

## Review

# Mixed methods: A review of literature and the future of the new research paradigm

Migiro S. O.<sup>1\*</sup> and Magangi B. A.<sup>2</sup>

<sup>1</sup>UNISA School of Business Leadership, North West University, Mafikeng Campus, South Africa.

<sup>2</sup>School of Education, Department of Psychology, Moi University, Eldoret, Kenya.

Accepted 16 December, 2010

**There are three recognised methods for conducting research: quantitative, qualitative and mixed methods. Mixed methods research encourages researchers to use multiple approaches to collecting and analysing data within a single study, recognising the limitations of using a single method. Despite this, a number of controversial issues and debates such as the paradigm-method fit issue and the “best” paradigm issue have limited the widespread acceptance of mixed methods research. Nonetheless, it is the researcher’s task to examine the specific contingencies and make the decision about which research approach, or which combination of approaches, should be used in a specific study.**

**Key words:** New research paradigm, mix methods.

## INTRODUCTION

There are three recognised methods for conducting research: quantitative, qualitative and mixed methods. Mixed method research is research in which the researcher uses the qualitative research paradigm for one phase of a research study and the quantitative research paradigm for another in order to understand a research problem more completely (Creswell, 2005). When used in combination in one study, quantitative and qualitative methods compliment each other and allow for a more complete analysis of the research problem (Greene et al., 1989; Tashakhori and Teddlie, 1998). The approaches are complementary rather than competitive methods [and the] use of a particular method [...] and the decision to use both methods in a single study must be based on the nature of the actual research problem and the research questions (Wilson, 1992; McKinlay, 1993, 1995 and Baum, 1995). Example on the application of mixed methods is where a researcher might conduct an experiment (quantitative) and after the experiment conduct an interview study with the participants (qualitative) to see how they viewed the experiment and to see if they agreed with the results.

The evolution of mixed methods in research began in

psychology with Campbell and Fiske (1959). They introduced the multi-method approach and suggested that researchers collect multiple quantitative measures and assess them with separate methods to study one psychological construct. This encouraged researchers to use multiple approaches to collecting data within a single study, recognising the limitations of using a single method (Sieber, 1973). Particular interest in combining quantitative and qualitative data sources however, emerged in the late 1970's with the work of Jick (1979). In his study he triangulated surveys, observations, semi-structured interviews and documents to better understand the research problem. This development of mixed methods research was interrupted by the debate between quantitative and qualitative researchers, which stemmed from the idea of incompatibility between different philosophical world-views and the quantitative or qualitative approaches (Reichardt and Rallis, 1994). The argument was that mixed method studies cannot be conducted because quantitative and qualitative researchers use different philosophies and methods to study research problems.

That notwithstanding, in the late 1990s an increased interest in the procedures for mixing different methods became evident (Tashakhori and Teddlie, 2003; Creswell et al., 2003). Since then, mixed methods research has evolved gradually as an alternative

\*Corresponding author. E-mail: [Stephen410@gmail.com](mailto:Stephen410@gmail.com)

research method (commonly referred to as the third wave after the qualitative wave that was preceded by the quantitative wave).

Despite this development, the problems in combining qualitative and quantitative research nevertheless have not been resolved in a satisfying way. A number of controversial issues and debates such as the paradigm-method fit issue and the “best” paradigm issue have limited the widespread acceptance of mixed methods research. Thus, this paper seeks to help researchers locate quantitative and qualitative methods in a single study and to get a clear picture of the strengths and features of either method, and in particular, it seeks to obtain extant researcher’s views on the use of mixed methods in a single study; rationale and steps in conducting mixed research; sampling approaches in mixed research; data collection approaches in mixed research and the future of mixed research in education.

## PHILOSOPHICAL FOUNDATION OF MIXED METHOD RESEARCH

The paradigm-method fit issue and the “best” paradigm issue have inspired considerable debate regarding the philosophical basis of mixed methods research. The paradigm-method fit issue relates to the question, “Do philosophical paradigms (for example, post-positivism, and constructivism) and research methods have to fit together?” This issue first surfaced in the 1960 and 70’s, primarily as a result of the increasing popularity of qualitative research and the identification of philosophical distinctions between traditional post-positivist and naturalistic research. Guba and Lincoln (1988), for example, identified paradigm differences between post-positivist philosophical assumptions and naturalistic assumptions in terms of epistemology (how we know what we know), ontology (the nature of reality), axiology (the place of values in research), and methodology (the process of research). This led to a dichotomy between traditional inquiry paradigm and naturalistic paradigms.

However, some researchers have argued that a post-positivist philosophical paradigm, or worldview, could be combined only with quantitative methods and that a naturalistic worldview, could be combined only with qualitative methods. This issue has been referred to as the “paradigm debate” (Reinhardt and Rallies, 1994). From this perspective, mixed methods research was viewed as untenable because certain paradigms and methods could not “fit” together legitimately (Smith, 1983). Reinhardt and Cook (1979) countered this viewpoint, however by suggesting that different philosophical paradigms and methods were compatible. That notwithstanding, they argued that paradigms and methods are not inherently linked, citing a variety of examples to support their position (for example, quantitative procedures are not objective, and qualitative

procedures are not always subjective). Indeed, the perspective exists today that multiple methods may be used in a single research study to; for example, take advantage of the representativeness and generalizability of quantitative findings and the in-depth, contextual nature of qualitative findings (Greene and Caracelli, 2003).

The best paradigm issue relates to the question “what philosophical paradigm issue is the best foundation for mixed methods research? This issue, like the paradigm method fit issue, has multiple perspectives (Teddlie and Tashakkori, 2009). One perspective is that mixed methods research uses competing paradigms, giving each one relatively equal footing and merit. This “dialectical perspective recognizes that using competing paradigms gives rise to contradictory ideas and contested arguments, features of research that are to be honoured and that may not be reconciled (Greene and Caracelli, 1977, 2003). Such oppositions reflect different ways of making knowledge claims. This perspective maintains that mixed methods research may be viewed strictly as a “method” thus allowing researchers to use any number of philosophical foundations for its justification and use. The best paradigm is determined by the researcher and the research problem not by the method.

Another perspective is that pragmatism is the best paradigm for mixed methods research (Teddlie and Tashakkori, 2009). Pragmatism is a set of ideas articulated by many people, from historical figures such as Dewey, James and Pierce to contemporaries such as Murphy, Rorty and West. It draws on many ideas including using “what works using diverse approaches, and valuing both objective and subjective knowledge (Cherryholmes, 1992). Rosseman and Wilson (1985) were among the first to associate pragmatism with mixed methods research. They differentiated between methodological purists, situationalists, and pragmatists. The purists believed that quantitative and qualitative methods derived from different mutually exclusive, epistemological and ontological assumptions about research. The situationalists believed that both methods have value (similar to the dialectical perspective mentioned earlier) but that certain methods are more appropriate under certain circumstances. The pragmatists, in contrast, believed that, regardless of circumstances, both methods may be used in a single study. For many mixed method researchers, then, pragmatism has become the answer to the question of what is the best paradigm for mixed methods research. Recently Teddlie and Tashakkori (2009) have attempted to formally link pragmatism and mixed methods research, arguing that, among other things, the research question should be of primary importance- more important than either the method or the theoretical lens, or paradigm that underlies the method. At least 13 other prominent mixed methods researchers and scholars also believe that pragmatism is the best philosophical basis of mixed methods research (Teddlie

and Tashakkori, 2009).

Thus, although, quantitative and qualitative philosophies have contributed to the development of mixed methods research, pragmatism has been considered the best philosophical foundation for justifying the combination of different methods within one study (Datta, 1994; Howe, 1988). Pragmatism as a philosophy includes the use of induction (or discovery of patterns or gaining an understanding of the meanings humans attach to events, a closer understanding of the research context, and collection of qualitative data.), deduction (moving from theory to data, the collection of quantitative data, testing of theories and hypotheses, explanation of causal relationships between variables, application of controls to ensure validity of data and the selection of sufficient sample sizes in order to generalise conclusions), and abduction (uncovering and relying on the best of a set of explanations for understanding one's result) (de Waal, 2001).

Pragmatism traces its origin to the ideas of scholars John Dewey, Richard Rorty and Donald Davidson. Pragmatists believe that the truth is "what works" best for understanding a particular research problem (Patton, 2002; Rossman and Wilson, 1985; Tashakkori and Teddlie, 1998). A study's research questions are considered to be more important than the methods used to answer them or the philosophical views underlying each method (Maxcy, 2003).

In conclusion, quantitative and qualitative methods to research are well established in the social and behavioural sciences, and mixed methods approaches are growing in prominence. The choice of the approach depends on the researcher's philosophical orientation (whether post-positivism; constructivist or pragmatist), type of knowledge sought (for example, objective, factual or subjective information, personal experiences, or both) and methods and strategies used to obtain this knowledge (surveys and experiments versus open-ended interviews and observations, or both).

### **Rationale for use of multi-method strategy in research**

In the mid-1980<sup>s</sup>, scholars began expressing concern that researchers were indiscriminately mixing quantitative and qualitative methods and forms of data without providing justification for doing so (Rossman and Wilson, 1985; Green et al., 1989). As a result, different reasons or rationales, for mixing both forms of data in a single study were identified (Green et al., 1989). These rationales went above and beyond the notion of triangulation. Triangulation tests the consistency of findings obtained through different instruments.

As for mixed method research, quantitative and qualitative methods compliment each other. Results from one method are used to elaborate on results from the

other method (Good year 2005, Beck, 2005; Cresswell et al., 2008). The paradigm recasts results from qualitative method to question results from the quantitative method, and extends the breath or range of inquiry by using different methods for different inquiry components.

Mixed methods researchers have identified the reasons for conducting a mixed methods investigation (Newman and Benz 1998; Martens, 2003; Punch, 2006; Cresswell et al., 2008). According to these researchers, there are several advantages to employing multi-methods in the same study. First, different methods can be used for different purposes in a study. For example, a researcher may wish to employ interviews in order to get a feel for the key issues before embarking on a questionnaire. Second, the approach enables triangulation to take place. Triangulation refers to the use of different data collection methods within one study in order to ensure that the data are telling you what you think they are telling you. That is, it facilitates comparison of quantitative and qualitative data sets to produce well- validated conclusions. Third, the approach helps to explain on quantitative results with subsequent qualitative data. Fourth, it uses qualitative data to develop a theory that is subsequently tested, and lastly, the multi-method approach enhances a study with a supplemental data set, either quantitative or qualitative.

### **Steps in conducting a mixed research**

Designing a mixed methods study involves a number of steps, many of which are similar to those taken in traditional research methods. These include dealing on the purpose of the study, the research questions and the type of data to collect. Designing mixed methods, however, also involves at least three additional steps. These include deciding whether to use an explicit theoretical lens, identifying the data, data collection procedures and identifying the data analysis and integration procedures (Creswell, 1999; Greene and Caracelli, 1993; Morgan, 1998; Tashakkori and Teddlie, 1998). Those steps occur more or less sequentially, with one informing and influencing the others.

The first step involves whether to use an explicit theoretical lens (philosophical basis or paradigm) that underlies a researcher's study and subsequent methodological choices (Crotty, 1998). Recognizing that all researchers bring implicit theories and assumptions to their investigations, researchers at this initial stage must decide whether they are going to view their study from a paradigm base (for example, post-positivism, constructivism) that does not necessarily involve a goal of social change or from an advocacy-based lens such as feminism.

The second step involves deciding how data collection will be implemented and prioritised. Implementation refers to the order in which the quantitative and qualitative data are collected, concurrently or subsequently,

and, priority refers to the weight, or relative emphasis given to two types of data, equal or unequal (Creswell et al., 2003; Morgan, 1998).

The third step involves deciding the point at which data analysis and integration will occur. In mixed methods studies, data analysis and integration may occur by analysing the data separately, by transforming them, or by connecting the analyses in some way (Caracelli and Greene, 1993; Onwuegbuzie and Teddlie, 2003; Tashakkori and Teddlie, 1998). A counselling researcher could, for example, analyse the quantitative and qualitative separately and then compare and contrast the two sets of results in the discussion. As an alternative strategy, themes that emerged from the qualitative interview data could be transformed into counts or ratings and subsequently compared to the quantitative survey data.

Nonetheless, the following is a summary of the steps to be followed in conducting mixed research:

- i) State your research question and determine whether mixed methods design is appropriate to address the research problem.
- ii) Do you believe that you can best answer your research questions through the use of mixed research?
- iii) Do you believe that mixed research offer you the best design for the amount and kind of evidence that you hope to obtain as you conduct your research study? Determine the rationale for using a mixed design.
- iv) Select a specific mixed methods design (explanatory, exploratory, triangulation, embedded or mixed model research design).
- v) Write a detailed purpose statement for your mixed methods study.
- vi) Develop research questions to address the quantitative and qualitative data in your study. Collect the data.
- vii) Analyze the data – use both qualitative and quantitative data analysis techniques.
- viii) Validate the data – done through out the study.
- ix) Writing the research report.
- x) Writing the report can also be started during data collection rather than waiting until the end.

Remember that mixing must take place somewhere in mixed research and your report should also reflect mixing, that is, as you discuss your results you must relate the qualitative and quantitative parts of your research study to make sense of the overall study and to capitalize on the strength of mixed research.

## **SAMPLING APPROACHES**

Sampling designs comprise two major components: sampling scheme and the sample size. The sampling scheme denotes the explicit strategies used to select

units (for example, people, groups, settings, and events) whereas the sample size indicates the number of units selected for the study. In mixed methods studies, the researcher must take sampling scheme and sample size considerations for both the qualitative and quantitative phases of the study. Thus, mixed methods sampling designs represent the framework within which sampling occurs, including the number of types of sampling schemes, as well as the sample size.

## **Sampling schemes**

Patton (1990), Mutes and Huberman (1994), Onwuegbuzie and Leech (2007) identified twenty-four sampling schemes that qualitative and quantitative researchers have available for use. All these sampling schemes fall into one or two classes: random sampling (that is, probabilistic sampling) schemes or non-random sampling (that is, non-probabilistic sampling) schemes. Table 1 presents the major sampling schemes in mixed research.

## **Sample size**

To increase representation, it is essential that power analyses are conducted both in quantitative and qualitative (Onwuegbuzie and Leech, 2007) research. Such power analyses provide researchers with information regarding appropriate sample sizes for both quantitative and qualitative phases of a mixed methods investigation.

## **Data collection approaches**

According to Creswell (2003), it is useful to consider the full range of possibilities for data collection in any study and to organize these approaches by their degree of predetermined nature, their use of closed-ended versus open-ended questioning, and their focus for numeric versus non-numeric data analysis.

The following approaches can be used in data collection in mixed research, open-ended questions, closed-ended questions, observation, document data, text and image analysis, interviews, focus groups, archived and research data.

## **DATA ANALYSIS AND INTERPRETATION IN MIXED RESEARCH**

The mixed methods research process model incorporates. Onwuegbuzie and Teddlie's (2003) seven-stage conceptualization of the mixed methods data analysis process. According to these authors, the seven data analysis stages are as follows:

**Table 1.** Major sampling schemes in mixed research

<b>Sampling scheme</b>	<b>Description</b>
Simple	Every individual in the sampling frame has an equal and independent chance of being chosen for the study.
Stratified	Sampling frame is divided into subsections comprising groups that are relatively homogeneous with respect to one or more characteristics and a random sample from each stratum is selected
Cluster	Selected intact groups representing clusters of individuals rather than choosing individuals one at a time.
Systematic	Choosing individuals from a list by selecting every $k$ th sampling frame member the population divided by the preferred sample size.
Multistage random	Choosing a sample from the random sampling schemes in multiple stages.
Maximum variation	Choosing settings, groups, and / or individuals to maximize the range of perspectives investigated in the study.
Homogeneous	Choosing settings, groups, and individuals based on similar or specific characteristics.
Critical case	Choosing settings, groups, and individuals based on specific characteristics because their inclusion provides research with compelling insight about a phenomenon of interest.
Theory based	Choosing settings, groups, or individuals because their inclusion helps the researcher to develop a theory.
Confirming / Disconfirming	After beginning data collection, the researcher conducts subsequent analyses to verify or contradict initial results.
Snowball / chain	Participants are asked to recruit individuals to join the study.
Extreme case	Selecting outlying cases and conducting Comparative analyses.
Typical case	Selecting and analyzing average or normal cases.
Intensity	Choosing settings, groups, and individuals because their experiences relative to the phenomena of interest are viewed as intense but not extreme.
Politically important cases.	Choosing settings, groups, and individuals to be included or excluded based on their political connections to the phenomena of interest.
Random purposeful.	Selecting random cases from the sampling frame consisting of a purposeful selected sample.
Stratified purposeful	Sampling frame is divided into strata to obtain relatively homogeneous subgroups and a purposeful sample is selected from each stratum.
Criterion	Choosing settings, groups, and individuals because they represent one or more criteria.

Table 1. Contd.

Opportunistic	Researcher selects a case based on specific characteristics to capitalize on developing events occurring during data collection.
Mixed purposeful	Choosing more than one sampling strategy and comparing the results emerging from both samples.
Convenience.	Choosing settings, groups, and individuals that are conveniently available and willing to participate in the study.
Quota	Researcher identifies characteristics and quotas of sample members to be included in the study.
Multistage purposeful random .	Choosing settings, groups, and individuals representing a sample in two or more stages. The first stage is random selection and the following stage is purposive selection of participants.
Multistage Purposeful	Choosing settings, groups, and individuals representing a sample in two or more stages reflect purposive Sampling of participants.

- i) Data reduction.
- ii) Data display.
- iii) Data transformation.
- iv) Data correlation.
- v) Data consolidation.
- vi) Data comparison.
- vii) Data integration.

Data reduction involves reducing the dimensionality of the qualitative data (for example, via exploratory thematic analysis, memoing) and quantitative data for example, via descriptive statistics, exploratory factor analysis, cluster analysis).

Data display, involves describing pictorially the qualitative data (for example, matrices, charts, graphs, networks, lists, rubrics, and venn diagrams) and quantitative data (for example, tables, graphs). This is followed (optionally) by data transformation stage, wherein quantitative data are converted into narrative data that can be analyzed qualitatively (that is, qualitized); Tashakkori and Teddlie, 1998) and / or qualitative data are converted into numerical codes that can be represented statistically (that is, quantitized, Tashakkori and Teddlie, (1998).

Data correlation involves the quantitative data being correlated with the quantitized data; this is followed by the data consolidation, wherein both quantitative and qualitative data are combined to create new or consolidated variables, or data sets. The next stage, data comparison involves comparing data from the qualitative and quantitative data sources.

Data integration characterizes the final stage whereby both quantitative and qualitative data are integrated into either a coherent whole or two separate data sets (that is,--, qualitative and quantitative) of coherent wholes.

The legitimation stage involves assessing the trustworthiness of both the qualitative data and subsequent

interpretations. Frameworks such as the quantitative legitimation model (Onwuegbuzie, 2003) contains fifty sources of invalidity for the quantitative component of the mixed methods research data collection, data analysis and data interpretation stages of the study) and the qualitative legitimation model (Onwuegbuzie, 2000; Onwuegbuzie et al., 2004) contain twenty nine elements of legitimation for the qualitative component of the mixed methods research at the data collection, data analysis and data interpretation stages of the study). These frameworks can be used to assess the legitimacy of the qualitative and quantitative phases of the study, respectively. It is important to note that the legitimation process might include additional data collection, data analysis, and / or data interpretation until as many rival explanations as possible have reduced or been eliminated.

### Evaluating mixed research

Mixed methods research builds on both quantitative and qualitative approaches. In the quantitative approach, the investigator relies on numerical data to test the relationships between the variables (Charles and Mertler, 2002).The researcher tests the theories about reality, looks for cause and effect, and uses quantitative measures to gather data to test the hypotheses. The researcher relates the variables to determine the magnitude and frequency of relationships. Quantitative studies are either descriptive or experimental. A descriptive study establishes associations between variables, while an experiment establishes probable causality. Hence, the goal of quantitative research is to describe the trends or explain the relationships between the variables. The sample size is large and is randomly selected from the larger population to be able to

generalise the results to the population. The main quantitative designs include experimental, quasi-experimental, and correlational and survey research designs. To collect data for the study, the researcher identifies independent, dependent and control variables (Creswell, 2005) and collects the data using existing or pilot-tested, self developed instruments intended to yield reliable and valid scores.

In contrast to the quantitative approach, qualitative research approaches reality from a constructivist position, which allows for multiple meanings of individual experiences (Denzin and Lincoln, 2005). In this approach a researcher develops a complex, holistic picture, analyses words, reports detailed views of informants, and conducts the study in a natural setting (Creswell, 2007). The goal of qualitative research is to explore and understand a central phenomenon in a qualitative research study (Cresswell, 2005). The research questions are general and broad, and seek to understand participant's experiences with the central phenomenon. The sample size is often small and purposefully selected from those individuals who have the most experience with the studied phenomenon (Patton, 2002). The major qualitative research designs include case study, phenomenology, grounded theory, ethnography and narrative research (Creswell, 2007). The main types of qualitative data includes transcripts from individual and focus group interviews with participants, observations, documents about the studied phenomenon, audiovisual materials and artefacts( that is, material objects used by the people). Interpretation involves stating the larger meaning of the findings and personal reflections about the lessons learned (Lincoln and Guba, 1985).

The application of mixed methods in a single study is a difficult issue since, as has been suggested the rationales for methodological decisions are often justified by the questions addressed and the way data have to be analysed. However, mixed method designs (that is, explanatory, exploratory, triangulation and embedded) have common features such as the sequence of collecting and analysing quantitative and qualitative data in a study ( concurrent or sequential), and the way quantitative and qualitative data and results are mixed or integrated during the research process ( connected or compared (Creswell and Clark, 2007). Mixing can occur at different stages in the research process, the data collection, the data analysis and interpretation of the study results. Deciding on how to mix depends on the purpose of the study, its design and the strategies used for data collection and analysis. For example in an explanatory mixed design used for the purpose of explaining the quantitative results, mixing occurs at two stages. First, by selecting the participants for the qualitative follow-up and secondly, by developing the interview questions grounded in the quantitative results (Ivankova et al., 2006). Then the results from the two stages are integrated at the interpretation stage of the

study. In an explanatory design, mixing occurs at the qualitative data analysis stage. At this stage, the data collected via interviews is analysed for codes and themes, which are then used to develop the items and scales of the survey instrument to be used in the second, quantitative phase of the study. And lastly, the results from the entire study are integrated during the discussion of the study outcomes. That notwithstanding, mixed method research has both strengths and weaknesses:

### Strengths

- i) Mixed method research can answer a broader and more complete range of research questions because the researcher is not confined to a single method or approach.
- ii) A researcher can use strengths of an additional method to overcome the weaknesses in another method by using both in a research study.
- iii) Mixed method research can provide stronger evidence for a conclusion through convergence and corroboration of findings.
- iv) Mixed method research can add insight and understanding that might be missed when only a single method is used.
- v) Mixed method research can be used to increase the generalisability of the results.
- vi) Qualitative and quantitative research used together produces more complete knowledge necessary to inform theory and practice.
- vii) Researchers can generate and test a grounded theory.
- viii) Words, pictures, and narrative can be used to add meaning to numbers.
- ix) Numbers can be used to add precision to words, pictures and narrative.

### Weaknesses

- i) A researcher has to learn about multiple methods and approaches and understand how to mix them appropriately.
- ii) Methodological purists contend that one should always work within either a qualitative or a quantitative paradigm.
- iii) The application of mixed methods in a single study is a difficult issue since the rationales for methodological decisions are often justified by the questions addressed and the way data have to be analysed.
- iv) Some of the details of mixed research remain to be worked out fully by research methodologists (for example, problems of paradigm mixing, how to qualitatively analyze qualitative data, how to interpret conflicting results and report them).
- v) Mixed method research can be difficult for a single researcher to carry out, especially if the two approaches are expected to be used concurrently.

vi) Mixed method research is more expensive and more time consuming.

## THE FUTURE OF MIXED RESEARCH IN THE SOCIAL SCIENCES

It is the researcher's task to examine the specific contingencies and make the decision about which research approach, or which combination of approaches, should be used in a specific study. In general contingency theory is recommended for a mixed research approach selection, which accepts quantitative, qualitative, and mixed method research. Hence, it is time for the research methodologists to formally recognize the third research paradigm and begin systematically writing about it and using it. Furthermore, practicing researchers frequently ignore what is written by methodologists when they feel a mixed approach will best help them to answer their research questions. Nonetheless, mixed method research is growing in prominence in both the social and behavioural sciences.

## CONCLUSION

It is evident from the literature review that the concept of mixed methodology in research has been the subject of debate for a considerable period of time and that this debate was (and still is) referred to as the "paradigm wars" (Tashakkori and Teddlie, 1998; Datta, 1994). In an effort to end the paradigm wars and to enable mixed methodology to gain an equal status with the positivist and interpretivist schools, the pragmatist paradigm allows for the use of quantitative and qualitative methods (Tashakkori and Teddlie, 1998). Hence, mixed research is the research paradigm in educational research. It offers much promise, and we expect to see much more methodological work and discussion about mixed research in the future as more researchers and book authors become aware of this important approach to empirical research.

## REFERENCES

- Campbell DT, Fiske D (1959) convergent and discriminant validation by the multitrait – multimodel matrix. *Psychol. Bull.*, 56: 81-105.
- Caracelli VJ, Greene JC (1993). Data analysis strategies for mixed evaluation designs. *Educ. Eval. Policy Anal.*, 15: 195 – 207.
- Cherryholmes CC (1992). Notes on pragmatism and scientific realism. *Educ. Res.*, 21: 13-17.
- Cook TD, Reinhardt CS (1979). *Qualitative and quantitative methods in evaluation research*. Beverly Hills, CA: sage.
- Creswell JW (1999) mixed method research: Introduction and application. In: T. Cijek (Ed). *Handbook of Educational policy*. San Diego, CA: Academic press, pp. 455-472
- Creswell JW (2002). *Educational research planning conducting, and evaluating quantitative and qualitative approaches to research*. Upper saddle River, NJ: Merrill / Pearson Education.
- Creswell JW (2003). *Research design: quantitative, qualitative, and mixed methods approach* (2<sup>nd</sup> ed). Thousand Oaks, CA: sage.
- Creswell JW (2005). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (2nd ed.). Upper Saddle River, NJ: Pearson Education.
- Creswell JW, Plano C (2007). *the mixed methods reader*. SAGE Publications Ltd.
- Crotty M (1998). *The foundations of social research: Meaning & perspective in the research process*. London.
- Datta L (1994). Paradigm wars: A basis for peaceful co existence & beyond. In C.S. Reinhardt and S.F Rallis (Eds). *The qualitative – quantitative debate: New perspectives*. San Francisco Jossey – Bass. pp. 83-70
- Greene JC, Caracelli VJ, Graham WF (1989). Toward a conceptual framework for mixed – method evaluation designs. *Educ. Eval. Policy Anal.*, 11: 255 – 274.
- Greene JC, Caracelli VJ (1997). Advances in mixed method evaluation: The challenge, and benefits of integrating diverse paradigms (*New Directions for Evaluation*, No.74). San Francisco: Jossey – Bass.
- Greene JC, Caracelli VJ (2003). Making paradigmatic sense of mixed methods practice. In A. Tashakkori and Teddlie (Eds.). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: sage, pp. 91 – 110
- Guba EG, Lincoln YS (1988). Do inquiry paradigms imply inquiry methodologies? In D.M. Fetterman (Ed.). *Qualitative approaches to evaluation in education* (). New York: Praeger publishers, pp. 89-115.
- Lincoln YS, Guba EG (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications, Inc.
- Martens DM (2003). Mixed methods and the politics of human research: The transformative emancipatory perspective. In A. Tashakkori and C. Teddlie (Eds.), *Handbook of mixed methods research*. Thousand Oaks, CA: sage, pp. 135-164
- Patton MQ (1990). *Quantitative research & evaluation methods* (2<sup>nd</sup> ed). Newbury park, CA: sage.
- Newman I, Benz CR (1998). *Qualitative – quantitative research methodology. Exploring the interactive continuum*. Carbondale: University of Illinois press.
- Onwuegbuzie AJ, Teddlie C (2003). Framework for analyzing data in mixed methods research. In A. Tashakkori and C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: sage, pp. 351-383
- Onwuegbuzie AJ (2003). Expanding the framework of internal and external validity in quantitative research. *Research in the schools*. 10: 71 – 90.
- Onwuegbuzie AJ, Jiao QG, Bostik SL (2004) *Library anxiety: Theory, research, and applications*. Lanham, M.D: Scarecrow press.
- Onwuegbuzie AJ, Leech NL (2007). A call for qualitative power analyses: Considerations in qualitative research. *Quality and Quantity: Int. J. Methodol.*, 41(1): 105-121.
- Reichardt CS, Cook TD (1979). Beyond qualitative versus quantitative methods. In: T.D. Cook and C.S. Reichardt (Eds.), *Qualitative and Quantitative Methods in Evaluation Research*. Beverly Hills, CA: sage, pp. 7-32.
- Reichardt CS, Rallis SF (1994). *The qualitative – quantitative debate: New perspectives*. San Francisco: Jossey – Bass.
- Rossmann GB, Wilson BL (1985). Numbers and words: combining quantitative and qualitative methods in a single large – scale evaluation study. *Educ. Res.*, 9: 627- 643.
- Siebert SD (1973). The integration of fieldwork and survey methods. *Am. J. Sociol.*, 78: 1335 – 1359.
- Smith JK (1983). Quantitative versus qualitative research; An attempt to clarify the issue. *Educ. Res.*, 12: 6 – 13.
- Tashakkori A, Teddlie C (1998). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: sage.
- Teddlie C, Tashakkori A (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Thousand Oaks CA: Sage.