Research Funding in the U.S.: Implications for Teacher Education Research

By Diane E. Mayer

Introduction

Discussions about appropriate methods for education research have escalated in the wake of the No Child Left Behind (NCLB) Act of 2001 and related changes to federal policies for educational research and its funding. This legislation highlights the importance of 'scientifically-based research' and in particular foregrounds the use of randomized controlled trials in which educational treatments are tested by comparing an experimental group that received a particular treatment to a control group that did not. It is argued that this approach lessens the potential for researcher bias and allows findings to be generalized more readily. The U.S. Department of Education's research arm, the Institute of Education Sciences (IES), supports projects that employ randomized-trial designs, while the What Works Clearinghouse provides an online database of research findings that the Department of Education has decided meet their guidelines for methodological rigor.

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This article examines this context and explores implications for education research in universities, particularly teacher education research. It is argued that rather than asking 'What is good education research?' a more appropriate question to ask in order to understand the current situation is 'How is good research designated?'. This amounts to *reading the*

field and specifically entails asking, 'Who are the people making the judgments?,' 'What evidence about the researcher and the research do they use when making these judgments?,' and 'What specifically are they looking at when they decide whether or not something is good?' (Yates, 2004). An examination of teacher education research—its histories and contexts, the teacher education enterprise, the purposes for which the findings of teacher education research are used, how the research is valued, and who is making the judgment – provides a basis for considering the future of teacher education research and how teacher educators might respond to critics of teacher education and teacher education research.

U.S. Department of Education
Institute of Education Sciences

The Institute of Education Sciences (IES) was established by the Education Sciences Reform Act of 2002. It is the research arm of the U.S. Department of Education and aims to make education research more rigorous in support of evidence-based education.

> Its mission is to expand knowledge and provide information on the condition of education, practices that improve academic achievement, and the effectiveness of Federal and other education programs. Its goal is the transformation of education into an evidence-based field in which decision makers routinely seek out the best available research and data before adopting programs or practices that will affect significant numbers of students. (Retrieved August 2005 from http://www.ed.gov/about/offices/list/ies/index.html)

In November 2002, Grover J. (Russ) Whitehurst was appointed to a 6-year term as the first Director. IES is made up of the Office of the Director and four centers—the National Center for Education Research, the National Center for Education Statistics, the National Center for Education Evaluation and Regional Assistance, and the National Center for Special Education Research. The centers aim to provide national leadership by defining research and development directions within their topic areas.

As part of its accountability framework, IES annually assesses the quality and relevance of newly funded research projects as well as the quality of research publications that result from funded research projects. Evaluation comprises identifying those projects that address causal questions and use randomized field trials to answer the causal questions, and surveying a random sample of K-16 policymakers and administrators once every three years to determine the percentage that report routinely considering evidence of effectiveness before adopting educational products and approaches.

The What Works Clearinghouse (WWC) was established in 2002 by the IES "to provide educators, policymakers, researchers, and the public with a central and trusted source of scientific evidence of what works in education" (Retrieved August

2005 from http://www.whatworks.ed.gov/). It evaluates the strength of the evidence of effectiveness of educational interventions using standards for review:

> The WWC Evidence Standards identify studies that provide the strongest evidence of effects: primarily well conducted randomized controlled trials and regression discontinuity studies, and secondarily quasi-experimental studies of especially strong design.
>
> "Meets Evidence Standards"—randomized controlled trials (RCTs) that do not have problems with randomization, attrition, or disruption, and regression discontinuity designs that do not have problems with attrition or disruption.
>
> "Meets Evidence Standards with Reservations"—strong quasi-experimental studies that have comparison groups and meet other WWC Evidence Standards, as well as randomized trials with randomization, attrition, or disruption problems and regression discontinuity designs with attrition or disruption problems.
>
> "Does Not Meet Evidence Screens"—studies that provide insufficient evidence of causal validity or are not relevant to the topic being reviewed.
>
> In addition, the standards rate other important characteristics of study design, such as intervention fidelity, outcome measures, and generalizability. (Retrieved August 2005 from http://www.whatworks.ed.gov/reviewprocess/standards.html)

The publication *Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User Friendly Guide* (Institute of Education Sciences, 2003) adds to the articulated and aligned structures, practices and publications that support IES policies on effective education research. It seeks to "provide educational practitioners with user-friendly tools to distinguish practices supported by rigorous evidence from those that are not" (Institute of Education Sciences, 2003, p.iii). The guide outlines a step-by-step process by which practitioners can judge an educational intervention.

What Is Good Education Research?

This is a question that many, in addition to education researchers, are currently asking. The media, politicians, government officials, teachers, and academics outside education faculties often ask why there is so little agreement on what education research can say about things like effective teaching and learning and effective school organization, and why there are so many debates in the field and conclusions drawn that regularly support opposing practices. Comparisons are regularly made with the field of medical research, which it is suggested has systematically and logically built a research agenda over the past century in order to find generalizable answers that have transformed medical practice. It is argued that in order to make gains in education comparable to the medical field, larger studies of a more rigorous nature are needed, and that education research should replicate what seems to have progressed the search for cures in medicine.

In this context the U.S. Department of Education has clearly articulated their

view of good education research—it is scientifically rigorous, it involves comparisons, it involves randomized controlled trials and the findings are generalizable. Predictably, this is impacting university-based research and schooling practices. The current guidelines for research funding clearly support some methods and genres as more legitimate than others. Some education researchers have embraced this, others have found ways to work with it, and many have critiqued and criticized it as overly narrow and limiting in the way that good research is recognized and enacted. For example, the Council of the American Educational Research Association unanimously passed a resolution on January 26, 2003 affirming the importance of randomized trials as one of the essential elements of sound scientifically-based research but expressed concerns that the U.S. Department of Education was limiting its commitment to problems and issues best addressed through other scientifically appropriate methodologies. Some researchers and policy makers argue that the current federal government approach aims to structure research in order to provide support for specific education agendas. Thus the debate often becomes polarized, focusing on issues of methodological rigor and the desirability of 'objective knowledge and proof' and generalizable findings on the one hand, and then on the other hand it is argued that all research is political or undertaken from a particular perspective with special interests in mind. The upshot is often that each side quickly discounts and dismisses the findings of the other.

Consequently, the critical question is not so much 'What is good education research?' but rather 'How is good research designated?' (Yates, 2004). Yates argues that good education research is not something that can be defined simply and technically, nor something on which we can expect absolute agreement. It "is a human, situated practice itself directed at, as well as located in, a field of activity (education) that changes its form over time and place" (Yates, 2004, p.3). Thus it is necessary to examine the pragmatics through which judgments of different approaches are made. "Judgments are not free-floating abstract things, but practices performed in particular contexts, with particular histories and relationships, and using particular materials" (Yates, 2004, p.211). It is not simply a question of which genre is more methodologically sound. Good education research can be enacted, judged, defined and constructed differently in different contexts. Therefore, one must examine the contexts, relationships and conditions in which those engaged in education research are located.

There are many arenas or contexts of education research where judgments about education research get made: the PhD thesis, academic journals, competitive research grants, commissioned research, teacher research, book publishing, and the press/ media (Yates, 2004). In each of these arenas, questions about the purpose of the research, who judges it and the explicit and implicit criteria by which it is being judged, mean that research judged 'good' in one area is possibly different from that which would be judged 'good' in another. It must also be acknowledged that university-based education researchers are often hybrid research workers. They do not usually position themselves solely within one context or arena. Negotiating

these arenas and the multiple and often conflicting 'rules of the game' particularly as they play out in relation to tenure and promotion decisions in the higher education sector, is challenging.

Moreover, many education researchers aim to examine the ways in which schools and schooling can redress societal inequities that marginalize and exclude various individuals and groups according to race, ethnicity, socio-economic status and physical and mental capability. So the question then becomes how can education researchers pursue these broader purposes and work for better reforms of education and fairer social arrangements through the work that they do and work across the different arenas? To do this, they must *read the field* – understand the contexts and 'rules of the game', and develop research programs designed to operate in more than one register (Yates, 2004).

Most agree that good research needs to be technically good, to make a contribution to knowledge and focus on something that matters. But since the enactment of these things is situated and contextualized, one has to *read the field* in which research findings are judged and ask, 'Who are the people making the judgments?,' 'What evidence about the researcher and the research do they use when making these judgments?,' and 'What specifically are they looking at when they decide whether or not something is good?' (Yates, 2004). IES decisions about the value of education research are being made by focusing on what it does, what topic it is directed to and whether it is scientifically based. In short, for research to be deemed valuable in their view, it must contribute to student learning, it must be accessible and usable by teachers, and it should address causal questions and employ randomized experimental designs. What does this mean for university-based education researchers and particularly teacher education researchers?

The Case of Teacher Education Research

The remainder of this article will examine teacher education research. It is argued that like other education researchers, teacher education researchers have to *read the field* and determine the contexts and 'the rules of the game.' They must pay attention to the texts, procedures and persons involved at the point where the decisions are made, and then determine how they can work for better reforms of education and more just social outcomes through their research activity. They have to understand the purposes for which the research is being supported and used, who is judging it and the criteria by which it is being judged.

Reading the Field of Teacher Education Research: History and Context

For many years, there have been ongoing debates about the research base for teacher education. Teacher education research has long been criticized for its lack of generalizability and the various findings from this research have been utilized in a range of ways as evidence in support of differing policies and practices. In some

ways this has contributed to the current precarious position for teacher education where it is becoming increasingly necessary to defend claims for its legitimacy. The questions of 'if' and 'how' teacher education matters, have grown in importance with teacher shortages in some teaching subjects and geographical regions, and associated pressures to ease entry requirements into teaching.

Within the current context of NCLB legislation, much teacher education research is discounted as flawed:

> In his remarks at the White House Conference on Preparing Tomorrow's Teachers, Grover Whitehurst (2002), director of the Department's Institute of Education Sciences, stated, "Research on teacher preparation and professional development is a long way from the stage of converging evidence and professional consensus." Whitehurst noted throughout his discussion that much of the research on teacher quality is dated, methodologically flawed, correlational in nature, and focuses on differences among teachers rather than the interventions that raise effectiveness for all teachers. He encouraged the field to employ experimental designs in the study of teacher effectiveness. (U.S. Department of Education, 2003, p. 3)

Historically, teacher education has been viewed in three distinct ways: first as a training problem, then as a learning problem and more recently as a policy problem (Cochran-Smith, 2004; Cochran-Smith & Fries, 2005b). These views have impacted the ways in which teacher education has been researched. The shifts have been shaped by the political and professional agendas of the time including public concern about the schools and the economy, specific criticisms of teacher preparation, and various new reforms and initiatives in teacher education. Most recently, there has been an intensification of the policy focus accompanied by a return to a training view of teacher education. It is assumed that one way policy makers can provide a well-prepared teaching workforce is by manipulating the parameters of teacher preparation most likely to have an impact on student learning. Therefore the 'right' policies are those based on empirical evidence about the value teacher preparation and its various components adds to students' scores on tests, highlighting the centrality of randomized trials and causal research in support of this quest.

However, as a recent major review of teacher education research by Division K of the American Educational Research Association (AERA) points out, there are very few studies in teacher education involving randomized experiments and almost none that demonstrate direct causal links from teacher education programs to student learning (as defined by scores on standardized tests) (Cochran-Smith & Zeichner, 2005). There are many reasons for this. Major grants are rare in the field of teacher education and as a result teacher educators often study their own teaching and their own programs, producing a wide variety of studies that include many small-scale and unconnected studies of practice. The findings from these studies do not produce convergent findings (indeed they never set out to do so) and therefore are not convincing to policy makers and financial decision makers operating within the NCLB legislative world. Moreover, the lack of randomized trials in teacher preparation probably has a lot to do with the

enterprise of teacher education, since it is changeable and varies considerably across all the institutional, accountability and local contexts within which it occurs—a desirable feature from the point of view of many teacher educators.

In addition, it is important to remember that there are at least two causal links associated with teacher education, one linking teacher preparation with teacher learning and another linking the knowledge, skills and dispositions that teachers learn as enacted in the classroom with student learning or other outcomes. Assuming a direct causal link between the teacher education curriculum and student learning outcomes is therefore problematic. The type of research needed to examine the multiple links—teacher education curriculum to preservice teacher learning to professional practice to student learning outcomes—requires far more resources than has traditionally been available in the field.

Many teacher education researchers also argue that the depth of analysis needed to understand the personal journey to becoming a teacher cannot be portrayed by drawing on randomized trials and causal research. They highlight the value of qualitative approaches such as narrative and self study in illuminating the full depth of the experience. It is argued that from these types of studies teacher educators can best learn how to effectively facilitate learning to teach in teacher preparation programs. Teacher educators continually argue that different questions call for different research approaches and yield different insights. So for example, qualitative studies like case studies and ethnographic research can illuminate teacher preparation in specific sites, how its multiple contexts influence the ways in which resources are used, and what meanings and understandings participants construct within different contexts.

In thinking about the history and context of teacher education research, it is also worth remembering that the field of teacher education research is young and that it is probably not currently at a stage that would allow general professional consensus about the conclusions of empirical research and its implications for policy and practice (Cochran-Smith & Fries, 2005). Research on teacher preparation per se (as a body of research separate from research on teaching and research on education in general) only began in the second half of the 20th century. It initially focused on training strategies within programs and then moved to examining teachers' knowledge of subject matter and pedagogy, beliefs and attitudes, problem solving and decision making processes, professional development over time and classroom performance. The knowledge base for teacher education is still developing.

The Purposes for Which Teacher Education Research Is Used

What appear to be inconsistent conclusions about the quality and strength of the research base for teacher education often reflect the fact that different questions were asked in the first place and the different purposes for which the research was conducted. Moreover, teacher education research has been used in many different ways by many different groups—sometimes as an instrument for political reform,

sometimes as a warrant for policy decisions, sometimes as a basis for curricula decisions and sometimes as a stance for generating local knowledge (e.g. Cochran-Smith, 2002; Cochran-Smith & Fries, 2005a).

First, teacher education research has been used throughout the 1990s and into the 2000s to support various agendas for reform of teacher preparation—both professionalization and deregulation. Usually this starts with an individual or a group with a particular view and agenda for teacher preparation reviewing the research for supporting evidence for their view and evidence to discredit other agendas. In this way, groups such as The Abell Foundation and The Fordham Foundation have featured prominently in arguments supporting deregulation (see for example The Abell Foundation, 2001). Likewise, the U.S. Department of Education's judgment that much of the research is "dated" and "methodologically flawed" (see earlier quotation: U.S. Department of Education, 2003) and its emphasis on "reducing barriers to becoming a teacher among otherwise highly qualified individuals" (U.S. Department of Education, 2004, p.2) point to a deregulation agenda. The establishment of and funding support for the American Board for the Certification of Teacher Excellence (ABCTE) further exemplifies the federal government's interest in and support for bypassing traditional teacher preparation.

Others have argued a professionalization agenda (e.g., Darling-Hammond, 2002). Based on reviews of studies of student achievement in the United States, Darling-Hammond, LaFors, & Snyder (2001) concluded that "teachers' qualifications—based on measures of knowledge and expertise, education, and experience—account for a larger share of the variance in students' achievement than any other single factor, including poverty, race, and parent education" (p.10). Therefore it is argued that policy investments in the quality of teachers (through teacher education, licensing and hiring arrangements, and professional development) may be the basis for improvements in student performance (Darling-Hammond, 2000a, 2000b).

Second, teacher education research has been used in policy decisions. When it is used in this way, it is often judged according to its empirical evidence in relation to the parameters of teacher preparation that policy makers can manipulate. Various groups have assessed the empirical evidence on the components and structures of teacher education about which there has been considerable debate in the education community (e.g. Cochran-Smith & Zeichner, 2005; Wilson *et al.*, 2001). Others have examined causal questions to inform state and federal policy makers (e.g., Allen, 2003; Rice, 2003). Comparison studies of teachers prepared in traditional teacher preparation programs and those prepared in alternative ways have also been used to progress various agendas. For example, the IES funded Mathematica Policy Research Inc study examined the impact of Teach for America (TFA) teachers on student achievement compared with a control group of non-TFA teachers and found a positive impact of TFA teachers on math scores and no impact on reading scores (Decker *et al.*, 2004). The conclusion drawn is that such alternative preparation is as effective as, if not more effective than, traditional preparation pathways, when

the measure of effectiveness is student learning outcomes as defined by standardized achievement scores.

Third, teacher education research is used to inform the teacher preparation curriculum. This research often includes research on human learning and development, as well as research about how specific teaching practices influence student learning and how preservice teachers learn in particular contexts (e.g., Reynolds, 1989). Finally, there are national, regional and local initiatives that view research as part of their job in teacher education, where it is part of the culture of the programs to engage in research that generates local useable knowledge and to make decisions using research and evidence.

Therefore, any judgment made about teacher education research needs to consider the original purpose for which the research was carried out. This is one important component of *reading the field* of teacher education. Another is to consider the expected and researchable outcomes of teacher education.

Criteria for Judging Teacher Education Research

In addition to arguments about the validity of teacher education research based on method and rigor, and even with an understanding of the purposes for which teacher education research has been and is used, there are conflicting views about the expected outcomes of teacher education and thus the things that should be researched (e.g., Cochran-Smith, 2001). Many argue that school student learning should be the main outcome of teacher education. While many agree with this, student learning is often defined exclusively in terms of achievement in test scores and these provide only one of the many measures of what, how and how much students know. In addition, as mentioned earlier, attempting to show a direct link between the teacher education curriculum and student learning is problematic. However, even if one agrees that student learning (however it is determined) is paramount, there are other important outcomes of teacher preparation that teacher educators rightly focus on. They explore preservice teachers' own learning during the on-campus and school-based components of their teacher preparation program. They focus on the enactment of this learning in professional practice. Likewise, issues around teacher recruitment and retention are related to teacher preparation and many teacher educators research these areas.

There is another way in which teacher education research is judged. Those compiling reviews of teacher education research determine which research they will review. To frame their reviews and indeed to make them more manageable, reviewers decide the parameters by which various research will be included in their examination. Sometimes it is geographic (e.g., looking at one country), sometimes it is one segment of the lifelong learning to teach continuum (e.g., preservice), and often it is according to some methodological criteria to do with rigor and validity. Currently these frames are being influenced by the federal government's emphasis on randomized experiments and direct causal links from teacher education programs to student learning.

As mentioned earlier, there are few such studies in teacher education. There is however, a large body of emerging teacher education research which takes as the research site the practitioner's own professional context and blurs the roles of practitioner and researcher; for example, self-study, practitioner inquiry, teacher research, narrative research, the scholarship of teaching and learning. However many do not include these studies in reviews of teacher preparation research either because it is too difficult to synthesize them (Wilson et al., 2001) or because they do not meet reviewers' criteria for things like objectivity and distance between the researcher and the subject.

Some reviewers have tried to determine more valid criteria relevant for the enterprise of teacher education. For example, the AERA Panel on Research and Teacher Education drew upon the National Research Council Committee on Scientific Principles for Education Research (Shavelson & Towne, 2002) which,

> . . . did not define scientific educational research by genre or method but by principles of inquiry, including significant questions that can be investigated empirically, links to related theoretical or conceptual frameworks, research designs and methods appropriate to the question, coherent and explicit chains of reasoning between evidence and theory, findings that are integrated across studies, and public critique and review in the professional community. (Cochran-Smith & Fries, 2005a, p. 51-52)

As the following quotation demonstrates, the panel questioned the assumption that research designs and genres unambiguously define rigor, and highlighted the need to focus on criteria for rigor appropriate to each genre. They used the following criteria for each genre (adapted from (Wilson et al., 2001):

> Experimental and quasi-experimental studies were expected to use random assignment to group or some form of matching for entering characteristics.
>
> Multiple regression studies were expected to control for relevant differences among students, other than the teacher preparation they received, insofar as data on such differences were available.
>
> Follow-up surveys were expected to be sent to a representative sample with information provided about the return rate; inferences were restricted to alumni perceptions, not allowing for inferences about the effects of programs on other beliefs and knowledge.
>
> Comparisons of credentialed and non-credentialed teachers were treated like multiple regression studies, including the expectation that they "controlled" for relevant differences among the two groups, other than the characteristic of being credentialed.
>
> Longitudinal studies of change were expected to check for the effects of attrition and to provide evidence that the changes were not simply due to maturation and teaching experience.
>
> Interpretive studies were expected to include a description of processes for data collection and analysis and include as part of the report evidence, such as samples of interview responses or detailed descriptions of events, as part of the report.
>
> Practitioner inquiries were treated like interpretive studies; they were expected to have clear descriptions of research questions, processes for data collection and analysis and evidence. (Cochran-Smith & Fries, 2005a, p. 61)

In these ways review teams decide criteria for including studies in their reviews, for what counts as high quality research within their frames of reference, and yet again the divergent and often conflicting conclusions drawn are identified as weaknesses by policy makers seeking consistent and generalizable findings.

Concluding Comments

I have attempted to lay out the complex aspects associated with *reading the field* of teacher education research particularly in relation to the current NCLB legislative context in the U.S. Given this analysis of the field, one might ponder if it is possible for teacher educators to take the lead in defining high quality teacher education research that will help them and policy makers draw valid conclusions from existing research and also build future research agendas. They must.

Reading the field highlights complex political and professional issues that constrain and support teacher education research. Main concerns of policy makers, teacher educators, and researchers encompass a range of topics—the entry paths and characteristics of those entering the profession, the contributions of various components of teacher education to desired outcomes, the impact of deliberate efforts to prepare teachers for underserved populations, the accountability processes typically used in teacher education, the effects of different types of programs, organization structures and routes, and so on. Moreover, it needs to be remembered that there are many important teacher education questions that cannot be answered by empirical research alone. Some of the most contested and debated issues in education deal with fundamental assumptions and beliefs about the purposes and processes of schooling in a democratic society. Likewise there are fundamental differences to do with the purpose of teacher preparation that similarly create heated debates—is the purpose of teacher preparation to prepare people to fit into and maintain the status quo, or should teacher preparation programs aim to prepare people who will be critical, political, activist, and work 'against the grain'? (Cochran-Smith, 1991).

These questions and debates cannot be settled by simply assembling good evidence. Good evidence is always interpreted through the belief lens of the interpreter and then used in different ways. However, rather than responding either with indignation that no one appreciates the valuable work that we do as teacher education researchers to illuminate the complexities of learning to teach, or acting with undue haste to realign our research methods and questions to compete for both funds and legitimacy within the academy, we need to carefully explore questions like: What are the purposes for which we want our research to be used? What teacher education outcomes do we value? And, given what is currently available in the field, what are the important research questions? How does the research we do build on what has already been done?

As a field we seem ill-prepared to respond to critics who question the value of teacher education. One good thing that has come out of the current deregulation

agenda is a collective sense of the importance of being able to speak to policy makers with our research. For too long, teacher education research has been deemed by many to be irrelevant but with the calls for more scientifically based research evidence to inform policy, teacher education research has become relevant if highly politicized.

Pam Grossman in her Vice-Presidential address at AERA in San Diego 2004, urged that teacher educators articulate and enforce standards for high quality research of many kinds in every aspect of our work or risk having them defined for us. Drawing on her work with colleagues in the above mentioned AERA Panel on Research and Teacher Education, she highlight the need for more programmatic research on teacher education, research that centers around a critical set of questions and that over time and in a variety of approaches tries to provide better answers. This research needs to build on its own findings and use common instruments and outcome measures that make it possible to aggregate findings. She also highlighted the need for clearly articulated criteria for high quality studies across the wide range of research traditions in the teacher education field from quasi-experimental research to self-study.

Likewise, in the Fall 2004 AERA Division K Newsletter, Christine Sleeter reinforced the urgency with which teacher education must shape research that builds clear findings to guide the work of teacher educators and inform their practice. She lamented the fact that so much teacher education research does not systematically connect with other studies that have asked similar questions, and that the primary sources of data are often preservice teacher work indicating what they had learned, with little or no connection to how well they teach in the classroom later on. Sleeter urged teacher educators to:

> Situate their work within a comprehensive literature review that identifies studies that have asked similar questions and use their research to build on what is already there.
>
> Attempt to 'talk' across institutions. Identify colleagues in different institutions who are looking at similar questions or problems in different contexts.
>
> Follow graduates into the classroom, and look for connections between teacher education and the quality of their instructional practice in the classroom. Try to look at how well the teacher education program has prepared them to teach in particular contexts (e.g. high poverty schools, English language learners). (Sleeter, 2004)

Finally, Ken Zeichner and the AERA Panel on Research and Teacher Education highlight several aspects of research design and methodology intended to strengthen research in teacher education:

1. Clear and consistent definition of terms.
2. Full description of data collection and analysis methods and the contexts in which research is conducted.
3. Research situated in relation to relevant theoretical frameworks.
4. Development of more programs of research.

5. More attention to the impact of teacher education on teacher learning and teacher practices.
6. Research that connects teacher education to student learning.
7. Total portfolio of studies that includes multi-disciplinary and multi-methodological approaches to studying the complexities of teacher education.
8. Development of better measures of teacher knowledge and performance.
9. Research that examines teacher preparation in different subjects in addition to mathematics and science and takes the subjects taught into account when examining the effects of teacher education components and programs.
10. More systematic analysis of clearly identifiable alternatives in teacher education using matching, controls or random trials as separate studies or in conjunction with in-depth case studies.
11. More in-depth multi-institutional case studies of teacher education programs and their components. (Zeichner, 2005, p. 740)

As teacher educators, we must be able to respond to critics who question the value of teacher education. We need to articulate and enforce standards for high quality research of many kinds, in every aspect of our work, or risk having them defined for us (both in the research that we do and also in how we use and critique others' research). We need to challenge the assumption that research designs and genres unambiguously define rigor and we need to try to work towards more programmatic research that centers around a critical set of questions and that over time and through a variety of approaches, tries to provide better answers. Moreover, teacher education research for the public good will be constructed relative to the different arenas and times and national, political and historical backgrounds, and attend to the different genres and contexts and constituencies for teacher education research. A number of prominent teacher educators have helped us think about this agenda in the last few years; they have taken the lead in helping us *read the field*. It is now our collective task to proactively continue the work.

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