

CROSS-DISCIPLINARY ANALYSIS OF THE USE OF MIXED METHODS  
IN PHYSICS EDUCATION RESEARCH, COUNSELING PSYCHOLOGY,  
AND PRIMARY CARE

by

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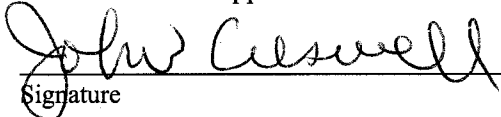
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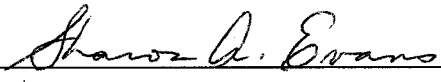
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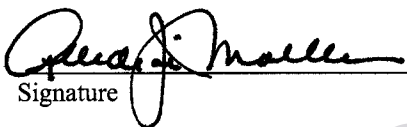
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CROSS-DISCIPLINARY ANALYSIS OF THE USE OF MIXED METHODS  
IN PHYSICS EDUCATION RESEARCH, COUNSELING PSYCHOLOGY,  
AND PRIMARY CARE

Vicki L. Plano Clark, Ph.D.

University of Nebraska, 2005

Advisor: John W. Creswell

Mixed methods research incorporates the collection, analysis, and mixing of qualitative and quantitative data within a single study (Creswell, 2005). It is a relatively new approach in social science research (Tashakkori & Teddlie, 2003a). Since this approach is in its "adolescence," there remain many unresolved issues about its use (Tashakkori & Teddlie, 2003b). Previous research has studied the use of mixed methods within single disciplines, but no previous study has investigated the use of mixed methods in multiple disciplines. In addition, no review of mixed methods studies has been augmented by interviewing mixed methods scholars.

The purpose of this qualitative study was to examine the use of mixed methods research in the disciplines of Physics Education Research, Counseling Psychology, and Primary Care. The findings of this study are based on three types of data including 60 empirical mixed methods articles, published discussions about mixed methods research, and interviews with twelve mixed methods researchers.

The analysis of these data resulted in three major findings. First, four major types of mixed methods designs, along with common variations, were identified in the empirical articles using the framework of Creswell, Plano Clark, Gutmann, and Hanson (2003). Next, the current use of mixed methods within the three disciplines was described. Finally, cross-case themes revealed attitudes that influence the use of mixed methods, logistical and feasibility issues faced by researchers choosing a mixed methods approach, analogies used to discuss this approach, and steps for establishing a new research method.

The results of this study are of value to researchers who want to learn how other researchers apply these techniques within their own studies. Methodologists can gain new perspectives about how researchers perceive mixed methods research and the issues involved with implementing this approach in practice. Methodologists will also have a description of the current status of this new methodological approach and better understanding of the process by which a new method is established within different disciplines.

This dissertation is dedicated to

Jack C. Plano  
(1921 - 2002)

academic scholar,  
prolific writer,  
captivating storyteller  
and beloved Father.

I hope that this has been worth the candle, Dad!

PREVIEW

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PREVIEW

## Chapter 1

### Introduction

In *The Meanings of Methodology*, Neuman (2000) wrote, "Research methodology is what makes social science scientific" (p. 63). No matter the approach (quantitative, qualitative, etc.), rigorous research studies are built from research methodologies that are thorough, systematic, empirical, critical, and publicly shared (Creswell, 2002; Kerlinger, 1986; Neuman, 2000). The research methodologies and specific designs and techniques available to social science researchers have continually increased in number over the years. New methods and techniques, such as qualitative research in the 1970s and 1980s, structural equation modeling in the 1990s, and web-based surveying in recent years, create new possibilities for posing problems and designing research.

While the development of new research methods and techniques can open new avenues for research, the necessary incorporation of new methods into the repertoire of different research disciplines can also pose great challenges. As new methods are undergoing a process of adoption across disciplines, they may be poorly-defined and subject to the idiosyncrasies of different disciplines. During this adoption phase, uncertainty may exist regarding terms and definitions, procedures and techniques, and appropriate evaluation criteria. This uncertainty can hinder the level of sophistication and the rigorous nature with which the new method is applied. Until a new method becomes well established, this uncertainty may also inhibit the publication of studies using the new method and the development of interdisciplinary work.

Mixed methods research (research combining both quantitative and qualitative approaches) is an example of a new method currently being adopted across diverse disciplines. Its present state of "uncertainty" was recently summarized by Tashakkori and Teddlie (2003b) who identified six major "unresolved issues" that exist around its use (p. 672). These issues included basic nomenclature and definitions, the utility of using mixed approaches, paradigmatic foundations, design typology, issues in drawing inferences, and logistical issues. Although mixed methods research is still in its "adolescence," it is undergoing a maturation process and becoming recognized as the third major research design (Teddlie & Tashakkori, 2003). A great deal of interest and effort is being undertaken to establish and promote this new research method. This effort is illustrated by the recent publication of the *Handbook of Mixed Methods in Social and Behavioral Research* (Tashakkori & Teddlie, 2003a), methodological texts focusing exclusively on mixed methods (e.g., Greene & Caracelli, 1997a; Tashakkori & Teddlie, 1998), and major research textbooks that emphasize the integration of qualitative and quantitative methods (e.g., Creswell, 2003; Mertens, 2005; Neuman, 2000).

Previous studies on mixed methods research have focused on the following primary topics. Several authors have written about its historical and philosophical foundations, often drawing on the ideas of pragmatism as the underlying basis for this methodology (e.g., Datta, 1994; Maxcy, 2003; Tashakkori & Teddlie, 1998). Other authors have examined researchers' rationales and purposes for using mixed methods in research settings (Greene, Caracelli, & Graham, 1989; Mertens, 1998; Newman, Ridenour, Newman, & De Marco, 2003). Much has also been written about the types of

mixed methods designs that exist (e.g., Creswell, Plano Clark, Gutmann, & Hanson, 2003; Tashakkori & Teddlie, 1998). Authors working in this area have emphasized criteria for distinguishing between designs (Creswell, Plano Clark, Gutmann, & Hanson, 2003; Morgan, 1998; Morse, 1991) and notations and visual diagrams for describing the designs (e.g., Morse, 1991; Steckler, McLeroy, Goodman, Bird & McCormick, 1992; Tashakkori & Teddlie, 2003b). Authors have also devoted much attention to different data analysis techniques that are appropriate for mixed methods approaches to research (e.g., Caracelli & Greene, 1993; Onwuegbuzie & Teddlie, 2003; Sandelowski, 2000).

Methodological discussions such as those described above attempt to describe the theory of how to do research. Of similar methodological importance are studies of how researchers actually apply research methods in their research practice. For that reason, previous works have reviewed the use of mixed methods research within published empirical studies from single disciplines. For example, Greene, Caracelli, and Graham (1989) analyzed 57 published articles from the field of Evaluation to develop a mixed method design typology based largely on the purpose of the employed research design. Swanson (1992) replicated their work by applying their typology to a set of 32 mixed methods studies in the area of Nursing research and found that the trends of mixed methods purposes and design characteristics appear to differ between the two disciplines. Creswell, Goodchild, and Turner (1996) conducted a meta-analysis of studies taken from Postsecondary Education, examining key design features and narrative structures. Creswell, Fetters, and Ivankova (2004) reviewed the features of 5 mixed methods studies in primary health care and proposed three models of mixed methods research.

More recently, the *Handbook of Mixed Methods in Social and Behavioral Research* (Tashakkori & Teddlie, 2003a) contained discussions about the use of mixed methods within seven disciplines, devoting a stand-alone chapter to each (Evaluation, Management and Organizational Research, Health Sciences, Nursing, Psychological Research, Sociology, and Education). These chapter authors described actual studies and categorized studies using typologies based on content, design characteristics, or reasons for the use of mixed methods. Many of these chapters emphasized the applied nature of the research being done in the disciplinary fields and argued that the pragmatic framework of mixed methods research makes it an appropriate and advantageous methodological approach. In their final discussion, Tashakkori and Teddlie (2003b) noted that mixed methods terms differed across these disciplinary chapters and highlighted how the exemplar studies illustrate the utility of mixed methods research.

Despite these many scholarly works, little is known about how mixed methods research is being adopted and translated into practice in research within diverse disciplines. Many disciplines using mixed methods research designs, such as Physics Education Research, have not been addressed by the mixed methods literature. Some disciplines that have been addressed, such as Nursing (Swanson, 1992) and Management and Organizational Research (Currall & Towler, 2003), were analyzed using early-developed typologies (i.e., Greene, Caracelli, & Graham, 1989, and Creswell, 1994) and therefore do not reflect current thinking about mixed methods research. At this time, no work has been done that systematically applies one analysis strategy across multiple disciplines representing diverse research areas. Such an analysis of the use of mixed

methods will allow for important comparisons of its use among the disciplines and for the emergence of issues that transcend the disciplines. In addition, no studies of the use of mixed methods have included the perspectives of mixed methods researchers to see how their perceptions may support or differ from findings based solely on the literature. By systematically studying the use of mixed methods research across disciplines as conveyed in publications and perceived by researchers, we can learn about the use of this new approach and may also learn about the adoption of any new method.

#### *Statement of the Purpose*

The purpose of this qualitative study was to examine the on-going adoption of mixed methods research by describing the current use of mixed methods approaches within three diverse disciplinary research areas. The selected disciplines, namely Primary Care, Counseling Psychology, and Physics Education Research, span a disciplinary spectrum from the health sciences, to the social sciences, to the physical sciences. Each discipline was first studied individually (using documents and one-on-one interviews) and then a cross-case analysis identified broad issues across the disciplines. The conceptual framework guiding this study's interpretation of mixed methods design criteria and types is the framework described by Creswell, Plano Clark, Gutmann, and Hanson (2003). This framework was selected because it represents current thinking about mixed methods designs and is a synthesis of and builds upon previous discussions in the mixed methods literature. In addition, it emphasizes procedural issues (methods as opposed to methodology), which are of interest to this study, and it is simple enough to be useful as a classification scheme and allow for cross-disciplinary comparisons.

### *Research Questions*

The central question addressed in this study was: How is mixed methods research being used in Physics Education Research, Counseling Psychology, and Primary Care?

Issue subquestions were stated to refine the central research question.

### *Issue Subquestions*

Issue subquestions indicate the focus or specific topics to be addressed by a study (Creswell, 2002). The issue subquestions addressed in this study included:

- (a) How are mixed methods research designs applied in empirical studies in Physics Education Research, Counseling Psychology, and Primary Care?
- (b) What is the status of mixed methods research in Physics Education Research, Counseling Psychology, and Primary Care?
- (c) What larger dimensions describe the use of mixed methods research across the three disciplines?

### *Definition of Key Terms*

#### *Terms Relating to the Study Design and Data Types*

*Counseling Psychology.* Counseling Psychology is a discipline within applied psychology that focuses on the personal and interpersonal well being of individuals, couples, families, groups, and organizational systems (W. E. Hanson, personal communication, June 2, 2004). Topic areas that are addressed in Counseling Psychology research include counseling activities, career development and vocational psychology, diversity and underrepresented populations in relation to counseling activities, the development of new measures to be used in counseling activities, and professional issues

in counseling psychology (American Psychological Association, 2004). Counseling psychologists in academic positions are typically found in departments of counseling psychology, applied psychology, or educational psychology where they participate in both clinical and research activities. Counseling psychology research is typically shared through discipline-based journals such as the *Journal of Counseling Psychology* and *The Counseling Psychologist* and conferences such as those sponsored by the American Psychological Association.

*Empirical mixed methods articles.* Empirical mixed methods articles are manuscripts reporting empirical research that used qualitative and quantitative data collection and analysis procedures and that have been published in peer-reviewed journals.

*Methodological discussions.* Methodological discussions are scholarly works about methodological issues that have been published, often in the form of journal articles or book chapters. Unlike empirical articles, methodological discussions do not report new research results although they may refer to actual research studies as examples of discussed topics. Within the context of this study, the term methodological discussion is limited to scholarly works about methodological issues specific to the use of mixed methods research.

*Methodological review.* A methodological review is a specific type of methodological discussion. In a methodological review, the author completes a systematic study of the methodological procedures and techniques used within a selected sample of published research. Conceptually, it is similar to a meta-analysis in which a