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Note

Numbers and words revisited: being "shamelessly eclectic"*

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Abstract. Despite the growing acknowledgement that complex social phenomena can be usefully understood through multiple methods of inquiry, there are few sound examples of mixed-methods research. This paper offers concrete examples from recent policy research in the United States about how qualitative and quantitative methods can be combined to better address complex research questions. Using a conceptual framework developed in 1985 and recently elaborated, we describe how, in both the design and analysis phases of research, combing methods can enhance the research purposes of *corroborating, elaborating, developing,* and *initiating* understandings of social phenomena.

The theoretical literature on methodology has increasingly called for research that combines methods. Except for the purists who argue that different methods derive from mutually exclusive views about society and social science research (Smith, 1983; Burrell and Morgan, 1979), there is growing acknowledgment that complex social phenomena can usefully be understood by looking at them both quantitatively and qualitatively. There are essays on why mixed-methods research should be done (Mathison, 1988) and conceptual frameworks to assist those who contemplate doing it (Greene *et al.*, 1989; Light and Pillemer, 1982; Cook and Reichardt, 1979). Yet there continues to be a dearth of examples where what we preach actually is being practiced.

This paper offers concrete examples from recent policy research about how qualitative and quantitative methods can be combined to better address research questions. Using a conceptual framework developed in 1985 (Rossman and Wilson) and then expanded by Greene *et al.* (1989), we describe how in both the design and analysis phases of research, mixing methods can

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enhance the research purposes of *corroborating, elaborating, developing*, or *initiating* understandings of social phenomena. For this analysis we rely on two mixed-methods policy studies conducted at Research for Better Schools (RBS), the midAtlantic regional educational research and development laboratory funded by the United States Department of Education. Specific examples, drawn from both studies, are used to illustrate how combining methods at both the design and analysis stages of inquiry can achieve each purpose.

A typology of mixed methods research

Based on an earlier policy study conducted at RBS, we made an initial attempt at conceptualizing different purposes for mixed methods research (Rossman and Wilson, 1985). In that article we argued that three purposes are served at the analysis stage by combining multiple methods in a single study: corroboration, elaboration, and initiation. Using examples from a three-year evaluation study of the services provided by regional education service agencies (in the American system, located between state and local education agencies), we showed how both quantitative and qualitative methods reciprocally inform each other for purposes of corroborating, elaborating, or initiating research findings. We attempted to respond to the following question: "With data generated from different methods, how can the researcher encourage the creative, useful, and insightful interplay of the two?" (Rossman and Wilson, 1985, p. 629).

The mixed methods conversation was greatly enhanced by the contribution of Greene *et al.* (1989) which extended the theoretical framework by suggesting an additional purpose for combining methods: development.[2] When their work is synthesized with ours, we generate a new typology of mixed methods purposes: corroboration, elaboration, development, and initiation. We argue that each purpose may be applied at either the design or analysis stage of research. We have selected these from among the four or five discrete stages of research because these two stages offer ample opportunities for creatively deciding how to combine methods.

Design and analysis

Discussions and examples of combining methods at all stages of inquiry may well be useful for explicating the subtle inductive and deductive processes that result in the powerful integration of multiple methods. During early

conceptualization of the research when ideas are fluid and possibilities roam free; in more formal design decisions and justifications for those decisions; while gathering data and engaged in concomitant initial and tentative analyses of them; during more formal analytic procedures and drafts of written reports; as well as in the final text production where the results of combining methods are presented, detailed descriptions of false starts, stalls, great leaps of faith, wonderful insights, and steady sometimes tedious work could contribute substantially to the mixed-methods literature.

Much previous work has focused on the design stage, that phase of inquiry (often with an indeterminate beginning) when the kernel of an idea jumps out or, in the case of evaluations or policy studies, is presented. The design stage incorporates this early work of idea generation and design possibilities, moves through "funneling down" processes as ideas become concrete decisions, and embraces the more formal design presented in the text of a proposal or research report. Working much as architects do, the researcher begins a process of iterative idea generation and refinement, as a blueprint for the investigation takes shape. Working back and forth between design possibilities and research questions, the researcher experiments conceptually with different elements, assesses their usefulness, soundness, and fit with the emerging design, and decides what elements to include and which to discard. At this stage of the inquiry, the possibilities for combining methods are constrained by logistics, resources, researcher skills, and stakeholder preference. The design processes, then, result in a set of decisions – a plan or blueprint – for the conduct of the study.

Analysis is defined as the process of bringing order to the mass of gathered data (Schatzman and Strauss, 1973; Marshall and Rossman, 1989). It entails thinking that is "self-conscious, systematic, organized, and instrumental" (Schatzman and Strauss, 1973, p. 109) in which the researcher discovers the significant variables and their relationships. The data are organized into categories which can then be manipulated conceptually (qualitative analysis) or statistically (quantitative analysis). This phase of inquiry also embraces a range of processes. Early analysis begins as the researcher plays with ideas, poses research questions, and constructs conceptual frameworks. As the research questions are refined, methods chosen to respond to them, and data gathered, the researcher becomes fully engaged in learning about the phenomenon. These processes and decisions preclude some ways of thinking about the phenomenon and highlight others. The researcher implements more formal analytic strategies when data have been generated. It is during these more formal processes when discussions about combining multiple methods during data analysis are most salient.

The typology, focused on these two stages of research, is applied to two

policy studies recently conducted at Research for Better Schools. The studies are briefly described next; we then turn to the typology.

The policy studies

We draw specific examples of how methods were combined to inform important research questions from two major policy studies (Corbett and Wilson, 1991; Wilson and Rossman, 1993). During the 1980s, a significant strategy for educational reform in the United States was the adjustment of formal policy mechanisms intended to shape processes and outcomes in local schools. Both studies investigated the effects of these new state policies on local school districts, focusing on the implementation of two common reform strategies: the introduction of mandatory minimum competency tests as an instructional accountability tool, and the regulation of courses and course-taking patterns through stricter high school graduation requirements. The two studies assessed the impact these policies had on local school districts; integral to both was a combination of qualitative and quantitative methods at the design and analysis stages. A brief overview of the research questions and the design of each study is presented below. For full details, readers are referred to the completed studies. Rather than clutter the discussion with repeated references to the original citations, they are referenced only once in this overview.

The study of minimum competency tests (Corbett and Wilson, 1991) began as a comparison of local school district responses to low-stakes and high-stakes testing programs in two of the 50 United States. The three-year research project hypothesized that implementing a mandatory statewide testing program would stimulate adjustments in school district organization, technology, and culture at the local level. The study was conducted in three phases over a period of three years. First, a preliminary round of qualitative fieldwork was performed wherein researchers visited each of 12 school districts (six in each state) to interview a wide variety of staff members. Second, the results from the interviews were used to design a questionnaire administered across districts in the states studied. Third, the survey results were used to structure a final round of feedback and interviews in the 12 sites originally visited.

The study of the implementation of more strict high school graduation requirements (Wilson and Rossman, 1993) was a four-year investigation of the effects of a new state policy in five American high schools. The research was guided by two concurrent emphases: a general interest in policy implementation; and a focused inquiry into the effects of that policy on the

structure of students' opportunity. The design called for six components of data collection. First, an historical perspective to the policy was created by indepth interviews with key state actors responsible for defining the new requirements. Second, interviews with school district officials were conducted to assess the degree to which the new requirements produced significant change in local practice. Third, repeated interviews with students, teachers, counselors, and building administrators in each of the five schools were conducted over the course of the four-year study. Fourth, interviews were conducted with representatives of institutions of higher education and local business to assess their views about the effects of the new requirements on the quality of graduates. Fifth, a quantitative review of master schedules and course catalogues across the five schools was performed to document changes in the quantity and character of courses offered. Finally, approximately 2000 student transcript records from the five schools were analyzed, comparing students' course-taking patterns before and after the new requirements were in place.

The typology applied

The mixed-methods typology is created by integrating the four purposes for combining methods – corroborating, elaborating, developing, and initiating – with the two research phases of interest – design and analysis. We present specific examples from the two studies described above to illustrate each cell of the conceptual matrix.

Corroboration

The first purpose for combining methods is classical triangulation where different methods are employed to test the consistency of findings from one method to another. Defined by Denzin as the "combination of methodologies in the study of the same phenomenon" (1970, p. 291), triangulation derives from the surveyor's and navigator's need to identify two points in order to locate a third. Jick refers to this purpose as "the archetype of triangulation strategies" (1979, p. 603). Implemented essentially simultaneously but independently of one another, qualitative and quantitative methods are expected to generate data that will "pinpoint the values of a phenomenon more accurately by sighting in on it from different methodological viewpoints" (Brewer and Hunter, 1989, p. 17). We also refer to corroboration as convergence, with one method used to confirm the results of the other. Examples

from the two policy studies illustrate how corroboration can be achieved in both design and analysis.

Design. Recent research on changes in high school graduation standards in the United States found that some high school departments shrank dramatically over the decade of the 1980s, while others grew. These findings came from mid-1980s California studies (Grossman *et al.,* 1985) as well as from more recent multi-state policy studies (McDonnell, 1988; Clune, 1989). Across studies, growth trends in mathematics and science departments were clear and consistent; substantial shrinkage in physical education and vocationally-oriented departments occurred; but patterns in other departments such as foreign language, art, music, and social studies were mixed.

In our high school graduation requirements study, we investigated whether teachers in five high schools felt their jobs were at risk as a result of new state graduation requirements. We expected to find substantial shifts among departments, with teachers in some departments being laid off or in fear of being laid off. To address these research questions, we included a design component where teacher interview data could be corroborated with master schedule data. The intent was to use unobtrusive, archival data (master schedules) gathered annually by most schools to assess actual class size within departments and numbers of classes given by each department. To the extent that these data were available historically, we could assess growth and shrinkage across departments in each school over time.

We planned to use these data in conjunction with data generated from teacher interviews, also available over time. The interviews would provide detailed, qualitative descriptions of teachers' perceptions about changes in their departments and across the whole school, allowing us to glimpse interdepartmental conflict and competition if present. Thus we intended that the corroborative design would allow useful comparisons of data generated through distinct methods assessing the same phenomenon.

Analysis. In the testing study survey results addressed the issue of local variation in response to state-mandated tests. Wide variations were documented in curricular and instructional adjustments across districts. Regression analyses resulted in factors explaining this variation. One of the most important explanatory variables was the "political climate" or how positive the relationship was between the district and the state. Specifically, positive relationships were associated with more curricular adjustments. At the analysis stage we turned to the third-phase interviews to seek convergence for these findings. Corroborative examples from both ends of the response continuum were found. For example, in one district where no changes occurred in the curriculum, a district administrator characterized the district/state relationship in this way: "The state has become someone we have to beat

rather than a partner to work with". On the other extreme was a district that accepted the state's increased role in monitoring educational outcomes and worked hard to find creative instructional techniques to improve student performance. The qualitative descriptions of how these two districts responded to the state mandate corroborated and offered convergence to the quantitative findings.

Elaboration

The second mixed-methods purpose is elaboration which provides a richness and detail that is often lacking if just one method is employed. Dismissed by one methodologist as "parenthetical, even somewhat patronizing" (Jick, 1979, p. 603), others have noted that this purpose "enhance[s], illustrate[s], clarif[ies] the results from one method with the results from the other" (Greene *et al.*, 1989, p. 259). If we think of social phenomena as gems, elaboration is intended to illuminate their different facets. It also lends strength to an argument and provides alternative perspectives (Rossman and Wilson, 1985).

Elaboration is a frequently-found purpose for combining methods: Data from one source extend, clarify, illuminate or help interpret data from another method. For this purpose, qualitative methods are frequently incorporated into a study to "put meat on the bones" of quantitative findings. For example, interview data might be used to help interpret questionnaire responses. Less frequently found is the type of elaboration where quantitative data are used to illuminate or extend understanding of indepth, ethnographic themes or patterns. An example here would be when ethnographic fieldwork generates patterns of beliefs; their distribution across a population is then assessed through surveys (see, for example, Siehl and Martin, 1988). Examples of elaboration at the design and analysis phases are described next from the two policy studies.

Design. The testing study offered a useful example of interview data collected during the third phase of the study enriching quantitative findings from the second-phase survey. During phase two of the research, a questionnaire was administered to 300 districts across two states, resulting in a wealth of information. However, the researchers acknowledged in the design that these quantitative results would not tell the full story. One problem associated with quantitative research is that researchers cannot be sure that the meanings they attach to words on a survey and to the resulting statistical summaries are similar to those held by respondents; the data have become de-contextualized.

To compensate for this potential problem, the design stipulated a third

phase when we returned to the original twelve sites and sought educators' reactions to the survey results. Essentially, we summarized key survey findings and then asked for their interpretations. The qualitative responses provided detail and enhancement to the numbers from the survey. For example, we found that the majority of the survey respondents indicated that the curriculum had improved as a result of the state testing program. Yet when we probed this in the followup interviews, we found that most of the interpretations of "improvement" focused on tightening of the curriculum with adjectives like "structured," "more focused," "coordinated," "more systematic". Thus the qualitative results offered an elaboration not available if just the quantitative results were analyzed in isolation.

Analysis. Several examples of analysis strategies for the purpose of elaborating data from different methods come from the study of high school graduation requirements. We routinely incorporated data obtained during site visits into the analysis process; these data provided insights into and explanations of events and teachers' perspectives. For example, discussing the differences among teachers' reports about curriculum changes at the five high schools, we incorporated information about schedules, enrollment trends, and student population served. These data all were obtained during fieldwork site visits and were used to complement interview data.

Development

The third purpose is development – when results from one method are used to shape a subsequent method (Greene *et al.*, 1989). That is, the results generated by one method shape subsequent instrumentation, sampling or analysis strategies of the other method (see, for example, Siehl and Martin, 1988). This purpose can be conceived as a series of waves where one method shapes and informs the next: The second method depends on the first; it cannot be implemented without crucial information gleaned from the previous method.

Design. A review of existing research on the local effects of state testing programs revealed that there was very little empirical information to assist us in the development of a questionnaire. Armed with this knowledge, we thought it appropriate to build into the design some investigative work that would help us better understand the issues before attempting to construct a survey. Thus we conducted interviews at six districts in each of the two states under study.

A researcher spent two or three days in each district talking to staff responsible for implementing the testing program. The guiding principle in the interviews was to get informants to talk about what was important to them

when implementing statewide testing programs. These findings provided the outline for the development of the survey instrument. The interview data revealed five themes around which a series of questions were developed. The themes included: the context in which the districts operated, the responses the districts made to tests, the strategies they employed to carry out those responses, the uses to which the tests were put, and the effects of the tests. In addition to the major themes around which the questions were organized, the interview data also offered specific information for the wording of survey questions. Thus, the qualitative data in phase one of the study were designed to inform the development of the survey in phase two.

Analysis. The original design for the study of high school graduation requirements called for substantial interviewing and collection of student transcript data; these were primary elements of the design. While we had framed general questions for the transcript analyses, specific questions did not emerge until we had considerable understanding of the issues at each site and had begun to generate the conceptual framework for the final report. Analysis of early interviews directly shaped the analytic questions for the transcript data. In particular, the interview data helped develop a focus on opportunity structure and how graduation requirements reform was affecting the opportunities of at-risk youth.

Additionally, early interviews with students led us to question the rigidity of tracking structures. Because some students talked with us about the variety of classes they took, we became less sure that a strict three-tiered classification system accurately reflected the reality of course-taking patterns in the five high schools. As a result, we began to play with alternative empirical measures of track and devised an algorithm that more accurately and discretely described students' course-taking patterns. Had we not allowed the interviews to shape subsequent analyses of transcript data, we would not have developed this new algorithm.

Initiation

The fourth purpose is initiation – where results from one method foster new lines of thinking (Miles, 1991; Brewer and Hunter, 1989), uncover "paradox and contradiction" (Rossman and Wilson, 1985, p. 633), suggest alternative ways to pose the research questions, and generally challenge the original conceptual framework of the study. Initiation has the potential of leading to a "substantial alteration in the overall perspective with which the problem ... is viewed" (Bargar and Duncan, 1982, p. 5). The search for divergent findings, paradox, and contradiction invites the "dissonance, doubt, and ambiguity" (Rossman and Wilson, 1985, p. 633) that may well lead to signifi-

cant creative insights. Brewer and Hunter (1989, p. 268) conclude that "research findings that sharply and persistently diverge lead social scientists to rethink research problems".

Design. Previous mixed-methods work suggests that examples of initiation at the design phase are difficult to locate. For example, Greene *et al.* (1989, p. 268) note that "purposeful initiation may well be rare in practice". It seems unlikely that researchers could design a study with the specific intent of uncovering the unexpected, the paradoxical, or the contradictory. These may well be the serendipitous results of analyses of data generated from different methods. On the other hand, it is consistent with qualitative research traditions that the researcher adopt a certain "habit of mind" in which the divergent, the unexpected, and the problematic are sought out, attended to, and incorporated in the emerging understanding. In fact, such a posture is often explicitly written into the original design of the study. Thus while researchers cannot guarantee that initiation will occur and that profound and different insights will result, they can adopt a stance of openness.

Analysis. In the analysis phase of the testing study, we found that rather than conformity being the primary local response (as was the state's intent), in many cases rebellion occurred. This was unanticipated in the original design and the quantitative data offered few insights. Only after probing interviews about the meaning behind some of the survey findings did this understanding emerge. Instead of accepting the state test as a valid indicator of student mastery of basic skills and using the results as a basis for making improvements, many districts rejected the goals of the state policy and replaced them with their own. These "rebellious" districts replaced the state's intended goals with a short-term goal of raising test scores to diffuse community pressure. Thus an important contradiction between state intentions and local actions emerged during the analysis; as a result, new understandings about the local effects of state policy were derived.

Conclusions

Mixing methods in evaluation research and policy studies holds promise for strengthening our understanding of complex social phenomena and hence, the possibilities for improving social conditions of nagging intractability. When we illuminate that complexity through multiple lenses, we see more facets than when only one is used. Although we have not tested this idea empirically, it appears that mixed-methods work is more prevalent in evaluations than in policy studies or more theoretical research. The pragmatic demand of evaluations to address many aspects of a program or an interven-

tion in order to respond to questions from stakeholders may have led to more eclectic methodological approaches. Our sense is that many policy studies reported in monograph form also rely on multiple methods. Similar demands to assess many facets of policy implementation and effects may operate here. These examples should be highlighted in the literature and discussed in more detail.

The conduct of mixed-methods research works more smoothly when certain conditions obtain. The first is that more than one researcher be engaged in the enterprise. Each researcher brings particular methodologic expertise to the endeavor; pooling those skills offers a more comprehensive perspective than one perspective alone. In order for such collaboration to work, however, each person's expertise must be acknowledged by the other members of the team so that disputes over authority to resolve issues are minimized.

The second condition is that norms of respect and collegiality should prevail. When researchers generate ideas and let them float to see if they make sense, we as scholars are vulnerable to criticism or ridicule. We expose our thinking – our most valuable asset. If norms of respect and collegiality do not develop, the ideas framing the study, the shape of the methodologic mix, and the insights and conclusions of the work will be impoverished.

The final condition is an attitude of healthy skepticism about both theory and method (see Brewer and Hunter, 1989, chapter 2 for a discussion). We should be skeptical about quick fixes, the one best model, and panaceas, whether for practice or research. A substantial change seems to be afoot in the discourse about research, educational policy, and educational practice. In research we hear of the value of multiple methods and the need to describe multiple perspectives. State policies promote local experimentation, autonomy, and control. And classroom practices foster constructivist approaches to knowledge and stress students as active learners. All these trends express a weariness with ideological harangues whether these have exhorted that one particular paradigm is clearly superior to another (positivist, interpretive, and critical theory advocates each make these claims); or have demanded that a particular set of authority relations should have dominance (e.g., the state defining particular outcomes for school districts); or have claimed miracles in classroom practice after a half-day workshop (e.g., the conversion-like experiences reported from Madeline Hunter workshops). The authoritarian view of the one best way is being challenged.

Educators are reclaiming responsibility to conduct business in ways that meet local needs. From our perspective, we see a similar movement in the research and evaluation community. Several years ago Lortie (1982) called upon a group of budding scholars to be "shamelessly eclectic" in using concepts from various disciplines to frame inquiry and insight. We echo that

call here: We should be shamelessly eclectic in our use of methods to understand the intractable and persistent problems of education today.

Notes

1. This phrase comes to us from Lortie (1982). The research reported here was supported by the Department of Education Office of Educational Research and Improvement. No official endorsement should be inferred. We wish to thank Jennifer Green, Matt Miles, and Dick Corbett for useful comments on earlier drafts of this paper.
2. The Greene *et al.* typology includes a fifth purpose for mixed-methods evaluations: expansion. Closely linked to their purpose of complementarity (what we call elaboration), expansion designs are characterized by the use of distinct methods to elaborate the "scope, breadth, and range" (Greene *et al.*, 1989, p. 269) of the study. This is seen most clearly in the use of qualitative methods to evaluate program processes while quantitative methods assess program outcomes; different methods in fact assess distinct phenomena. In applying this purpose and design concept to our policy research, we struggled with the notion of distinct phenomena. In personal communication with one of the authors (Greene, 1991), we decided that this fifth purpose may not fit policy research as easily as evaluation studies. Space does not permit, however, a full explication of the differences between evaluations and policy studies here.

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