different beliefs (Greene, 2007). However, mixed methods research also represents an opportunity to transform these tensions into new knowledge through a dialectical discovery. Divergent findings, while potentially unsettling are valuable. They can lead to a reexamination of the conceptual framework underlying the research.

9.1. Time, teamwork, and resources

Because multiple forms of data are being collected and analyzed, mixed methods research requires extensive time, teamwork, and resources to carry

out the multiple steps involved in mixed methods research, including the time required for data collection and analysis.

Given that research team members come from many different backgrounds, one can anticipate that these different perspectives will contribute to both the challenges and benefits of a team approach to mixed methods research. While it is not necessary or possible for everyone to hold expertise in all methods employed in any research project, all of the team members need to be open to a mixed methods perspective,

9.2. Sampling issues

When undertaking a mixed methods study, it is important to estimate reasonable sample sizes for both the quantitative and qualitative phases of data collection and analyses. For example, in the Dickson et al. (2011) study 41 participants were more than adequate for their qualitative analyses but insufficient for their regression analyses.

10. Summary

The ultimate goal of any research is to answer the questions that were laid out at the beginning of the project. Mixed methods are useful if they provide us with stronger possibilities to answer our research questions. They also help researchers to evaluate the "goodness" of their answers and provide the opportunity for presenting a greater diversity of differing views (Teddlie & Tashakkori, 2003). The importance of complementarity in blending the best from qualitative and quantitative paradigms cannot be underestimated. It is our opinion that we, as research investigators, faculty members, and keepers of the keys for future generations need to reframe our conversation from continuing conundrums to a civil cohabitation as we explore with graduate students the valued potential of both qualitative and quantitative methodologies both by themselves and in combination. As Creswell (Creswell, cited by Leech, 2010) indicated, graduate students are "the prime movers in the field of mixed methods research as they are the majority of the people who are attending mixed methods research workshops and are 'looking for new ways of doing research and are not afraid of trying out new methodology'". By increasing faculty dialogue with students and with each other, we can build departments and programs with mixed-methods strengths and overcome a problem-focused view of methodological conundrums.

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