Taking the Next Step: Mixed Methods Research in Organizational Systems

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Mixed methods research combines theoretical and/or technical aspects of quantitative and qualitative research within a particular study. This paper traces the historical development of mixed methods research, and delineates current post-positivist and constructivist paradigmatic perspectives. We describe the two major positions of mixed method advocates: the dialectic and the pragmatic. We identify five purposes for mixing methods and eight types of mixed method studies. Grounded in mixed method inquiry literature, the authors examine the benefits and tenets of mixed methods research, analyze how it is currently being reported in three studies published in the Information Technology, Learning, & Performance Journal, *and offer specific recommendations for clarifying written descriptions of methods used to collect and interpret data. We draw positive implications for the organizational systems field for clearly writing about mixed research methods in publications.*

Few examples exist in the fields of human resource development, distance education, and foreign language education, of intentionally using the inquiry literature on mixing qualitative and quantitative methods in one research project. Standard texts, such as the widely used Gay and Airasian (2000), barely include any reference to the use of both qualitative and quantitative methods in the same study. Creswell (1994), however, dedicates a chapter to combined qualitative and quantitative designs. Whether a researcher has read about mixed methods research or is aware that the literature exists, any researcher who has collected data that includes closed-ended items with numerical responses as well as open-ended items on the same survey (Tashakkori, Aghanjanian, & Mehryar, 1996) has conducted mixed methods research.

Mixed methods research is characterized as research that contains elements of both qualitative and quantitative approaches (Brewer & Hunter, 1989; Howe, 1988; Miles & Huberman, 1984; Patton, 1990; Reichardt & Cook, 1979). More than 40 years ago, quantitative researchers Campbell and Fiske (1959) suggested mixing methods to accurately measure a psychological trait. Their call for multiple methods "to ensure that the variance was reflected in the trait and not in the method" (Creswell, 1994, p. 174) later expanded into what Denzin (1978) dubbed "triangulation."

Qualitative researchers, initially led by Denzin (1978; 1989) and Jick (1979) and later by others such as Patton (1990), continued the conceptual

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development of triangulation. Denzin (1989) advised, "By combining multiple observers, theories, methods, and data sources, [researchers] can hope to overcome the intrinsic bias that comes from single-methods, single-observer, and single-theory studies" (p. 307). Triangulation evolved to include using multiple data collection and analysis methods, multiple data sources, multiple analysts, and multiple theories or perspectives (Patton, 2002). Patton (2002) clarified the notion that the purpose of triangulation is to test for consistency rather than to achieve the same result using different data sources or inquiry approaches. Inconsistencies are seen as an opportunity for developing further insight into relationships between the methods chosen and the phenomenon studied, thus allowing researchers and the readers of their reports, alike, to improve their understanding of that phenomenon.

According to Patton (2002), some researchers believe qualitative research has gained acceptance, and therefore, the paradigm wars are over.[1] In this view, instead of fighting over the superiority of quantitative versus qualitative approaches to research, the challenge is to match research method and paradigm to the purposes, questions, and issues raised. Researchers are using aspects of both quantitative and qualitative methods in their studies because they "need to know and use a variety of methods to be responsive to the nuances of particular empirical questions and the idiosyncrasies of specific stakeholder needs" (Patton, 2002, p. 585). As an example of the latter, organizational policy makers and people who are the subjects in a research study differ widely in what they want to learn from a project. For reasons such as these, using a combination of methods to study a social phenomenon came to be accepted as a beneficial research practice during the 1980s. Researchers have increasingly accepted the underlying assumption that biases are inherent in any one particular method of data collection or analysis. Therefore, researchers are turning to mixed methods to conduct stronger research. In recognition of the increasingly widespread use of mixed methods in the social and behavioral sciences, noted methodology publisher Sage recently published *The Handbook of Mixed Methods in the Social and Behavioral Sciences* (Tashakkori & Teddlie, 2003).

There are many ways to mix methods and many levels of mixing both qualitative and quantitative elements in research projects. The purpose of this article is to describe mixed methods, to provide a primer on how and when to use mixed methods, to provide an analysis of the articles found in the *Information Technology, Learning, and Performance Journal* that used mixed methods, and to discuss implications for the field. We will address the following important questions: What are the characteristics of mixed method research? What are the benefits of a mixed methods research project?

Describing Mixed Methods

A description of mixed methods should begin with a discussion of paradigms. This discussion should include a definition of the components of a paradigm as well as the perspectives.

Defining Paradigm Components

A paradigm may be best defined as a "worldview." As such it is a "basic set of beliefs or assumptions that guide" a researcher's inquiry (Creswell, 1998, p. 74). Every researcher brings to his or her research a "set of interlocking philosophical assumptions and stances" (Greene & Caracelli, 1997, p. 6). These include the researcher's *ontological* beliefs, those about the nature of reality. The nature of reality is explored through a researcher's answers to problems such as what is the nature of the world, including social phenomena; if reality is orderly and lawful; the existence of a natural social order; if reality is fixed and stable or constantly changing, and whether it is unitary or multiple; and if reality can be "constructed by the individuals involved in the research situation" (Creswell, 1998, p. 76).

Connected to a researcher's beliefs about what is real are those *epistemological* beliefs concerning what it is possible for one to know. To paraphrase the Watergate question once asked of a president, "What can we know, and how can we know it?" What is the relationship of the researcher to that being researched? What does it mean for a researcher to claim objectivity? Should researchers

deliberately try to minimize the distance between themselves and those they study?

A paradigm also includes *axiological* beliefs including those concerning ethics. Researchers ask what it means to "Do the (ethically) right thing." They examine the relationship between their values and social research. They question the role of values in research.

Researchers' beliefs about reality, knowledge, and values "guide and frame" (Greene & Caracelli, 1997, p. 6) their beliefs about *research methods*. Do they turn to quantitative or qualitative methods of data collection or data analysis exclusively? Do they only ask questions that can be answered in one way, or do they ask questions best investigated using multiple methods? When and why does it make sense to mix methods?

Paradigm Perspectives

There are purists whose answers to the questions above always lead them to separate qualitative and quantitative approaches to research. One purist perspective is articulated by the positivists (and post-positivists). For them, reality may be, at least to some degree, objectively known, and some degree of causal linkage may be legitimately claimed. This is possible only when they strive to keep their values out of their research and when they employ primarily deductive logic and quantitative methods of research. The second purist perspective is associated with the constructivists or interpretivists. They believe reality to be socially constructed and only knowable from multiple and subjective points of view. The knower and the known are seen as inseparable. Inductive logic and qualitative methods are generally employed with the goal of understanding a particular phenomenon within its social context. Not surprisingly, from this perspective, inquiry is considered to be inevitably value laden.

Researchers make knowledge or truth claims when they report what they have discovered as a result of their research, and when they report what their findings mean. While they disagree on which paradigm is more accurate, the one belief purists from both paradigms hold in common is that the two paradigms embody such fundamentally different understandings of the world and what constitutes legitimate truth or knowledge claims that they should not be mixed within a single study.

Researchers whose worldviews reject these purist claims as extreme often find it advantageous to mix methods. Two positions developed among mixed methods advocates: the pragmatist and the dialectical (Rocco, et al., 2003). Greene and Caracelli (1997) consider these *positions* rather than more philosophically complex *paradigms*. It should be noted that the two positions have different rationales for conducting mixed methods research. Each position or perspective, however, has something to offer researchers seeking ways to strengthen their own research.

The *pragmatist* position (e.g., Patton, 1988; Reichardt & Cook, 1979; Reichardt & Rallis, 1994; Tashakkori & Teddlie, 1998) calls for using "whatever philosophical and/or methodological approach works for the particular research problem under study" (Tashakkori & Teddlie, 1998, p. 5). Research design and implementation decisions are made according to which methods best meet the practical demands of a particular inquiry (Patton, 1988). Discussions among pragmatic mixed methods researchers generally concern the "best use" techniques and procedures for specific research problems. The researcher holds no *a priori* commitment to using mixed methods; all are compatible and potentially useful. Mixing may occur in a particular study if the researcher decides it will help make the data collection and analysis more accurate or the inferences more useful.

In contrast, the *dialectical* position (Greene & Caracelli, 1997; Kidder & Fine, 1987; Maxwell & Loomis, 2003) calls for explicitly seeking a synergistic benefit from integrating both the post-positivist and constructivist paradigms. The underlying assumption is that research is stronger when it mixes research paradigms, because a fuller understanding of human phenomena is gained. Dialectical researchers believe it is more ethical to mix methods "in order to represent a plurality of interests, voices, and perspectives" (Greene & Caracelli, 1997, p.14). Discussions among dialectical mixed methods researchers generally concern the benefits of remaining cognizant of what is to be gained through explicitly drawing on the two paradigms' different understandings of reality, knowledge, and the place of values in research.

There is a philosophically grounded *a priori* commitment to using mixed methods to reach the same utility and accuracy goals held by the pragmatists, but through complementarity rather than compatibility. Using the example above, a researcher operating from this standpoint or position might deliberately seek both information about an objective, universal reality by quantitatively analyzing Likert scale data in a survey, and information about multiple, subjective realities by conducting a constant comparative analysis of open ended questions on the survey.

A Primer on Mixed Methods

This section begins with commonly asked questions about mixed methods and the corresponding answers. Following this is a discussion of five purposes for mixing methods (Greene & Caracelli, 1997) and mixed method types (Tashakkori & Teddlie, 1998).

Mixed Methods in a Research Project—Q & A

- When? Mixing may occur at any point or at multiple points within a research project, from the purpose statement and statement of the research question, to the data collection and management, to data analysis, to drawing inferences from the interpretation of the findings.
- In what order? Mixing may be done sequentially/interactively, using information gained from one to make decisions about the other or in simultaneous/parallel portions brought together only in the final analysis of the research project.
- At what level? Data collection and analysis can be mixed between and within levels. Levels may include the individual, group, organization, and society.
- In what proportions? Quantitative or qualitative components may be used equally, or one may be more dominant.
- To what degree are the tools/techniques different? There are quantitative and qualitative data gathering tools/techniques that are similar, such as a scaled questionnaire and a structured interview, and those that are farther apart such as an achievement test and an open-ended interview.
- Does the type of data dictate the type of analysis? No. Qualitative data may be "quantified" (Miles & Huberman, 1994) converting it to numbers for quantitative analysis. Likewise, quantitative data may be qualitatively analyzed (Tashakkori & Teddlie, 1998). For instance, a profile of a group and/or individuals may be developed based on quantitative data.
- What is one benefit of mixing? Mixing makes room for both the exploratory inductive process that begins with empirical evidence of the particular and proceeds to a level of abstracting/theorizing/generalizing and the confirmatory deductive process of hypothesis testing of theories.

Five Purposes for Mixing Methods

In their review of 57 mixed methods studies, Greene, Caracelli, and Graham (1989) identified and gave examples of evaluation projects that demonstrated five purposes for adopting mixed methods design strategies; triangulation, complementarity, development, initiation, and expansion. To increase a study's validity, *triangulation* refers to the classic convergence or corroboration concerning the same phenomenon discussed earlier in this article. For example, triangulation is illustrated by using a qualitative interview and a quantitative questionnaire to assess program participants' perceptions. To increase a study's validity and interpretability, *complementarity* measures "overlapping, but also different facets of a phenomenon" (p. 258). An example of complementarity is the use of a qualitative interview to measure the nature and level of program participants' perceptions, "as well as *influences* on these [perceptions], combined with a quantitative questionnaire to measure the nature, level, and *perceived ranking within peer group* of participants' [perceptions]" [emphases in the original] (p. 258). To increase a study's validity, *development* uses the "results from one method to help develop or inform

the other method" (p. 259). For example, a quantitative survey of program participants' vocational needs could be used to identify a purposive sample for more in-depth interviews about those needs. To add depth and breadth to inquiry results and interpretations, *initiation* uses the intentional analysis of inconsistent qualitative and quantitative findings. This search for "fresh insights" (p. 260) is more likely to emerge than be planned into the research design. To widen the scope of inquiry, *expansion* calls for including multiple components to "extend the breadth and range of the study" (p. 259). An example is using qualitative methods to assess program processes and quantitative methods to assess program outcomes. Research design options become wider as design purposes move from triangulation to expansion.

Table 1: Summary of Mixed Methods Types

I.	Confirmatory Investigation Qualitative Data Statistical Analysis	II.	Confirmatory Investigation Qualitative Data Qualitative Analysis
III.	Exploratory Investigation Quantitative Data Statistical Analysis	IV.	Exploratory Investigation Qualitative Data Statistical Analysis
V.	Confirmatory Investigation Quantitative Data Qualitative Analysis	VI.	Exploratory Investigation Quantitative Data Qualitative Analysis

Types of Mixed Method Studies

Tashakkori and Teddlie (1998) developed a pragmatic framework for understanding why to use mixed methods. They point out that a research project has three stages. The first stage concerns the type of project. Projects can be exploratory (without a priori hypotheses) and/or confirmatory (with a priori hypotheses). The second stage concerns the type of data collection and operations. Research operations include sampling procedures, measurement techniques, and methods for establishing the trustworthiness of the results. The third stage concerns the type of data analysis and inference. They have developed a framework of six types of mixed methods studies (See Table 1) and two types of more complex mixed models based on these three discrete "stages" (p. 55). Methods of data analysis are seen as related to research questions rather than to methods of data collection. It is assumed that questions of quality, credibility, validity, and reliability will be answered in ways that are appropriate to the method.

The two additional types of mixed methods are Type VII and Type VIII. Tashakkori and Teddlie (1998) describe these types as being large scale "completely mixed studies" and identified them as "mixed models" rather than "mixed methods" (p. 149). These two types of studies are more complex than the others because they call for mixing qualitative and quantitative orientations within as well as between the stages of a research project. Type VII is the parallel mixed model study. In it, mixing takes place simultaneously within at least one of the three stages. There may be both exploratory and confirmatory aspects to a Type VII study. Both qualitative and quantitative data may be collected or quantitative and qualitative analyses may be conducted and inferences drawn. Type VIII is the sequential mixed model study. It is the most large scale and complex of all the types because it has multiple phases. Each phase is part of the overall study and has one iteration of all three stages. The mixing takes place between the phases. If one phase is primarily quantitative, another must be primarily qualitative. Each phase is designed to explore or confirm the questions raised in the previous phase.

The intent of Greene, Caracelli, and Graham's purposes and Tashakkori and Teddlie's types and models is to be able to analyze existing research better and to design research that is more useful. More useful research says something important about the phenomena under study. It is insightful, and its explanations are plausible. Many researchers find that to conduct this level of research involves mixing methods and perhaps also mixing paradigms. It is important for researchers to provide evidence that mixed methods were carefully and thoughtfully incorporated into their projects' designs and processes. A field is strengthened when its researchers show an awareness of the weaknesses and strengths of each approach. Purely quantitative research tends to be less helpful through its oversimplification of causal relationships; purely qualitative research tends to be less helpful through its selectivity in reporting.

A Beginning: An Analysis of Studies Using Mixed Methods

We reviewed 16 online articles published from 1999 to 2001 in the *Information Technology, Learning, and Performance Journal*. We screened the abstracts, methods, and findings sections to determine whether mixed methods were used in the purpose and design, data collection, and/or data analysis sections. None of the 16 articles identified the use of mixed methods in the abstract. However, three articles met the criteria for using mixed methods as evidenced in their methods sections (Burdett, 2000; Crews & Alexander, 1999; Feather, 1999).

The authors of the articles did not explicitly state their commitment to using mixed methods. Each author employed mixed methods from the pragmatic perspective using "whatever method [was] appropriate for their studies" (Tashakkori & Teddlie, 1998, p. 5). Burdett's (2000) research on the differences in perception between women who participate in electronic meeting systems versus conventional meetings was a pragmatic example of confirmatory (hypothesis testing) research. On the other hand, Crews and Alexander (1999) and Feather (1999) used (non-predictive) exploratory investigations to conduct their research on the impact of group support systems on group development (Feather, 1999) and the availability of computers in Far Eastern Universities (Crews & Alexander, 1999). In the following two sections, entitled "Confirmatory Investigation" and "Exploratory Investigations," we will discuss each of these studies in terms of the study's research design and use of mixed methods. We will make connections to the mixed method inquiry literature.

Confirmatory Investigation

Burdett (2000) conducted a comparison study of women's perceptions of satisfaction and participation using an Electronic Meeting System (EMS) versus a conventional meeting format. Thirty female participants in nine EMS meetings provided feedback on a questionnaire that replicated questions in an earlier study of Australian university women who participated in conventional meetings (Affirmative Action, 1995, as cited in Burdett, 2000). The quantitative results from the questionnaire were compared using the Phi coefficient. Only the item dealing with feelings of intimidation was statistically significant (r = -.27). Women in the conventional meetings (19%) felt more intimidated than women in the EMS meetings (3%). In addition to the quantitative data collection and statistical analysis, Burdett used qualitative data collection and analysis strategies.

In the methods section, Burdett (2000) stated that she "also gained information from first-hand observations and experiences as an [EMS] meeting facilitator as well as from the questionnaire responses and some follow up semi-structured interviews with a small number of participants" (p. 5). No specific information was provided regarding the construction of the interview guide or analysis of the observations and comments; however, the results section appears to be organized by themes that emerged from the comments and observations (i.e., gaining a confident voice through anonymity, equity, listening, maintaining relationships, efficiency and effectiveness, and satisfaction with outcomes). She interspersed specific comments and observations throughout the results.

The comments and observations often revealed aspects that reduced the women's satisfaction in the EMS meetings. Overall, more women in EMS meetings (83%) were satisfied with their contributions than women in conventional meetings (61%). The comments, however, revealed that study participants felt that ideas presented in these EMS meetings were presented too rapidly, leaving people feeling disempowered; that bonds with close colleagues could be threatened due to anonymity; and that adequate time was not given to analyze the various views presented. The comments revealed new information and perspectives about the women's experience of electronic meeting systems.

Based on the five purposes identified in Greene et al. (1989), Burdett (2000) used mixed methods according to the complementarity purpose. The use of both quantitative and qualitative data collection and analysis resulted in the phenomenon of women's experience of meetings being seen from different perspectives, which were illuminated with mixed methods.

Because both quantitative and qualitative data collection and analysis/inference were used in this

single-phase study, Burdett's study is also an example of a parallel mixed model study or Type VII as described by Tashakkori and Teddlie (1998). Type VII is an extended example of a mixed model design that involves the simultaneous application of different approaches. Burdett's study used quantitative and qualitative strategies for more accurate and useful findings in a confirmatory investigation.

Exploratory Investigations

Crews and Alexander's (1999) research is an example of a parallel mixed model study for an exploratory investigation. They studied computer availability and funding at Far Eastern Universities. The exploratory study was driven by three general research questions: (a) what types of computers are available at the university, (b) how was funding for computers obtained, and (c) what computer materials would be obtained with funding. Two universities from China and Korea and one from Japan responded to the request for information. A total of 64 department heads representing over 1,000 faculty members returned the survey via mail or fax.

They collected data using a survey with three sections containing closed-ended questions and one open-ended section for additional information. This data was translated and reviewed by graduate assistants, students, and faculty. Sections one through three used descriptive statistics and frequencies, while section four summarized the qualitative information.

Findings from this study were presented in narrative and tabular form. A summary of the types and location of hardware available in the universities was exhibited in table form. Most support for computers came from university funds (74%). Thirty percent of respondents indicated that personal money was also used to purchase computers and materials. Additional comments revealed some faculty provided their own notebooks and computers in student labs that were "used mainly to word process papers" (p. 32).

Crews and Alexander's study is an example of a Type III mixed model study as described by Tashakkori and Teddlie (1998). It is a descriptive study with no predictions or hypothesis. As shown in the Table I, this type of research design can employ both qualitative and quantitative data collection and data analysis. In Crews and Alexander's study, data collection was both qualitative and quantitative with the use of open and closed-ended questions. Data analysis was predominantly quantitative via descriptive statistics. It also included the use of statements to expand the results using open-ended questions.

Crews and Alexander's research is an example of the expansion rationale delineated by Greene et al. (1989). Clearly, the use of open-ended questions in the survey allowed Crews and Alexander to obtain further information about the use of computers in Far Eastern universities. The limited use of mixed methods by Crews and Alexander expanded and enhanced the findings of their exploratory study.

In another exploratory investigation, Feather (1999) used mixed methods in her research on the impact of group support systems (GSS) in collaborative learning settings on group development. Feather's study was guided by three research questions regarding the impact of GSS on groups developing through all seven stages of Johnson and Johnson's (1997) model of group development, the time required to move through the stages, and whether groups reached stage six.

Data was collected from two groups of subjects via audiovisual taping of all sessions, observation logs kept by the researcher, and document review (i.e., flipcharts, computer printouts, assignments). Each session was transcribed, visual behavior was noted, and data from both were coded. The coding of behaviors in the videotape and calculating the time for each behavior determined the time spent by each group in one of Johnson and Johnson's stages. Frequencies and total time were presented graphically for each stage and for each group in both GSS and non-GSS conditions. Additionally, the facilitator changed from an autocratic style to laissez-faire (Feather, 1999). The observation log generated information about possible effects of the facilitator's style on the group process.

Using Tashakkori and Teddlie's (1998) typology, this study was a mixed methods Type IV using qualitative data and statistical analysis and inference. Specifically, Tashakkori and Teddlie refer to this process as "quantitizing" the qualitative

data (p. 128). In this study, quantitizing included a frequency count of the stages and the calculation of the total length of time spent in each stage. This exploratory investigation resulted in quantitative findings regarding the impact of GSS.

Some Observations on the Use of Mixed Methods

These three research articles used various mixed methods strategies to test hypotheses and explore research questions. Explicit rationales for the use of mixed methods were not given in these articles; however, their use resulted in richer findings, more accurate information, and greater usefulness.

Burdett's (2000) study of women and meetings was enriched by the use of mixed methods to collect and analyze the data resulting from the statistical findings. The one statistically significant finding, that women felt more intimidated in conventional meetings, was complemented by the identification of several factors that reduced the women's overall satisfaction with EMS meetings. She obtained a clearer, more accurate, and nuanced view of women's behaviors in and feelings about meetings. More research can thus be generated from the plethora of relevant themes that emerged from Burdett's study.

Feather's (1999) use of mixed methods in her study on GSS and group development provided greater accuracy. By using quantitative analysis on qualitative data, Feather was able to generate information regarding time spent in each stage and the frequency of stage related behaviors. Crews and Alexander's (1999) study generated information that has greater applicability concerning computers in Far Eastern universities. The data from the open-ended questions gave some insight into the recent pattern of use of computers by students and faculty and might generate future cross-national research on computer use, needs, and support. As evidenced by the results of these articles, the use of mixed methods can unleash rich findings, greater utility, and more useful research. In the future, referencing mixed method literature and providing theoretical frameworks for research design can only strengthen studies reported in the *Information Technology, Learning, and Performance Journal* that use mixed methods.

Improving the Clarity of the Method Description

Many methods sections and abstracts describe a study simply as "a qualitative study" or a "quantitative study" citing only textbooks to support this position. *Qualitative* and *quantitative* are not types of studies, nor does qualitative inquiry have a unified theoretical orientation. Each describes an approach to research. Both use an array of designs (e.g., case study, experimental design, and ethnography). Within each tradition, variations in data collection and analysis procedures exist. Their roots extend into different philosophical traditions, and knowing this can influence the researcher's understanding and use of a particular method or mix of methods.

The research design should be selected as the most appropriate to address the research questions or hypotheses at a technical, philosophical, or political level. Often the theoretical orientation of the particular method, as found in the inquiry literature, provides criteria for determining the appropriateness of the research design to the research questions and to the study's conceptual framework. This theoretical orientation most often addresses technical level questions about appropriate data collection and interpretation methods. Less often, it addresses philosophical questions that might lead researchers to a deeper understanding of their "worldviews" and related paradigm preferences. Political questions about the larger social view of the "purpose and role" of particular research projects that influence which projects are funded are least often addressed (Greene & Caracelli, 1997, p. 5).

Being aware of how to use different criteria from the inquiry literature effectively can lead to more thoughtful problem statements and related research projects. "At first blush, a well developed problem statement appears simple...but writing a good problem statement is far from effortless" (O'Connor, 2000, p. i). Writing a good method section is also far from effortless, involving many of the same issues. For instance, once a researchable problem is established, the appropriate method for collecting and analyzing the data to respond effectively to the research problem is vital to conducting high quality, rigorous research. Just as it

is necessary to establish the importance and "existence of a researchable problem" (O'Connor, 2000, p. i) through a discussion of the related literature, it is important to establish the appropriateness of the method used by grounding it in the inquiry literature. This conceptual framework for the method should involve a demonstration by the researcher that research design decisions were made intentionally through an informed reading of the mixed methods literature, and the researcher should provide the rationalizations or justifications for the use of mixed methods grounded in the mixed methods literature.

The purpose of the method section is to report the specifics of the procedures used to collect, manage, and analyze the data. This includes information on how, who, and under what conditions data are collected and analyzed with the rationale for these decisions grounded in the inquiry literature. Enough detail should be provided so that readers understand what was done and why it was done. Readers of mixed methods studies need information on how data were analyzed and a rationale for why the analyst chose specific data analysis tools or methods and whether the tools or methods are quantitative or qualitative. The decisions need to be grounded in the inquiry literature while connections should be made between the data, the conclusions, and the study's conceptual framework.

As Bartlett, Kotrlik, and Higgins (2001, p. 49) point out, "the procedures used ... should always be reported, allowing the reader to make his or her own judgments as to whether they accept the researcher's assumptions and procedures." This not only strengthens the discussion and findings of a study but also contributes to the growth of a field. Readers can gain insights into their own research methods by learning about the design choices researchers make and the rationale behind the choice as supported by the literature. It is our hope that the various rationales for using mixed methods presented in this article empower readers to use them appropriately in their future research projects.

Implications for the Field

Little explicit discussion of research design decision-making or theoretical support for mixing design components was observed in the examples used in this paper. The authors may have had sound rationales for their choices, but this level of detail did not make it into the method sections of their articles. This has larger implications for organizational systems as a field as we strive to have our research taken seriously by other disciplines.

Many research questions and topics of interest lend themselves to mixed methods approaches. Yet, current research training typically lacks the appropriate use of mixed methods in all but the most rudimentary ways (e.g., triangulation). There is a need for research courses that demonstrate quantitative and qualitative data collection and analysis techniques followed by instruction in how and when to mix methods in the various stages of a research project's design. This will lead to a greater sophistication when making thoughtful design decisions at the technical level and encourage more design decisions to be made at the philosophical and political levels.

In conclusion, many of the research reports we have reviewed in the human resource development and adult education literature (Rocco, Bliss, Gallagher, & Perez-Prado, 2002) and in organizational systems do not discuss the broader philosophical and political level decisions that ultimately shape research agendas. They confine their discussions concerning research design and data interpretation to descriptions of technical level decisions about "methods and procedures" (Greene & Caracelli, 1997, p.6). Appropriate journals should encourage the inclusion of such discussions in research submitted for publication. As Greene and Caracelli have pointed out, "the underlying rationale for mixed-method inquiry is to understand more fully, to generate deeper and broader insights, to develop important knowledge claims that respect a wider range of interests and perspectives" (1997, p. 7). Mixed methods research that emerges from this discourse has the potential to be more useful to people making policy decisions about business, technology, education, and society.

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Endnote

[1] For a history of the successful resolution of the "paradigm wars" from a pragmatic point of view, see the first two chapters of Tashakkori and Teddlie's (1998) *Mixed Methodology: Combining Qualitative and Quantitative Approaches*.