Toward a Framework for Classifying and Guiding Mixed Method Research in Information Systems

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Abstract

The field of information systems (IS) has explored research questions in a near-unilateral focus in that most IS research, particularly research published in North American journals, uses a quantitative, positivist approach. To achieve a better understanding of the effect of IS in organizations, researchers should invoke mixed method research in which both quantitative and qualitative methods are used. Rather than simply calling for more mixed method research, we adapt a framework from the education evaluation literature for use within IS. This framework not only classifies existing literature and provides insight into possible mixed method designs, but also contains recommendations for implementing different types of mixed method research. We also analyze this framework in the context of three IS mixed method studies. Challenges to mixed method research and future plans for research are also discussed.

1. Introduction

All research methods have fundamental flaws that inhibit a researcher from simultaneously achieving high external validity, ensuring accuracy in measuring constructs, and creating realistic environments for observation of behavior [17]. Without examination of research problems from multiple viewpoints, these conflicting research goals cannot be attained. In the past decade, the field of information systems (IS) has been chided for a near-unilateral stance in examining phenomena. Orlikowski and Baroudi [24] commented that IS “[exhibits] a single set of philosophical assumptions regarding the underlying nature of phenomena being investigated, the appropriate research methods to be used, and the nature of valid evidence” [p. 2]. Other studies have criticized the strong emphasis on positivist, quantitative research employed by IS researchers [19, 22, 24, 36]. Multiple methods provide additional insight because a problem is approached from differing perspectives [17]. The advantages of examining a problem using both qualitative and quantitative approaches has been touted for 25 years [6, 10]. However, in many disciplines, including IS, the call for using mixed research methods has been largely ignored [18, 24].

The examination of problems using diverse paradigms and research methods establishes a firm foundation of knowledge. Research using the same assumptions and research methods can be easily challenged; however, a research problem that is examined via multiple perspectives and approaches can withstand opposition [26]. Thoughtful use of mixed methods can capitalize on the strengths and defuse the weaknesses of each method [10, 17]. Kaplan and Duchon [12] acknowledged that mixed methods “can lead to new insights and modes of analysis that are unlikely to occur if one method is used alone” [p. 582]. Divergent results from each method allow the researcher to develop more complex, and potentially novel explanations of a phenomenon [10].

Instead of simply calling for more mixed method research in IS, we have adapted a framework to educate IS researchers on different possible motives for conducting mixed method research. The framework, adopted from the education evaluation literature, also prescribes research designs for integrating qualitative and quantitative methods, depending on the researcher’s motive for using mixed methods. We believe that this framework, shown in Figure 1, informs and assists researchers in conducting mixed method research.

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Figure 1: Framework for mixed method research
This paper offers several contributions to researchers considering using mixed methods. First, we examine the history and debate of mixed method research in both the social sciences and in the IS literature. Next, based on the review of literature, we adopt a framework from the education evaluation discipline as a means to examine mixed method studies in IS. In Section 3, we introduce this new framework and analyze IS studies in terms of the classification scheme. Next, we caution researchers about the challenges faced when designing, conducting, and publishing mixed method studies. Sections 5 and 6 outline plans for future research and offer concluding thoughts.

2. Literature Review

2.1. Defining mixed method research

Several IS researchers have responded to the need for additional mixed method research; however, the definitions of mixed method research vary. The simplest definition of mixed method research, also known as multimethod research, employs more than one research method in a study – which could include two quantitative methods or two qualitative methods [18, 19]. Mixed method research has also been defined as an approach to study phenomena by using multiple data collection techniques to generate multiple data sets [29, 30]. In this paper, we restrict the definition to include only research that combines qualitative and quantitative methods to collect, analyze, and present both types of data. This narrower definition of mixed methods has been adopted in the social sciences [25, 34], and also suggests that previous reports, such as recent publications by Mingers [18, 19], have overstated the prevalence of mixed method research in IS.

2.2. Confusion in mixed method research

Mixed method research is a topic that has been widely discussed across the various social science disciplines. Much reading on the topic leaves one with a sense of confusion, however. First, there is little consensus on terminology. This creates a challenge to researchers seeking to design mixed method studies. Terms are not used consistently and definitions vary both within and across disciplines. For example, a common term in mixed methods literature is “triangulation,” which is most often defined as the use of multiple methods to converge on a construct [4, 8, 10]. While many researchers use this term, others call the same concept corroboration [27, 28]. Adding to the confusion, some researchers define triangulation as one of several specific techniques to perform mixed method research [8, 27], while others imply that triangulation is synonymous with mixed method research [13, 21]. The lack of a common vocabulary creates difficulty in understanding and writing about mixed method research.

A second point of confusion in the literature is in regards to the ongoing debate regarding the possibility of combining methods that are ultimately derived from conflicting paradigms. Opponents of mixed method research state that quantitative and qualitative methods have been developed under different paradigms and, therefore, each method has conflicting assumptions [31, 32]. According to Smith and Heshusius [32], confusion surrounding the word method has affected the qualitative-quantitative debate. If “method” is defined as techniques or procedures found in research methods textbooks, then it is possible to combine qualitative and quantitative methods to better understand a given research problem. Alternatively, if the word “method” is defined as “logical issues and ultimately … justifications that inform practice” [32, p. 8], then methods cannot be combined because each paradigm defines truth and validity differently. Proponents of mixed method research have stated that “research methodologies are merely tools, instruments to be used to facilitate understanding” [21, p. 122], and that differences between qualitative and quantitative methods “are often blown out of proportion” [9, p. 15]. Many papers advocating mixed method research do not define what is meant by “method.” The failure to agree on the definition of this term leaves a casual reader of the literature perplexed. Each side clearly agrees that if one defines method as qualitative or quantitative techniques or procedures, then use of mixed methods is acceptable. Therefore, the real debate lies in the determination of whether methods derived from differing epistemological assumptions and paradigms are indeed compatible. This debate exists in the literature in terms of purists versus pragmatists, which is explained in the following section. Since researchers fail to consistently define “method,” the debate about combing qualitative and quantitative methods is more complex as one tries to realize the benefits and challenges of mixed method research.

An examination of research published in the IS literature regarding the combination of qualitative and quantitative methods within a single study suggests that the tone and structure of the discussion differs. As in the social sciences, there is a lack of common vocabulary within IS mixed method research, but the debate regarding the ability to use mixed methods in IS appears to be largely resolved. It has been
acknowledged that positivist and interpretive researchers are not limited to quantitative and qualitative methods, respectively. Quantitative methods can be used under an interpretive paradigm [1], and qualitative methods can be effective tools under a positivist paradigm [14, 22]. Mingers [18] asserts that paradigmatic conflicts are overstated and research methods can be extracted from the paradigm from which they emerged and applied to a different setting. IS has largely accepted the ability to mix both paradigms [12, 15] and techniques [7, 18, 30] in a single study; however, other fields are struggling with these issues as more researchers in the social sciences call for mixed method research.

2.3. Mixed method research vs. mixed paradigm research

2.3.1. History of debates in the social sciences. After World War II, positivism, an epistemology which bases knowledge on observable facts, endured criticism from the philosophy of science community for not producing significant outcomes in the social sciences on par with scientific discoveries in the physical sciences [34]. As a reaction to the “failed” paradigm, many researchers in the social and behavioral sciences adopted post-positivism to address the problems in positivism [23]. Post-positivists agreed that stable relationships among social phenomena exist; however, this new paradigm adopted tenets that stated that research is affected by the values held and theories used by the researcher.¹ The adoption of post-positivism incited many studies in which positivist and post-positivist researchers criticized the opposing perspective. Realist-oriented researchers, using quantitative methods, believed that social reality could be observed from a perspective that describes the reality both accurately and objectively. Idealist-oriented interpretive researchers, drawing on qualitative methods, believed that social reality was not value-free, but dependent on the subjects’ and the researchers’ experiences, interests, and values [2, 32].

Within the social sciences, researchers have conceded to peaceful coexistence of the dichotomous views of reality provided by positivism and post-positivism [9, 32, 34]. However, there has been movement within various disciplines to combine the methods historically associated with these two conflicting paradigms to gain a better perspective of the world. Education [28], nursing [21], and geography [37] for example, have called for and have instituted a more pluralistic approach to research by combining qualitative and quantitative methods. Using mixed methods in the social science disciplines has sparked an ongoing debate; however, this debate is more a discussion of mixing paradigms rather than mixing methods within a given study. In this “war” for the dominant research paradigm [5], three camps exist: purists, situationalists, and pragmatists.

Purists: Some researchers believe strongly in the purity of their research paradigm, claiming the superiority of their paradigm over all others. Purists advocate that the methods and tenets from positivism and post-positivism can not and should not be mixed [23]. They believe that the axioms of post-positivism and positivism have mutually exclusive assumptions about society; therefore, the research methods derived under each are considered to be mutually exclusive as well [32]. Howe [9], an opponent of the purist view believes that only having one view of the world is analogous to the “principle of the drunken search.”

There is a story of a drunkard searching under a street lamp for his house key, which he had dropped some distance away. Asked why he didn’t look where he had dropped it, he replied, “It’s lighter here!” [11, p. 11]

For the drunkard, the light dictates where he will look, and purist opponents question why a paradigm should dictate the research a person performs. By restricting one’s perspective, interesting problems and approaches are overlooked [9]. Critics of the purist approach also argue that positivist research is not entirely objective, nor is post-positivist research completely subjective [23]. Onweuguzie [23] suggests, for example, despite claims of having objective techniques, positivists make subjective decisions throughout the research process. The 5% level of significance for testing null hypotheses is subjective, in that a 4% or 6% level could be just as valid. He also argues that post-positivists use objective criteria in research by asking “...if there cannot be standards (i.e. validity) for judging the ‘trustworthiness’ of qualitative research, then how is it that editors of qualitative journals can determine which studies are published?” [p. 522]

Within the social sciences, the purist perspective is considered to be a phase that is over. The current focus is on procedural issues, rather an emphasis on paradigmatic differences [32].

Situationalists: Situationalists find value in both qualitative and quantitative research, believing that certain methods are appropriate for specific situations.

¹ Several more radical paradigms, such as constructivism, interpretivism, and naturalism, emerged from the post-positivist paradigm [27]. In this paper, the term, post-positivism, is used to refer to both post-positivism and its successors.
Researchers in this camp occasionally note the flaws or inconsistencies of the opposing paradigm, but do not suggest that one should abandon one paradigm for the other [32]. While accepting of both positivist and post-positivist paradigms, situationists maintain that qualitative and quantitative methods are complementary but should not be integrated in a single study [27]. This camp receives less attention in the literature as compared to the extreme positions of purists and pragmatists. This neutral position pacifies researchers from each paradigm within the research community, but tends to be ignored in the more vocal debates between purists and pragmatists.

**Pragmatists:** According to the pragmatist perspective, the integration of methods from differing paradigms is a powerful method to enhance the credibility of findings [27]. This movement gained momentum throughout the 1990’s as many researchers resented being forced to choose one paradigm over another. Pragmatists argue that methods from both positivist and post-positivist paradigms should be used jointly to better understand a phenomenon [9]. Pragmatism states that both subjective and objective points of view exist, and research should be conducted using whatever methods are necessary to achieve the desired result [23]. The compatibility thesis, proposed by Howe [9], states that qualitative and quantitative methods are indeed compatible although the underlying paradigms from which the methods are derived are not.

Opponents of the pragmatist camp argue that in the attempt to combine methods, fundamental epistemological differences are ignored. Smith and Heshusius [32] argue that “paradigmatic differences that require different interpretations of inquiry and different evaluations of results are no longer taken seriously” [p. 8]. Purists and situationists argue that the differing logic between paradigms makes it impossible to properly validate a study when each method holds a different perspective of truth [23, 32]. In addition, pragmatists have been criticized for using imprecise language and “mixed-up models” derived from the “lack of a worldview, paradigm, or theory for mixed-model studies” [5, p. 59].

Tashakkori and Teddlie [34] believe that the paradigm wars are over because most phenomena are examined with multiple research methods, and this truce is a positive step in advancing knowledge because researchers no longer rely on one method exclusively to examine a research problem.

2.3.2. Debates in IS research. In the IS literature, numerous researchers have documented the slow and steady progression away from the pure dominance of positivist, quantitative research methods toward a broader array of epistemological and methodological approaches. Both Orlikowski and Baroudi [24] and Walsham [36] noted that positivist approaches had been the mainstay of the IS field early on, but that increasingly, alternative approaches – such as interpretive epistemologies and qualitative methods – have increasingly become accepted toolssets in the IS researcher’s arsenal. While the diversity within the IS field has increased as a whole, there has been less progress in terms of mixed method approaches within a given study. Orlikowski and Baroudi documented that only 3% of studies in North American journals employed mixed methods in the late 1980s, whereas Gallivan [7] – examining similar publications during the mid-1990s – concluded that the incidence of mixed method research had declined to under 2%. Thus, while there appeared to be greater acceptance within the IS community for a “plurality” of research methods [26], few researchers have specifically employed both quantitative and qualitative methods within the same study. Using a broader definition of “multimethod research” – as well as a broader sampling of (primarily) European journals – Mingers [19] found evidence that approximately 20% of IS studies combine two or more methods.

Aside from differences in counting the incidence of mixed methods or multimethod research, there has also been concern with identifying the potential barriers to such research. Mingers [18] described in detail four types of barriers to multimethod research – philosophical, cultural, psychological (cognitive), and practical. Although he documents the underlying rationale for these barriers, Mingers argues that these barriers are not insurmountable. In contrast to the paradigm incommensurability argument (equivalent to the purist camp, described above), Mingers notes that it is indeed possible to “detach research methods from a [philosophical] paradigm and use them, critically and knowledgeably, within a context that makes different assumptions [18, p. 243] In fact, rather than arguing merely for loose pluralism (i.e., that different methods should be encouraged within the IS field, as a whole), Mingers advocates strong pluralism – that is, “where all research situations are seen as inherently complex and multidimensional, and would [thus] benefit from a range of methods” [18, p. 243]. While several IS researchers have provided a conceptual rationale for the benefits of employing mixed methods, there has been little practical guidance for conducting such research. One recent exception is Mingers [18], who provides practical guidelines for researchers on how to conduct multimethod research. Going one step further, Sawyer [29] offers guidance for conducting multi-method fieldwork, and describes such an approach as “a new method, not just an aggregation of styles” [p. 218].
2.4. Towards a framework for mixed method research

To gain a better understanding of the use of mixed method research in IS, we examined literature in other disciplines. Education [9], management [10], nursing [21], and geography [37] are fields that have had extensive debate and calls for mixed methods in research. Several frameworks have been proposed in education evaluation to better understand and classify the use of both qualitative and quantitative methods within a single study [8, 27, 28]. Rossman and Wilson [27] proposed a framework to explain different research designs using mixed methods. Their initial framework offers labels for different types of mixed method research and provides examples from the authors’ own research. Their framework suggested three goals for research: triangulation, to confirm one’s findings, elaboration, for expanding knowledge on a topic, and initiation, to examine controversial and complex phenomena.

Also writing in the education evaluation field, Greene et al. [8] subsequently built upon Rossman and Wilson's framework to identify five techniques for mixed method research design. The latter framework is based on an empirical review of 57 mixed method evaluations from the period 1980-1988. More details about this framework are discussed below. Building on this research, additional frameworks were later created within the education evaluation field to provide typologies for mixed method design and analysis [3, 28].

Researchers in other disciplines – such as nursing [20], IS [18], and more broadly, the social sciences [34] – have proposed other frameworks for mixed method research; however, many frameworks tend to stop at classification. Informing researchers about the benefits of mixed methods is helpful, but explaining how to actually conduct and publish this type of research is better yet. The framework developed by Greene et al. [8] accepted the challenge and created not only a typology, but also defined design characteristics to explain how to conduct a mixed method study. The mixed method framework is also different from many other proposed frameworks in that it is based on a review of theoretical “starting points” such as triangulation and the mixed paradigm debates. In addition, unlike other studies, the Greene et al. framework is grounded in a foundation of empirical analysis [8]. The strength of this framework is evident in that it has been cited throughout the social sciences [20, 28, 34].

The five approaches to conducting mixed method research are not mutually exclusive. In fact, Greene et al. [8] found that in their review of 57 evaluation studies, authors often listed multiple motives for using mixed methods, giving a total of 70 reasons for mixed method research. Greene and her colleagues classified the primary and, if necessary, secondary purposes of research as stated by the original author and as identified based on the classifications of their framework. Therefore, a given study may fit two different categories in this classification scheme, but depending on the researcher’s objective, one category may be dominant over the other. In some cases, the details of the researcher’s motive may not be explicitly revealed in the study; approximately one-fourth of the studies offered no rationale explaining why a mixed method design was chosen [9]. Although the lack of mutual exclusivity between categories in a framework is rare and may be construed as a source of confusion, this framework enables researchers to appreciate the dynamic and varied nature of mixed methods. The five motives are triangulation, complementarity, development, expansion, and initiation.

Triangulation: Triangulation seeks to improve the accuracy of results through the collection and analysis of different types of data [10]. Campbell [4] first applied the term “triangulation” to research methodologies using multiple data collection methods for a single construct. If the results of both the qualitative and quantitative studies converge, then convergent validity is achieved by demonstrating that the results are not an artifact of the method used [8]. Jick [10] advocated the use of triangulation to “capture a more complete, holistic, and contextual portrayal of the unit(s) under study” [p. 603].

The strongest form of triangulation implements both qualitative and quantitative studies simultaneously and independently [8]. Independence of the research methods requires that the two studies be conducted and analyzed separately from one another; however, this type of research has rarely been performed [8, 20]. The added time and expense of performing two separate studies that may or may not converge is a significant risk for researchers to assume. To properly conduct a triangulation study, the weaknesses of each method must be countered by the strengths of another [10]. Because the goals of triangulation are to achieve convergent validity and to reduce bias, the qualitative and quantitative methods should examine the same phenomenon and, according to Greene et al., should remain consistent with the assumptions of a single paradigmatic framework [8].

Complementarity: A complementarity research design, also called elaboration [27, 28], uses mixed methods to provide additional richness and detail to better understand a phenomenon [8]. The goal of complementarity is to use “the strengths of one method
to enhance the performance of the other method” [20, p. 365]. While some have labeled this type of research “somewhat patronizing” [10], others argue that complementarity offers strength to arguments and new perspectives on a given phenomenon [27]. In this approach, one study typically dominates, and a lesser study is conducted to provide additional clarification [18, 34]. For example, qualitative data may provide insight into the results of statistical analysis, and likewise, quantitative data can help to explain qualitative findings [27]. Complementarity research can be performed in either a sequential or parallel manner. Sequential suggests that two phases of research are conducted in sequence, with the findings from one method feeding into the other. Parallel research is defined as two studies that are conducted simultaneously with some interaction between the studies.

Complementarity research should use quantitative and qualitative methods to examine overlapping phenomena or different aspects of the same phenomenon [8]. Although this approach may be implemented sequentially in phases, Greene et al. advises that “interpretability is best enhanced when the [two] methods are implemented simultaneously and interactively within a single study” [9, p. 267].

**Development**: A third reason to combine qualitative and quantitative research is for the results of one method (i.e., the secondary method) to help in the development of the primary study. This approach is, by definition, sequential in nature, since the results of the secondary study inform and shape the dominant primary study [8]. Common examples include the use of interviews to help create a questionnaire or the use of a questionnaire to determine selection criteria for a subsequent case study. In development studies, research is performed sequentially in phases to observe the same or similar phenomenon of interest, rather than conducting the two different methods simultaneously [8].

**Initiation**: Unlike triangulation, which has the goal of converging results, initiation is conducted to “uncover paradox and contradiction” for a new understanding of a problem [27]. By searching for divergent findings, initiation provokes additional analysis and reframes the research question [27]. Often, the discovery of fresh perspectives for a given research problem are emergent as opposed to purposeful intentions of the researcher [8, 27, 28]. For example, in the description of this type of mixed method research, Rossman and Wilson described their own study in which quantitative data yielded patterns, but these results were unable to shed light on the research problem. By analyzing qualitative data “a whole new perspective on the research problem was revealed” [27, p. 638]. Mixed methods enabled the researchers to gain new insights and to reframe the original understanding of the problem.

For a researcher wishing to design a mixed methods study for initiation purposes, it is recommended to use multiple paradigms to study a phenomenon over a broad range to obtain a higher likelihood of obtaining contradictory evidence.

**Expansion**: The final purpose of mixed method research identified in the Greene et al. framework is expansion. Mixed methods can be used to expand the scope and breadth of a problem by studying multiple phenomena; this is motivated by a desire to provide a more comprehensive solution or understanding of a problem [8]. Greene et al. [8] found that many studies with this intent had

...a paramedic quality to the qualitative component… qualitative data often appeared in the emergency room of report writing as a life-saving device [9, p. 269].

Based on the 57 studies they reviewed, Greene et al. [8] noted that stronger expansion studies retain the independence between qualitative and quantitative methods, with no interaction between the two methods throughout the inquiry. In addition, they recommended that the phenomena under investigation should be somewhat different to ensure a broad understanding of the concept.

### 3. A new framework for IS research

Using the Greene et al. [8] framework, we have added another dimension to examine the implementation phase of mixed methods studies. Three approaches of mixed methods data collection and analysis are defined for this new dimension. The first approach, *sequential*, has two or more distinct phases in the study, in which a different research method is employed in each stage [34]. In this approach, it is common for one study to be dominant over the other. The second approach is *parallel*, which is conducting two or more simultaneous studies with separate researchers (or research teams) pursuing the different methods, but allowing for some interaction between the researchers, data, and results of each study. The final approach is *independent* research, which is typically conducted simultaneously, but with no interaction among researchers during data collection or analysis.

Using these two dimensions, the framework shown in Figure 1 can be derived. This framework combines the five purposes of mixed method research (based on [8]) and the three approaches to mixed method
research defined here [7, 18]. The framework allows a researcher to determine the possibilities for research design, based on the goals of the study.

3.1 Examining mixed method research in IS

Our analysis provides examples of different motives and approaches for conducting mixed method research. While the framework can be used to classify prior research, it is best used in designing future mixed method research. In this initial analysis of the framework, we analyze three papers that employ mixed method research. First, we examine the influential paper by Kaplan and Duchon [12] that offered detail and insight for conducting a mixed methods study. Next, we investigate a study by Trauth and Jessup [35], which was featured in a special issue of *MIS Quarterly* for its use of intensive research methods. Third, we analyze Markus’ [16] research on the use of email by managers.

3.1.1. Kaplan and Duchon’s study of a hospital laboratory system. Kaplan and Duchon [12] described the benefits and challenges of combining both research methods and paradigms. The research study examined hospital employees’ reactions to the implementation of an information system. During the early phases of the study, the quantitative researchers “viewed qualitative methods as a means for deriving quantitative measures, rather than as rich sources of research data useful for grounding theory and interpretation” [p. 576]. This statement suggests that while Kaplan, the qualitative researcher, hoped to use qualitative and quantitative methods in a complementarity manner, the quantitative researchers perceived qualitative research as only necessary for development purposes.

We classified this study as having the initial purpose of a sequential development study – based on goals of the quantitative researchers – and a sequential complementarity study – based on the goals of the qualitative researcher. Although development and complementarity served as the initial motives for using mixed methods, these were not the only motives that emerged in their study. During the initial analysis phase, the quantitative analysis yielded no publishable results, yet Kaplan found evidence in the qualitative data to suggest otherwise. She noted several interesting patterns in the qualitative data and encouraged Duchon to reassess the quantitative data. Ultimately a desire “to reconcile apparently conflicting data resulted in an interpretation that synthesized the evidence” [p. 582]. Kaplan and Duchon’s study led to *initiation*: by reconciling the divergent results between the two sets of data, the researchers achieved greater insight and created a new concept in the IS literature, work orientation.

Based on the methods described by Kaplan and Duchon, we compared their research methods to the recommendations posed by Greene et al. [8]. Kaplan and Duchon stated that their motive was to perform a development or complementarity study (depending on which author’s justification is considered); however, the methods used by the researchers did not appropriately match the recommendations for these research purposes. Ultimately, the authors achieved initiation, which is usually an emergent motive for research. Few researchers design their studies to generate contradictory results. Rossman and Wilson believe that initiation studies are “the serendipitous results of analyses of data generated from different methods” [28, p. 4]. To achieve initiation, Greene et al. [8] recommended the use of different paradigms, different methods, and an interactive (or parallel) implementation. This is exactly the type of research conducted by Kaplan and Duchon, suggesting that for this study, their approach was consistent with Greene et al.’s guidelines.

3.1.2. Trauth and Jessup’s study of GSS use. A second study that employed quantitative and qualitative methods is one published by Trauth and Jessup [35]. The second author collected data regarding the use of group support systems (GSS) to discuss gender-equity issues among faculty and staff in a university, and the authors examined the same transcript data using both positivist and interpretive methods. Because the researchers used a single data set for both types of analysis, the approach employed was parallel. The motive for using mixed methods in this study is *expansion*. The authors stated that besides taking the traditional, positivist approach to the data analysis, “we expect to gain additional insight from conducting an analysis from the interpretive paradigm as well” [p. 49]. The authors wanted to ensure that the full story of the impact of the GSS was told, in not only the examination of completing tasks, but also investigation of changing attitudes. The breadth of the study was increased using mixed methods to tell the full story of GSS use.

The researchers examined the data to determine the effectiveness of the GSS to support users in meeting three goals: raising awareness of gender inequity issues, bringing dissimilar groups together to facilitate communication, and developing alternatives for managing gender inequity issues. Different analysis techniques were used to analyze the same data in regards to these goals. The positivist, quantitative analysis suggested that the GSS sessions were effective in terms of meeting the goals of the GSS sessions, engaging participants, and reaching a consensus;
however, the analysis offered no suggestions as to whether people had changed their attitudes as a result of interacting through the GSS. The interpretive, qualitative analysis suggested that the GSS sessions were only partially effective. The use of both qualitative and quantitative methods broadened the understanding of GSS use.

Greene et al. [8] advised researchers conducting expansion research to explore different phenomena independently to avoid a “paramedic quality” to one form of data. Although the methods were not entirely independent, the authors did avoid using a research method as a “life-saving device” as found in many of the expansion studies examined by Greene et al [8].

3.1.3. Markus’ study of email use. Markus [16] performed a mixed method study using questionnaires, archival data, and interviews to examine the use of email by managers. The research tested the viability of information richness theory and alternative social theories to explain and predict the patterns of email usage. The multiple theoretical perspectives “make differing and sometimes conflicting methodological demands” [p. 509]. Information richness theory examines the individual as the unit of analysis. Markus believed that sampling large numbers of subjects to gain statistical validity would be appropriate. Alternatives to information richness theory – such as social definition theory and critical mass theory – refer to the individual as part of a larger social unit, however. Thus, the latter theories were best analyzed using qualitative, interpretive methods. Quantitative methods were used to examine core properties of information richness theory, such as media sensitivity and frequency of email use, while organizational processes were analyzed using qualitative, interpretive methods.

Markus stated that the design of this mixed method study “followed principles of methodological triangulation” [p. 510]; however, the approach she described does not agree with Greene et al.’s [8] definition of triangulation. Rather than conducting two studies to corroborate the results, Markus actually performed each type of study to examine different theoretical issues. Greene et al. stated that using mixed methods to “extend the scope, breadth and range of inquiry by using different methods for different inquiry components” represents expansion [8, p. 269]. Markus indeed used different methods and different paradigms to examine different theoretical issues, which is the definition of expansion. Our assessment of Markus’ approach, based on Greene et al.’s [8] guidelines, suggests that Markus did not analyze and assess data independently; however, she took care to follow “expert guidelines for each method individually” [17, p. 510]. This attention to methodology ensured that one method was not simply used as a “life-saving device” [8, p. 269] to the other method of analysis.

3.2. Discussion

The analysis of the three IS mixed method studies provide examples of the different motives for using mixed methods. In addition, these studies offer insight into the benefits of employing qualitative and quantitative methods. Each research study is quite different in both the research design and the outcome of using mixed methods. Kaplan and Duchon [12] illustrate that initial motivations for using mixed methods do not always coincide between members of the research team, and inconsistencies in results between methods should not be the downfall of a study, but may yield positive – and surprising – synergies. Trauth and Jessup [35] exemplify that altering the method of analysis on the same data has the potential to yield expansive results, which in turn affects researchers’ understanding of the phenomena under study. Markus’ [16] email study exemplifies that some research studies do succeed in achieving the initial goals set out by the researcher, but they may require different units of analysis to do so.

4. Challenges of Using Mixed Methods

This paper has provided several benefits of performing mixed method research, yet there are challenges that impede researchers from taking advantage of the value derived from using qualitative and quantitative methods in a study [24]. First, social factors can influence the use of mixed methods. Research methods are sometimes hampered by the

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<td>Kaplan and Duchon (1988)</td>
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<tr>
<td>Initiation</td>
<td>Kaplan and Duchon (1988)</td>
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Figure 2: Classification of IS mixed method research
The framework identified five different motives for using mixed methods along with recommendations on conducting research to achieve the goals of each motivation. Although the framework was created based on the analysis of education evaluation studies, we believed that this framework offers insights to IS research as well. We analyzed three IS studies that used both qualitative and quantitative data and analysis techniques and classified each study according to the framework to provide examples of motives for conducting mixed method research. We also identified the challenges that researchers face when undertaking this type of research. While there are obstacles to any research method, those identified for mixed method research are not insurmountable. By achieving a greater understanding of combining qualitative and quantitative methods, the benefits, and the challenges, researchers have the potential “to produce richer and more insightful analyses of complex phenomena than can be achieved by either one alone” [27, p. 641].

7. References


