The Educational Researcher Defined: What Will Future Researchers Be Trained to Do?

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ABSTRACT Researchers have conducted studies of curriculum for doctoral students in various disciplines and subdisciplines. In this study, the authors examined methods (e.g., quantitative, qualitative, mixed methods) requirements for doctoral programs in education. Such requirements operationalize visions about the meaning of educational research and the functions that educational researchers should be able to perform. Findings also provide implications about (a) the history of educational research and (b) in which direction it seems to be moving. Approximately 72% of doctoral programs that the authors observed required at least 1 quantitative course, 42% required at least 1 qualitative course, and the mean number of required research methods courses was 2.6 (*Mdn* = 2.0, *SD* = 2.2).

Keywords: doctoral curricula, educational researcher, mixed methods, qualitative and quantitative research

What type of methodological training do contemporary educational researchers receive to conduct research, and how does that preparation help them to be thoughtful in the peer-review process? Training that educational researchers receive affects all educational research, its quality, and its impact on the field. The ability of reviewers to select noteworthy research depends on the quality of their methodological training.

Understanding the vast differences in methodological training gives authors a context for interpreting reviews and editorial decisions. This understanding also affords a context and demonstrates the need for continuing education for those charged with reviewing manuscripts. Hence, the topic is timely and important because training educational researchers, including those who engage primarily in K–12 research, affects the quality and usefulness of published articles.

Researchers have studied curriculum of doctoral students in various disciplines and subdisciplines, including psychology (Aiken, West, Sechrest, & Reno, 1990), medicine (Dawson-Saunders, Azen, Greenberg, & Reed, 1987), and political science (Schwartz-Shea, 2003), and in the subdisciplines educational statistics (Curtis & Harwell, 1998) and educational measurement (Guo & Nitko, 1996). Schwartz-Shea noted in her review of doctoral curricula that these methodology requirements enact the judgment of faculties (p. 379) about the characteristics that constitute a scholar in a given discipline.

Faculties make curriculum decisions in an environment of fierce competition for intellectual space, and therefore the curricula reflect difficult choices operationalizing educational researchers' views of scholarship. Methodology requirements are important because doctoral-methods training informs our expectations about the capacity of future scholars to use tools from the complex and ever-expanding array of potentially available methods. For example, Aiken et al. (1990) found that virtually all psychology departments require introductory statistics courses predominantly 1 year in length, "but very few of the departments have any requirements in measurement" (p. 725). Pedhazur and Schmelkin (1991) stated that throughout the social sciences,

> although most programs in sociobehavioral sciences, especially doctoral programs, require a modicum of exposure to statistics and research design, few seem to require the same where measurement is concerned. Thus, many students get the impression that no special competencies are necessary for the development and use of measures. (pp. 2–3)

Consequently, Thompson and Vacha-Haase (2003) noted,

> We have entered a black-box era in which students with terminal degrees in education and psychology first enter their training based upon scores from a computer-adaptive GRE testing that upon their graduation they could not intelligently explain or evaluate. (p. 130)

We had two purposes in the present study. First, we wanted to provide one snapshot of contemporary views of educational scholarship and educational scholars. Second, we wanted to provide a framework for commentary about the history of educational research and where the field seems to be moving.

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Contextualizing the Study

Doctoral curriculum requirements have been formulated within the context of decades-long paradigm wars within the educational research community. Now, however, consensus seems to be emerging within the community regarding several related issues.

First, a current consensus is that diverse methods may be not only useful but also necessary to solve education problems and to address educational research questions. Larabie (2003, p. 14) noted in a recent article that "after a quarter century of debate in the pages of *Educational Researcher,* the consensus seems to be that both [quantitative and qualitative] methodologies are useful and valid approaches to educational research (Gage, 1989; Feuer, Towne, & Shavelson, 2002)."

For example, there seems to be growing acceptance of the idea that "Only experimental designs allow us to make definitive statements regarding causality, although other research designs may suggest the possibilities of causal effects (see Odom, Brantlinger, Gersten, Horner, & Thompson, 2005)" (Thompson, 2006, p. 24). The emphasis on randomized clinical trials (RCTs; Raudenbush, 2005) has been reinforced by recent movements toward evidence-based practice in medicine (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000), psychology (American Psychological Association Presidential Task Force on Evidence-Based Practice, 2006), and education (Mosteller & Boruch, 2002). The ideas (a) that only RCTs can produce definitive causal evidence (Raudenbush), (b) that evidence-based practice is desirable, and (c) that if evidence-based practice works in medicine, the same model will work in education (see Feuer et al., 2002) are distinct arguments that should not be confused with one another.

Second, a consensus seems to be emerging that qualitative research is essential for contextualizing causal mechanisms. RCTs may help create warrants about causality but are less helpful in understanding why interventions work. We need both paradigms, which are equally vital, given that educational research is the "hardest science of all" (Berliner, 2002) because people are so idiosyncratic. Unlike educational researchers, for example, physicists are not bound by potential generalizations with qualifiers such as limiting generalization to only quarks or neutrinos experiencing favorable conditions during gestation or to persons not abused during childhood. Feuer et al. (2002) stated,

> We believe that understanding causal processes and mechanisms requires close attention to contextual factors and that capturing these complexities typically involves qualitative modes of inquiry. . . . We do not view our strong support for more randomized field trials and our equally strong argument for close attention to context in the research process as incompatible. (p. 8)

Third, recognition seems to be growing among some researchers that qualitative and quantitative methods have common features (Thompson, 1989). Research in both paradigms is empirical, at least in the broad sense of the term, meaning that qualitative and quantitative research requires the collection, analysis, and interpretation of data. Larabie (2003) noted, "Both operate within the same postpositivistic paradigm and are subject to the same basic standards ([LeCompte & Goetz, 1982] Howe & Eisenhart, 1990)" (Larabie, p. 14).

The notion of standards is central to educational inquiry because without standards, (a) we become mired in relativism and (b) research in both paradigms can be poorly done. For example, with respect to quantitative research, Eisner (1983) noted that experimental treatments are often

> so brief that the achievement of educationally significant results is highly unlikely. The median experimental treatment time for 7 of the 15 experimental studies that reported experimental treatment time in volume 18 of *AERJ* [*American Educational Research Journal*] is 1 hour and 15 minutes. I suppose that we should take some comfort in the fact that this represents a 66 percent increase over a 3-year period. In 1978 the median experimental treatment time per subject was 45 minutes. (p. 14)

Regarding qualitative research, Fetterman (1982) noted that "in one study, labeled 'An ethnographic study of . . .,' observers were on site at only one point in time for 5 days. In a national study purporting to be ethnographic, once-a-week, on-site observations were made for 4 months" (p. 17).

Feuer et al. (2002) stated that formulating all types of inquiry is essential because "researchers must have a clear, commonly held understanding of how scientific claims are warranted. . . . It is incumbent upon the field to cultivate its own form of life including, however difficult this may be, attention to bolstering quality" (p. 9).

Concerns about standards and improving the quality of educational research underlie the recent articulation by a task force on the American Educational Research Association Standards for Reporting on Research Methods, which focus on various forms of inquiry. The single most fundamental standard is the consensus that "as everyone seems to say, questions should drive [the selection of] methods" (Raudenbush, 2005, p. 25). Although this view is not universal, some persons may interpret it according to another statement by Raudenbush, "We share a belief in the limitations of positivism and its successor, postpositivism" (p. xi), to be an ontological view that the person controls the research question; therefore, the person controls the paradigm. This view is also discussed in depth within some qualitative traditions (cf. Kemmis & McTaggart, 2000; Schwandt, 1997; Schwandt & Halpern, 1988).

Participants

We studied the 2005–2006 catalogue requirements of doctoral programs within 21 schools or colleges of education. Table 1 shows the 21 universities that we considered. These are some of the leading schools from among the roughly 100 education schools or colleges that "devote substantial

TABLE 1. Numbers of Doctoral Education Programs at Selected Universities and Number of Programs Requiring Quantitative or Qualitative Courses

	Doctoral programs		Quantitative		Qualitative	
University	Number	%	Number	%	Number	%
Boston College	7	2.8	7	100.0	7	100.0
Cornell University	2	0.8	1	50.0	1	50.0
George Washington University	6	2.4	6	100.0	6	100.0
Harvard University	5	2.0	4	80.0	4	80.0
Indiana University	16	6.4	13	81.3	5	31.3
Michigan State University	10	4.0	10	100.0	3	30.0
New York University	23	9.2	7	30.4	2	8.7
Northwestern University	2	0.8	2	100.0	1	50.0
Ohio State University	16	6.4	10	62.5	5	31.3
Stanford University	10	4.0	10	100.0	10	100.0
Teachers College, Columbia University	17	6.8	11	64.7	0	0.0
Texas A&M University	17	6.8	13	76.5	13	76.5
University of California, Berkeley	13	5.2	13	100.0	13	100.0
University of California, Los Angeles	9	3.6	2	22.2	3	33.3
University of Iowa	15	6.0	6	40.0	2	13.3
University of Michigan	12	4.8	12	100.0	10	83.3
University of Oregon	11	4.4	9	81.8	7	63.6
University of Pennsylvania	13	5.2	10	76.9	5	38.5
University of Texas	24	9.6	17	70.8	12	50.0
University of Wisconsin	13	5.2	11	84.6	4	30.8
Vanderbilt University (Peabody)	10	4.0	7	70.0	3	30.0
Total	251	100.0	181	72.1	116	46.2

resources to education research and doctoral programs" (Larabie, 2003, p. 21). We selected the 10 top-ranked private schools and the 10 top-ranked public schools from the recent *U.S. News & World Report* rankings and examined our own college out of personal interest. We believed that through their leadership, these schools may drive curricular reform within schools and colleges of education. In addition, course requirements of the schools were available to the public on the Internet by area of emphasis.

The schools varied in their structure. For example, some schools and colleges of education included health and kinesiology departments, whereas others did not. The schools also varied widely with respect to the number of programs they offered. Some schools and colleges created broad programs, whereas others created narrowly structured programs. The number of programs in each of the 21 schools and colleges ranged from 2 to 24 (M = 12.0, Mdn = 12.0, SD = 5.9).

Of the 251 doctoral programs, 199 (79.3%) were PhD rather than EdD programs. In some programs, an EdD is more of an applied degree than a research degree, but in other programs, little or no difference exists between the degrees. For example, although our colleague Yvonna Lincoln has an EdD degree, she has conducted important scholarship that has considerably influenced educational research. The junior author of this article has an EdD degree but has had some academic influence on the social sciences.

Results

Cognitive Versus Performance Requirements

Curricular requirements can be expressed at three levels. *Cognitive* requirements detail the knowledge that students must have or which courses they must complete to master selected information. *Performance* requirements specify how students must use their knowledge. For example, in some doctoral programs, students are expected to present their own research at professional meetings to meet dissertation requirements; in other programs, students can instead publish their articles. *Consequence* requirements specify compulsory effects of performance. They are more common after graduation than in doctoral curricula because educators in some academic departments believe that faculty bear a burden to prove that their articles are frequently cited.

Curriculum requirements may be specified at combinations of levels, and some doctoral curricula not only do not require specific courses but also actually proscribe completing the courses. For example, in keeping with the British model, at Australian universities, students may be prohibited from taking any courses; instead, they must independently write a thesis of at least 70,000 words that must be approved by two scholars from outside Australia who have no connection with the research study. In a study of statistical-reform movements within ecology, medicine, and psychology, Fidler (2006) illustrated that important projects can result from this model.

Quantitative- and Qualitative-Methods Requirements

Table 1 shows that 181 (72.1%) of the 251 doctoral programs required completion of at least one quantitative course, with 109 of these 181 programs requiring completion of specific quantitative-methods courses. The mean number of specific courses that were required was 2.6 (*Mdn* = 2.0, *SD* = 2.2). Also, 116 (46.2%) of the 251 programs required at least one qualitative-methods course, and 61 of these 116 programs required completion of specific quantitative-methods courses. The mean number of specific courses that were required was 1.1 (*Mdn* = 1.0, *SD* = 0.3).

Of the 251 programs, 65 (25.9%) required neither quantitative courses nor qualitative courses, whereas 111 (44.2%) programs required both types of courses. Of the 251 programs, 70 (27.9%) required quantitative courses but not qualitative courses, whereas 5 programs (2.0%) required qualitative courses but not quantitative courses.

Mixed-Methods Requirements

In the early days of the paradigm wars, quantitative and qualitative methods were perceived as philosophically incompatible. Currently, some researchers view these approaches as constituents of a single continuum (Newman & Benz, 1998).

Some scholars have suggested that mixed-methods studies have important advantages (Johnson & Onwuegbuzie, 2004; Onwuegbuzie & Leech, 2004). Various models are available for performing mixed-methods research (Tashakkori & Teddlie, 2002). Some faculties have argued that separate quantitative and qualitative courses should be replaced "with research methodology courses at different levels that simultaneously teach both quantitative and qualitative techniques within a mixed methodological framework" (Onwuegbuzie & Leech, 2005, p. 268). Textbooks are available for such courses (Creswell, 1995; Johnson & Christensen, 2004). However, none of the curricula for the 251 doctoral programs required completion of mixed-methods courses.

EdD Versus PhD Degree Requirements

Of the EdD programs, 63% required at least one quantitative course; of the EdD programs requiring a specific number of quantitative courses, the mean number of quantitative courses required was 1.8 (*Mdn* = 1.0, *SD* = 1.3). With respect to the PhD programs, 74% required at least one quantitative course; of the PhD programs requiring a specific number of quantitative courses, the mean number of quantitative courses required was 2.5 (*Mdn* = 2.0, *SD* = 2.4).

Of the EdD programs, 38% required at least one qualitative course; of the EdD programs requiring a specific number of qualitative courses, the mean number of qualitative courses required was 1.2 (*Mdn* = 1.0, *SD* = 0.4). With respect to the PhD programs, 48% of the programs required at least one qualitative course; of the PhD programs requiring a specific number of qualitative courses, the mean number of qualitative courses required was 1.3 (*Mdn* = 1.0, *SD* = 0.4).

Discussion

Levine (2007) reported,

> Deans and faculty, even at the highest-ranked schools of education, persistently complained that their doctoral curriculums did not equip students sufficiently for the dissertation. . . . Almost half (47 percent) of education school doctoral recipients thought their curriculum lacked rigor, and over a third (35 percent) believed educational schools do not adequately prepare their graduates academically. (pp. 34–35)

Schools of education have tried to confront these challenges in diverse ways.

Roughly a quarter (25.9%) of the 251 doctoral programs required completion of neither a quantitative-methods course nor a qualitative-methods course. Nearly half of the programs (44.2%) required completion of courses in both genres. Of the programs requiring completion of specific methods courses, on average, almost three (*M* = 2.6) quantitative courses were required, whereas roughly one (*M* = 1.1) qualitative course was required. No programs required the completion of a mixed-methods course, perhaps because the emergence of mixed-methods curricula and textbooks is a relatively recent phenomenon.

Slightly more of the PhD programs required completion of quantitative (74% vs. 63%) and qualitative (48% vs. 38%) methods courses than the EdD programs. Thus, programs for both degrees were reasonably comparable in their requirements.

Of the 251 programs, 72.1% of the programs required completion of either (a) both quantitative and qualitative courses or (b) only quantitative courses. This finding does not necessarily reflect greater valuing of quantitative methods and may instead reflect the exponentially accelerating development of new complex quantitative methods, such as hierarchical linear modeling. The quantitative subdiscipline is creating new knowledge so rapidly that even the most dedicated scholars find the challenges of remaining current almost overwhelming.

These findings must be interpreted with caution because some programs explicate expectations in the form of recognized course requirements, whereas others explicate expectations informally. Other programs articulate performance expectations (e.g., publication by students of a specific number of articles) rather than cognitive expectations (i.e., mastery of selected knowledge). Nevertheless, our findings afford a foundation for considering the structure of future methods curricula.

The Carnegie Initiative on the Doctorate was a 5-year program to work with doctoral-granting departments committed to restructuring their doctoral programs to better

prepare graduates in six disciplines: chemistry, education, English, history, mathematics, and neuroscience. The Carnegie Project on the Educational Doctorate (CPED) arose from this earlier work because of the blurring of distinctions between the PhD and EdD over the past half century. The CPED helps to better distinguish between the two highest education degrees offered with the intent of strengthening both. We help provide a benchmark for examining the impact of CEPD and allow for a focused future comparison between the doctorate of professional practice and the PhD.

Pitfalls of a Technical Focus

Quantitative and qualitative methods are susceptible to being taught with a focus on methodological technicalities. With respect to quantitative-methods courses, Quilici and Mayer (1996) noted,

> Students in introductory statistics courses are expected to solve a variety of word problems that require using procedures such as *t* test, chi-square, or correlation. Although students may learn how to use these kinds of statistical procedures, a major challenge is to learn when to use them. (p. 144)

The same pitfalls are present in the qualitative-methods context. Page (2001) noted, "Methodological training is too often reduced to technical know-how. . . . It can produce students who become whizzes at taking field notes, but who are clueless about what it makes sense to take notes on" (p. 22). In their qualitative study of the perceptions of qualitative-methods students, Cotner, Intrator, Kelemen, and Sato (2000) reported,

> Feelings of frustration echoed through the students' descriptions of their qualitative research preparation, describing it as *weak, terribly inadequate, very lacking, fairly inadequate,* and a feeling of *no formal training* [emphasis in original]. . . . Others also spoke about . . . not feeling adequately prepared to apply methods learned in class, interpret data and results of qualitative research in the literature, and not learning how to analyze their own data. (p. 9)

In our view, good methodology instruction focuses primarily on reasoning and thoughtfulness rather than on technical issues (e.g., formulas, esoterica of taking field notes). Instead, good methodology instruction emphasizes that "good social science research is primarily about thinking, about reflection, and about judgment" (Thompson, 2006, p. v). This definition is true even with respect to statistics, which inherently involves judgment and is not a field of definitively correct and incorrect choices. Huberty and Morris (1988) said, "As in all statistical inference, subjective judgment cannot be avoided. Neither can reasonableness!" (p. 573).

Performance Versus Cognitive Expectations

We believe that the field would be well served if, especially in our leading institutions, methodology expectations were articulated in expressions of what students must do (e.g., present research at annual meetings, publish refereed journal articles, submit funding proposals) rather than expectations of what students know or which courses they should take. Such a model would evaluate at the level of expected outcomes rather than at the level of precursors to these outcomes.

For an alternative route to program completion, more programs might articulate performance outcomes—perhaps supplemented by oral examinations that evaluate depth of mastery—rather than evaluation against the standard of course completion. Elliott (1990) noted in his presidential address at a meeting of the British Educational Research Association,

> Methodology courses and seminars tend to be concerned with the acquisition of a standard set of techniques for collecting and processing data. . . . Such a view is a recipe for mediocrity. Excellence in educational research depends on the continuous participation of researchers in a reflective conversation about their practices against a background of fundamental research principles. (p. 3)

Doctoral curricula should ensure that students are "aware of the limitations of their own approach and the value of alternative approaches, and they should be capable of working in conjunction with researchers doing work quite different from their own" (Larabie, 2003, p. 15). In educational doctoral programs that best prepare educational researchers, "the apprenticeship is the central educational experience; and close contact [of students with faculty mentors immediately] begins upon entrance into the program" (Levine, 2007, p. 76).

Summary

The transition from educational practitioner to educational scholar can require that students resolve difficult tensions (Neumann, Pallas, & Peterson, 1999). Nevertheless, some of the programs that we studied appear reasonably situated to meet a standard requiring "research training that enables newly minted educational researchers to read and critically evaluate research findings from a wide array of methods while being expert in a specific methodological orientation" (Raudenbush, 2005, pp. 30–31). The mean research-methods requirement would enable future researchers to complete their doctoral program with less than 9 course hr; one fourth of the programs have no requirements. To be assured that significant training occurs and that researchers are prepared to enter the field and to generate, evaluate, and eventually use research findings, they must receive a rich methodological foundation that cannot be achieved in 9 course hr. Given that the colleges in this study are among the top rated in the nation and have graduate students who are in demand for appointment to new faculty positions, the practices of these universities are among the factors that will contribute to the future of doctoral training programs.

We found little guarantee that university pedigree alone predicts either the number of specific courses required or the specific foci of required courses. Although one might reasonably expect top-tier universities to be among the most rigorous, one should be concerned that so few universities have embraced mixed-methods research. The mean number of required research-methods courses is 2.6, with a standard deviation of 2.2, which may indicate that the mean is not necessarily a good measure of central tendency. Thus, researchers might expect that students may be graduating with the median of two research methods courses, yet be expected to author competitive external funding proposals, review manuscripts for publication, and assume the mantle of leadership in their respective domain.

The next few years will doubtless bring continuing evolution of the expectations articulated by these doctoral programs. Developments in two areas will be of particular interest. First, the field will continue to evolve with expectations that students will understand and appreciate multiple methodological perspectives and recognize commonalities in quantitative and qualitative methods because both paradigms "describe their data, construct explanatory arguments from their data, and speculate about why the outcomes they observed happened as they did" (Sechrest & Sidani, 1995, p. 78). The location of mixed-methods courses within doctoral curricula will be of particular interest.

Second, we hope that (a) the field will increasingly emphasize the importance of reflection in all forms of educational research and (b) technical skills will be taught without being emphasized at the expense of thinking. Studies of people are complex, and only thoughtful inquiry will successfully address puzzles inherent in the "hardest science of all" (Berliner, 2002). The rarity of mixed-methods course requirements and the potential for focusing on inquiry (cf. Onwuegbuzie & Leech, 2004, 2005)—rather than for generating questions based solely on paradigms—may eventually enable the entire field to shift toward a more pragmatic, inquiry-based approach.

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