

STUDYING TEACHER EDUCATION

*The Report of the AERA Panel
on Research and Teacher Education*



Edited by
Marilyn Cochran-Smith • Kenneth M. Zeichner



Published for the American Educational Research Association by Lawrence Erlbaum Associates, Inc.

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Marilyn Cochran-Smith

Boston College

Kenneth M. Zeichner

University of Wisconsin at Madison

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Foreword

This is a volume whose time has come. Issues related to teacher quality and quality teacher education are always a priority in a democratic society committed to excellence in teaching and learning for all of its participants. These issues, however, are seldom as central to public policy concerns and decisions as they are today. As the Preface points out, this book was conceived as a project in the late 1990s, at a time when teacher education reform policies were becoming highly controversial and politicized. We are pleased that the American Educational Research Association (AERA) did what a national research organization can do best—that is, serve the public good by ensuring that research knowledge is rigorously assessed and made accessible in a timely way to inform discussion and decisionmaking.

There were several fundamental premises underlying AERA's decision to pursue this project, each in keeping with the Association's goal of advancing research on education and promoting its sound application to policy and practice. First, through action of its governing Council, the Association determined that the debate over teacher education required thoughtful analysis of the relevant research and established a study panel to undertake this exploration. Second, the Association gave the panel independence to undertake this activity without further approval of the work product by its Council. Third, the panel was charged with building in internal processes of peer review so that each of the chapters of the report were vetted by scholars who brought independent expertise to the work and who had no stake in the panel or its report.

That the journey of the AERA Panel on Research and Teacher Education took only four years from its first organizational meeting to AERA's putting a book into production with Lawrence Erlbaum Associates, is a tribute to the fine leadership of the Panel's Co-Chairs and Co-Editors, Marilyn Cochran-Smith and Kenneth Zeichner. They, along with an exceptional roster of panel members, authors, graduate student assistants, and reviewers emulated the best in scholarly practice to assess what is known and what needs to be known in order to reform the preparation of quality teachers. In completing this project, the co-editors demonstrated an open-mind to diverse information and critique, the capacity to conceptualize and analyze a broad field of research, high standards of evidence, and a heavy dose of motivation and perseverance. The result is a volume—*Studying Teacher Education*—that will become an essential resource in addressing today's very compelling concerns about the education and preparation of the nation's teachers.

The strength of the book lies in both the specific issues that are addressed through topical chapters and the overarching chapters that knit together a wide-ranging set of

topics in teacher education. In an era when both the research and policy communities are taking very seriously the importance of research-based guidance in professional practices of all types, this volume takes just the right tack in providing information and insights that derive from research. Through research syntheses, charts that map the extant research literature, and discussion of the areas where knowledge is non-existent or thin, this book does the “heavy lifting” for a wide number of audiences seeking to understand, improve, and study teacher education and the larger contexts that shape quality teaching.

It is a tremendous advantage for policymakers and scholars to have a volume that offers both a benchmark and a guide to what research on teacher education is and can be. As with all book publications of AERA, *Studying Teacher Education* received a final independent review by three anonymous reviewers not connected to the project as part of the determination to publish this product under AERA’s imprimatur. While the substance and recommendations in this volume are solely those of the panel, this book has fully met the quality standards that AERA applies to its published work. We are pleased that the Association is positioned to offer a foundation of knowledge about teacher education for policymakers and practitioners, for scholars, and for those involved in educating and supporting the next generation of teacher education researchers.

Felice J. Levine

Executive Director

Carl Grant

Chair, Publications Committee

2005–2007

American Educational Research Association

Preface

During the mid- to late 1990s, the quality of public schools and of the nation's teaching force reached center stage in federal as well as in state and local politics. During that time, the national discourse about the recruitment, preparation and retention of teachers became increasingly contentious. Competing agendas for teacher education reform were advocated by groups with differing political and professional agendas, all of whom claimed to have empirical support for their positions. During this same time, the two of us served back-to-back terms as Vice President of AERA for Division K (Teaching and Teacher Education), Kenneth Zeichner from 1996 to 1998 and Marilyn Cochran-Smith from 1998 to 2000. In these roles, we participated in multiple AERA Council and committee discussions about the scope and strength of the empirical research base for proposed or existing accountability procedures, structural arrangements, and state and federal policies related to teacher preparation. As scholars who had been long and actively involved in teacher education practice, research, and policy, we grew increasingly concerned about the claims that were being made about evidence related to teacher education and about the assumptions people seemed to have about the role research could or should play in determining teacher education policy and practice. During the AERA Presidency of Lorrie Shepard (1999–2000), an AERA Panel on Research and Teacher Education, which we had proposed to the Council a year or so earlier, was approved, and we were appointed as the Panel's co-chairs. President Shepard appointed eight additional Panel members with different areas of expertise, including not only teacher education but also policy, testing and assessment, curriculum, liberal arts, multicultural education, research design and methods, and school reform: Mary Dilworth, Dan Fallon, Bob Floden, Susan Fuhrman, Drew Gitomer, Jacqueline Jordan Irvine, Ann Lieberman, and Ana Maria Villegas. Designated chapter authors were later invited to join the Panel as well: Renee Clift, Pamela Grossman, Etta Hollins, Marleen Pugach, Suzanne Wilson, and Karen Zumwalt. Kim Fries was named Project Manager.

When we began work on this project in 1999, the many current syntheses of research on teacher education were not yet published (although there have been a dozen or more new reviews with different purposes and sponsors released since 2000). In the midst of claims and counter-claims about which teacher preparation programs and routes were truly effective, our charge was to try to make sense of what the research did and did not say about teacher education and to craft a new research agenda that might begin to answer some of the most important, but previously unanswered, questions. We undertook this challenging task by endeavoring to provide a critical and

evenhanded analysis of the weight of the empirical evidence relevant to key practices and policies in preservice teacher education in the United States. Just as important as the nine research syntheses we eventually produced, however, the panel's job was to recommend a new research agenda for teacher education by outlining topics that needed further study, identifying terms and concepts that required clarification and consistent usage, describing promising lines of research, and pointing to the research genres and processes most likely to define new directions and yield useful findings for policy and practice. In translating our charge into a workable set of questions and topics, the Panel was faced with many difficult decisions about what to include and what to omit from consideration. We were guided in part by a sense of what we were *not* doing relative to other related projects. Unlike many large handbook-type projects, we were not constructing a comprehensive analysis of the existing research related to all areas of teacher education, nor were we surveying the state of the field. Most importantly, our goal was *not* to provide a brief on behalf of teacher education that marshaled all of the evidence we could find in favor of policies and practices we already advocated. In fact, given the markedly different perspectives and areas of expertise of panel members, as noted in the following, it was crystal clear that there was no foregone approach or policy that we all advocated in the first place.

What the Panel did do was to select a relatively small number of key questions that policymakers, the public, and the educational community seemed particularly interested in and develop research syntheses that focused on these questions. We also prepared three framing chapters that provide historical and conceptual background information and recommend a new teacher education agenda. In doing so, we knowingly made the decision to leave out of our reviews large bodies of important work, including all of the research in, on, and about teacher education in contexts other than the United States, even though we were (and are) well aware of the relevance of this work to many of our questions and of its importance in the broader field. We also did not systematically review, but were informed by, historical and other scholarship that is not empirical. Again we made these choices knowingly, acknowledging that trade-offs are unavoidable in defining the limits of a research review. In the Executive Summary and introductory chapter of this volume, we have tried to make the decisions, assumptions, and trade-offs that defined this project transparent and explicit.

The AERA Panel on Research and Teacher Education was first convened in November of 2000. Over the next four years, the Panel held seven multiday meetings to deliberate about its charge, specify working assumptions, establish criteria for the inclusion and exclusion of empirical studies, debate the strengths and weaknesses of particular research methods and designs, review multiple outlines and drafts of chapters, and deliberate about the contours of a new agenda for teacher education. Working together as part of this multidisciplinary panel was an unusual experience for everybody involved, sometimes affirming, sometimes exasperating, and always provocative and instructive. There are few contexts in the academic world where one's writing is reviewed and critiqued by as many as 18 scholars with different ideas and areas of expertise. That the members of the Panel eventually completed their work and ultimately "signed off" on each chapter in the volume is a feat in itself. But even more noteworthy is the fact that the members of the Panel argued but also remained collegial, were highly critical of each others' analyses but also respectful of differences in perspectives and paradigms, and were steadfast over a long time in their commitment to constructing an evenhanded critical review of the empirical evidence. As

co-chairs of the Panel and co-editors of this volume, we are enormously grateful to all of the Panel members who have become our colleagues.

There is no way this project could have been done without the thoughtful, always positive, and tireless efforts of Kim Fries, Project Manager, who is also co-author of two of its chapters. Kim kept all of us organized and also handled all of the administration, logistics, and finances related to the project over four years. Her efforts were absolutely indispensable, and her cheerful diplomacy and unfailing grace in the most trying circumstances were inspiring. Her organizational and intellectual contributions to the project and to this volume are immense.

We are also grateful to the graduate students and co-authors who worked on these chapters, met on numerous occasions with the panel, and presented along with us at multiple conferences. Their hard work and strong commitments to the profession were always apparent. Our thanks to Melanie Agnew, University of Wisconsin, Milwaukee; Patricia Brady, University of Illinois at Urbana-Champaign; Hilary Conklin, University of Wisconsin, Madison; Elizabeth Craig, Teachers College, Columbia; Byron Delgado, University of Southern California; Kim Fries, University of New Hampshire (formerly Boston College); Danielle Igra, Stanford University; Kimberly Hollins, University of Southern California; Jesse Kass, University of Southern California; Marco Meniketti, Michigan State University; Chancey Monte-Sato, Stanford University; and Peter Youngs, Michigan State University (formerly University of Wisconsin-Madison).

Peer review is at the heart of ensuring scholarly research products of highest merit. We were privileged to have an extraordinary group of colleagues who provided exceptional service at various stages in the development of the chapters that comprise this volume. Their comments, feedback, and critique furthered our work tremendously, adding to its quality, depth, and breadth. We would like to acknowledge and gratefully thank each of those who took the time to review our work: Michael Allen, Education Commission of the States; Michael Andrew, University of New Hampshire; JoMills Braddock, University of Miami; Carol Sue Englert, Michigan State University; Fred Erickson, University of California at Los Angeles; Sharon Feiman Nemser, Brandeis University; Carl Grant, University of Wisconsin-Madison; Dan Humphrey, SRI International; David Imig, American Association for Colleges of Teacher Education; Richard Ingersoll, University of Pennsylvania; Mary Kennedy, Michigan State University; Gloria Ladson-Billings, University of Wisconsin-Madison; Bill McDiarmid, University of Washington; David Monk, Penn State University; Frank Murray, University of Delaware; Martin Nystrom, University of Wisconsin-Madison; Annemarie Palinscar, University of Michigan; Andrew Porter, Vanderbilt University; Jeremy Price, University of Maryland; Christine Sleeter, California State University at Monterey Bay; Brian Stetcher, Rand Corporation; Alan Tom, University of North Carolina; and Linda Valli, University of Maryland. We would also like to thank the three anonymous reviewers who reviewed the entire volume toward the end of its development as well as those who provided us with formative feedback in their roles as conference discussants or commentators: Carol Ames, Michigan State University; David Berliner, Arizona State University; A. Lin Goodwin, Teachers College, Columbia; Carl Grant, University of Wisconsin-Madison; Judith Green, University of California-Santa Barbara; David Imig, American Association of Colleges for Teacher Education; and Fred Korthagen, University of Utrecht, the Netherlands.

Finally we want to acknowledge the generous financial support provided to us by the American Educational Research Association in the form of a grant to launch and complete this project, with special thanks to AERA Past Presidents James Banks, Alan

Schoenfeld, and Lorrie Shepard, whose foresight, wisdom, and support allowed this volume to get off the ground and come to fruition. We also want to thank the Carnegie Corporation of New York, which provided two small grants to fund graduate research assistants for each of the chapter authors. Without this financial support, the volume would certainly not have been possible. Finally we thank Felice Levine, Executive Director of AERA, and the AERA publications staff for encouragement, support, and help during the publication process. Felice's advice, attention to detail, and wealth of experience as a publisher and editor were invaluable, and her unfailing commitment to the value of this work kept us going during its final stages. Likewise Naomi Silverman and her colleagues at Lawrence Erlbaum Associates were excited about publishing this project, and their attention and support were very important to us.

We look forward to discussion and debate about the ideas set forth in this volume. We believe there are few things as important as the quality of the nation's teaching force, which is—to a great extent—entrusted with the future of our democracy.

Marilyn Cochran-Smith, Co-Chair
Kenneth M. Zeichner, Co-Chair

EXECUTIVE SUMMARY

It is now widely agreed that teachers are among the most, if not the most, significant factors in children's learning and the linchpins in educational reforms of all kinds. Despite the growing consensus that teachers matter, however, there are many debates about why and how they matter or how they should be recruited, prepared, and retained in teaching.

Growing recognition that teacher quality is significant coupled with concerns about low standards in the schools prompted a new wave of criticism of teachers and "traditional" teacher preparation that began in the mid-1990s and continued into the 21st century. Several different agendas for reforming teacher preparation emerged and were hotly debated. Advocates of opposing viewpoints claimed to have an empirical research base to support their ideas about how best to recruit, prepare, and retain teachers. In fact, in some of the most important debates about teacher preparation, the central focus—at least on the surface—was research itself, particularly whether there was a methodologically and conceptually strong research base about teacher preparation, and if so, what it suggested for policy and practice. It was within this context that the American Educational Research Association (AERA) formed its Panel on Research and Teacher Education.

The Charge to the Panel

The AERA Panel on Research and Teacher Education was charged with providing a critical and evenhanded analysis of the empirical evidence relevant to practices and policies in preservice teacher education in the United States. Just as importantly, the panel's job was to recommend a new research agenda for teacher education by outlining topics that need further study, identifying terms and concepts that require clarification and consistent usage, describing promising lines of research, and pointing

This "Executive Summary" provides an overview of *Studying Teacher Education: The Report of the AERA Panel on Research and Teacher Education*. The summary draws directly from the three general chapters and the nine research reviews included in the report. Although intended to be informative and using some actual passages from the chapters in the report, this summary in no way does justice to the careful and nuanced reviews of the research that are provided in each chapter. Readers are strongly encouraged to read the full report.

to the research genres and processes most likely to define new directions and yield useful findings for policy and practice.

This volume represents a systematic effort to apply a common set of evaluative criteria to a range of important topics in teacher education. It is our intention to provide balanced, thorough, and unapologetically honest descriptions of the state of research on particular topics in teacher education as a field of study. For many of the topics we considered, this meant that we needed to identify and acknowledge the considerable inconsistencies and contradictions that characterize the field. Our reviews were designed not only to note this state of the field but also to explain why this is so and to evaluate both the strengths and the weaknesses of different questions and approaches as we simultaneously identified promising lines of inquiry.

Each of the research syntheses developed by the AERA Panel on Research and Teacher Education points to promising lines of research that we can build on to enhance what we know about the impact of teacher preparation and the influence of various policies and practices. As we state in the conclusion of this summary, we believe that we are at a turning point in the field with more attention than ever before focused on the recruitment, preparation, and retention of teachers for the nation's schools. As a field, we need now to develop a rich portfolio of theory-driven studies that address the questions posed in this report as well as other important questions related to teacher preparation from multiple perspectives and using many different research designs. We need to develop accurate national databases that make many kinds of cross-institutional and multivariate analyses possible. We need to initiate multisite studies that link multiple smaller studies in ways that reveal the impact of differing contexts and conditions. We need to develop reliable and valid outcome measures with consistent language and procedures. Perhaps most importantly, we need studies from differing paradigmatic and epistemological perspectives that examine the links between and among teacher preparation contexts for learning, what teacher candidates actually learn, how their learning is played out in practice in K–12 schools and classrooms, and how this influences pupils' learning—all within the context of varying resource allocation, schools, communities, and programs. To do all of these things, it will take strategic investments in research infrastructure that supports both large-scale studies and in-depth case studies of teacher preparation. It will also take significant improvements in the peer-review process and the preparation of teacher education researchers. Finally it will take many research partnerships among teacher educators themselves and their colleagues in other fields and disciplines, in the schools, and in research and policy institutes.

Working Assumptions About Research, Practice, and Policy

The AERA Panel worked from an empirical perspective on teacher preparation. From the beginning, however, the panel acknowledged that although many empirical questions are important, there are also many important questions that cannot be answered by empirical research alone. We assumed that some of the most contested questions in the history of education deal with fundamental disagreements about the purposes and processes of schooling in a democratic society. The panel took as a working assumption that questions like these cannot be settled simply by assembling good evidence. To be sure, questions can be shaped, reformulated, or understood more profoundly on the basis of evidence; but evidence must always be interpreted, and interpretations are often made in highly politicized contexts. The values and beliefs of the interpreter influence the purposes for which evidence is used. Education and

teacher education are social institutions that pose moral, ethical, social, philosophical, and ideological questions. Although questions of value and ideology underlie many of the most contentious disagreements about teacher education, these disagreements are often mistakenly treated as if they were value-neutral and ideology-free. Along the same lines, research is often mistakenly portrayed as if it had the capacity to resolve issues on the basis of evidence alone. The panel assumed from the outset that teacher preparation policies and practices cannot be decided solely on the basis of empirical evidence divorced from values.

It is important to note that the work of the panel is situated both within but also outside of the contemporary policy and political scene. On the one hand, the panel's work responds to the policy context of the time, and our choice to evaluate the empirical evidence about some of the teacher education issues that are of most interest to decision makers has been influenced by current policy debates. On the other hand, explicit in the panel's working assumptions is a critique of the current policy focus and considerable skepticism about the feasibility of producing the kind of evidence that many policymakers now seem to want—research that settles the teacher education “horse race” once and for all and declares a definitive winner.

Our reviews of the literature make clear why the horse race approach to studying teacher education invariably leads to mixed or inconclusive results and at the same time leaves out other very important questions. As this volume suggests, teacher preparation in the United States is enormously complex. It is conducted in local communities and institutions where program components and structures interact with one another as well as with the different experiences and abilities prospective teachers bring with them. Teacher preparation is also affected by local and state political conditions, which create their own accountability demands and other constraints and possibilities. In addition, the outcomes of teacher preparation always depend in part on candidates' interactions with one another and how they make sense of their experiences.

As it began its work, the panel acknowledged the difficulty in producing research that examines the impact of teacher preparation on the eventual achievement of pupils in K–12 classrooms. This kind of research depends on a chain of causal evidence with several critical links: empirical evidence demonstrating the link between teacher preparation programs or structures and teacher candidates' learning (i.e., candidates' knowledge growth, skills, and dispositions); empirical evidence demonstrating the link between teacher candidates' learning and their practices in actual classrooms; and empirical evidence demonstrating the link between the practices of graduates of teacher preparation programs and what their pupils learn. Individually each one of these links is complex and challenging to estimate. When they are combined, the challenges are multiplied: There are often substantial time lags between the teacher preparation period and the eventual measures of pupils' achievement; there are many confounding and intervening variables (which are themselves difficult to measure) that influence what teacher candidates are able to do and what their pupils learn; and, the sites where teacher candidates complete fieldwork and eventually teach are quite different from one another in terms of context, school culture, resources available, students, and communities. Unraveling the complicated relationships between and among these variables and the contexts and conditions in which they occur is exceedingly complex, and of course this entire enterprise assumes in the first place that there is consensus about appropriate and valid outcome measures, an assumption that is arguable.

Taken together, the syntheses in this volume suggest that there are not likely to be good answers to the most important questions about teacher preparation unless they

are driven by sophisticated theoretical frameworks about the nature of good teaching and the nature of teachers' learning, unless they are built on rich empirical work from both qualitative and quantitative perspectives and from mixed-methods studies, and unless they are designed to take into account the varying social, organizational, and intellectual contexts and conditions of schools, universities, and communities. In this sense, our analyses differ from some contemporary policy reviews, which refer to research to make claims about already-favored preparation programs and routes. The panel's approach is different. We argue that it is not research that tries to determine "who wins" that is most important, but research that helps to identify and explain what the active ingredients are in teacher preparation programs whose graduates have a positive impact on pupils' learning and other important educational outcomes. Research that identifies these active ingredients and the conditions and contexts in which they are most likely to be present is the kind of research that can guide policy and practice in the 21st century.

What Is the Weight of the Evidence About Teacher Preparation?

The work of the AERA Panel is organized around a number of major topics that concern policymakers, teacher educators, and researchers. These include the entry paths and characteristics of those entering the teaching force; the contributions of subject matter study and of education coursework and fieldwork to desired outcomes; the pedagogical approaches used in teacher preparation; the impact of deliberate efforts to prepare teachers for special needs students and for groups traditionally underserved by the schools; the accountability processes typically used in teacher education; and the effects of different program types, organizational structures, and routes.

Readers will note that there is unequal weight in some of the chapters to different efforts in these areas. As the chapters show, this inequality reflects the history, scope, and depth of study on each topic, rather than the differences in the ways the standards of scholarly critique and assessment were applied.

Our analyses also suggest that some of what are considered serious failings in the research on teacher education are more rightly understood as reflections of the field's relative youth and of its history in terms of research priorities and resource allocation. Research on teacher education emerged as an identifiable field separate from research on teaching only during the last half-century. Some of the strengths and limitations of the research reflect this newness. For example, in the current policy context, there are many calls for increased randomized field trials in all areas of education and sharp criticisms of areas where these are lacking. It is worth noting, however, that randomized field trials—whether in medicine or in other lines of research—are generally appropriate at a point in the maturity of the research where enough theoretical and preliminary empirical work has been completed to permit the design of competing interventions that reflect the most promising combinations of components and conditions known to have an impact on the outcomes in question. In teacher education research—where the outcomes in question include teachers' learning, classroom practice, and pupils' achievement—the preliminary theoretical and empirical work does not fully exist. In addition, it also is worth noting that the newly emerging policy imperative is forcing questions that have not been asked of other professions at all, nor have they been previously asked in teacher education.

In addition, as the chapters show, in several areas of the teacher education research, there are primarily small studies conducted in individual courses or seminars by individual teacher educators functioning as researchers. These studies are often carried out to improve practice at a local level. But there have also been very few longitudinal studies or analyses based on national databases. Again it is worth repeating that this dearth of larger and longer studies is the case, at least in part, because teacher education has rarely been either a research priority for funding agencies or a focus of well-supported programmatic research.

Our syntheses reveal that there are promising lines of research in each of the areas we reviewed. Nonetheless, the body of teacher education research that directly addresses desirable pupil and other outcomes and the conditions and contexts within which these outcomes are likely to occur is relatively small and inconclusive. In posing the following questions about teacher preparation, the intention of the panel was to not only build on the promising research lines but also stake out the territory worth pursuing in a new research agenda for teacher education.

TOPIC 1: TEACHER CHARACTERISTICS: RESEARCH ON THE DEMOGRAPHIC PROFILE

Background

There are many current claims and predictions about the number of teachers the nation needs and will need in the near future, how and where they are being prepared to teach, and what career paths they follow into the profession. In particular, there are competing claims about the long- and short-term retention and effectiveness of teachers with differing characteristics. In posing questions about the demographic profile of teachers, the panel was interested in sorting out conflicting claims and providing an empirically accurate but sufficiently complex profile of the demographic characteristics of those entering teaching. (Readers should note that research comparing the impact of teachers certified through “traditional” and “alternative” routes is reviewed under Topic 9.)

Guiding Questions

Who is going into teaching, how are teachers being prepared, what entry routes did they take, and what career paths do they follow?

What We Have Learned About the Topic

Who Are They? Teachers are predominantly female, White, and monolingual. They are currently more likely to have high-school- and college-educated parents than was the case in previous years. Their average age is in the low 40s, reflecting the aging of the teaching force, the older age of college graduates, and the growth of graduate and alternative programs.

Where Are They Prepared? Although there is a growing number of extended, graduate, and alternative programs, most teachers are prepared in baccalaureate programs at public institutions. There is great regional and institutional variation in the distribution of prospective teachers of color. Graduate and alternative programs

attract similar or higher proportions of students of color compared to undergraduate teacher preparation programs.

Where Do They Teach? New first-time teachers represent an increasing proportion of the teaching force. Currently, they are slightly more likely to be male, older, and more diverse than was the case in previous years. They are more likely to find their first jobs in hard-to-staff, low-performing, rural, and central city schools with higher proportions of minority and low-income students.

Alternately prepared teachers, especially teachers of color, are more likely to teach initially in urban schools serving minority and low-income students. Teachers teaching in the suburbs, in high schools, and in the Northeast are more likely to have master's degrees.

How Long Do They Stay? Reasons for teaching and expectations about staying in teaching show some variation by gender, race and ethnicity, socioeconomic status (SES), and age. Less than half of those prepared to teach actually teach the next year, with prospective elementary teachers more likely to enter teaching than secondary teachers.

Teacher turnover is the largest single determinant of demand for new teachers. The average annual turnover is about 30%, with about 17% switching teaching assignments, about 7% moving to another school, and about 6% leaving teaching altogether. Of those leaving, more than half return to teaching after taking a "break." Age is the prime demographic factor in the 6% attrition rate, with the highest rates of departure among the youngest and oldest teachers. Generally, secondary-school teachers, special education teachers, and teachers in small, private schools exhibit higher attrition rates than others. Research comparing the attrition rates of teachers prepared through alternative and traditional routes and the attrition rates of those prepared in graduate and undergraduate programs yields mixed results.

Impact of Demographic Variables Although studies indicate that gender of teachers is not related to differences in pupil achievement, research examining the relationship of teachers' race and ethnicity and pupil achievement yields findings that are more mixed.

What We Have Learned About the Research

Empirical evidence confirms, in broad strokes, commonly held assumptions about the current demographic profile of teachers. Yet the lack of up-to-date demographic data limits our knowledge. We know even less about the impact of race and ethnicity imbalances in the demographic profile on teacher practice and student learning.

Data on school staffing from the National Center for Education Statistics are the most comprehensive, but because of the time lag between collection, release, and analysis, the picture it paints is dated. This directly affects the ability of the research and policy communities to determine whether the teaching force is getting more or less diverse in terms of race and ethnicity. Data on the SES background of teachers are not available. Little is known about the reserve pool of teachers.

The data on prospective teachers are less comprehensive than the data on practicing teachers. A major challenge is developing an accurate national picture of teacher candidates in many different types of undergraduate, graduate, and nondegree certification

programs within the complex higher education system in 50 different states with different certification requirements.

The usefulness of demographic research is also limited by changing classifications of race and ethnicity and by inconsistent definitions of education major, alternative program, certification status, and teacher turnover. State and local databases that are not linked to one another limit information about what happens to teachers when they leave a particular jurisdiction.

We have limited knowledge about the interaction of teacher characteristics such as race and ethnicity, gender, SES background, and age because few datasets examine these variables in relation to how teachers are prepared, where they teach, and how long they stay in teaching.

The research evidence about impact on pupil outcomes is much slimmer, and although it is characterized as “impact” research, it is largely correlational. Pupil outcomes are usually defined by student achievement test scores rather than by other variables. We know little about the impact on pupil achievement of the interaction of demographic and quality variables, teacher preparation variables, schools and pupil variables, and teacher retention rates.

The Research We Need

Most important, the research and policy communities need to develop a comprehensive, up-to-date demographic profile about prospective teachers, current teachers, and the reserve pool of teachers. We also need to know how demographic variables—separately and together—are related to how teachers are prepared, where they teach, and how long they stay in teaching.

We need a comprehensive database of who is in the teacher education pipeline, utilizing consistent definitions of types of programs and routes.

Given the growing diversity of the student population, the continuing predominance of White teachers, and the general belief in the desirability of a diverse teaching force, demographic research should focus on the race and ethnicity of prospective, current, and reserve pool teachers. Baseline comparisons with other professions would help us understand the lack of diversity among teachers and indicate different policy implications, particularly if the problem is unique to teaching. Further study is needed about the impact of raising entry and certification standards on the number of teachers of color as well as about what happens to teachers of color at various points along the teacher education pipeline. Given the persistent staffing needs in large urban schools and the desire to ensure a diverse teaching staff in all schools, a clearer understanding of the dynamics of hiring, supporting, and retaining teachers of color is also needed. Research needs to examine and take account of the impact of changing demographics of the teacher workforce.

The persistent achievement gap is particularly pronounced between minority-majority students and students from low versus middle- and high-income groups. Given this situation, research should be designed to find out whether and how the nonrepresentative profile and distribution of teachers affects achievement and other pupil outcomes.

It is particularly important that the research and policy communities have access to large, longitudinal databases that take into consideration related student, family, teacher, and school variables to examine the impact of demographic variables. Correlational studies should be supplemented with qualitative research that probes relationships indicated but not explained by large-scale data analyses.

Research must also look beyond the characteristics of individual teacher variables to consider the external forces, such as the civil rights and women's movements, which shape demographic patterns. The changing economy also provides an opportunity to study such factors. Research is needed about whether and how the ethos of the teaching occupation and the structure of schools shape who is attracted to teaching, who prepares to teach, where they teach, and how long they stay.

TOPIC 2: TEACHER CHARACTERISTICS: RESEARCH ON THE INDICATORS OF QUALITY

Background

This second set of questions directly follows from and is the companion to the first set. The intention of the panel here was to provide an analysis of empirical relationships between the demographic profile, as outlined earlier, and the indicators of teacher quality. It was not the intention with this set of questions to analyze all of the literature related to teacher quality, teacher effectiveness, and teacher attributes. Rather, this was limited to research that sheds light on the relationships between and among demographic characteristics, preparation, career paths, and certain indicators of quality. Readers should note that research on the impact of other indicators of quality, such as content majors, teacher tests, and certification, is considered under Topics 3 and 8.

Guiding Questions

What are the relationships between teacher quality and the demographic profile, including teacher preparation, entry routes, and career paths?

What We Have Learned About the Topic

Academic Ability and Achievement The bleak picture of teachers' academic ability and achievement painted by earlier reports has been modified by recent studies, probably reflecting improvement in both research methods and teacher education reform.

When academic differences among college students are reported, prospective teachers tend to have lower college entry test scores but higher academic achievement as measured by high school grade point average (GPA) and rank and college GPA than do college students in general. These differences, however, may largely reflect gender imbalance in the teaching pool.

More lower ability students exit the teacher education pipeline at successive stages (e.g., high school graduation, college entry, entry into teacher education programs, graduation from college) than do higher ability students.

By graduation, those who have completed teacher preparation programs have higher average SAT/ACT scores than the general pool of students entering college. Although prospective teachers in general have slightly lower average scores when compared to all college graduates, those preparing for secondary teaching have test scores comparable to other college graduates.

Those in the top SAT/ACT quartile are actually less likely to take jobs as teachers, and once teaching, are less likely to stay.

There are some patterns indicating differences in the academic ability, as indicated by test scores and GPA, between Black and White teachers—those preparing for elementary school teaching and those preparing for secondary school teaching—and between male and female teachers.

Teacher Education Programs Most prospective teachers are still prepared in undergraduate programs. However, as state and institutional requirements have changed, more teachers are graduating with regular content-area majors rather than with education majors.

Currently more prospective teachers are graduating from alternative programs than was the case in previous years. Research on the indicators of quality of alternately prepared candidates is inconclusive. Although they are more likely to have content majors, they are not necessarily more likely to have majored in the subject they are teaching.

Teacher Test Scores The relationship between teacher test scores and teacher attrition is inconclusive. However, studies have documented differences among groups on teacher tests used to both enter teacher preparation programs and gain licensure: When compared to other groups, higher average test scores have been found for White teachers graduating from teacher education programs and private universities.

The overall effect of teacher tests is to enhance the test scores of teachers, which has resulted in restricting the diversity of the teaching force.

Certification Status Given the often-used inclusive definitions of certification, most teachers are counted as being “certified,” even though they may hold partial, provisional, probationary, or emergency certification. Under these conditions, viewing certified teachers as being “qualified” can be problematic.

The generally high proportion nationwide of certified teachers drops considerably when data about whether teachers are certified in the area in which they teach most of their classes or in the other areas they teach are taken into account.

Teachers in departmentalized school contexts (e.g., many middle and secondary schools) are less likely to be certified in their teaching areas than are elementary teachers. The least likely to be certified are bilingual and special education teachers.

Schools serving high-poverty and high-minority students have more teachers without full certification and more teaching “out of field” compared to schools serving low-poverty and low-minority schools.

Impact of Academic Ability and Achievement Differences in teachers’ academic ability may have an impact on public perceptions about the teaching force. However, whether differences in teachers’ academic ability and achievement have an impact on pupil achievement is unclear because empirical research findings are mixed.

Although some recent studies provide strong evidence of the relationship between teacher verbal ability and student achievement, there is no evidence about the relative importance of high ability compared to other indicators of teacher quality.

The research suggests that the goal of increasing the diversity of the teaching force and the goal of increasing the academic achievement of teachers by establishing higher GPA and SAT/ACT scores for entry and graduation may be in conflict. Given historical inequities in opportunities and achievement, minority teacher candidates are less likely to meet higher entry requirements.

What We Have Learned About the Research

Some earlier reports about the low academic quality of teachers were the result of misleading research that compared the academic ability and achievement of high school students who intended to teach with those who intended to go into other fields. These high school students are not the same population of students who actually prepare to teach.

Research following cohorts of students through the teacher education pipeline has been particularly informative in understanding changes in the ability and achievement profile of prospective teachers, as has the recognition that the gender and SES distribution of teachers may explain some of the differences between prospective teachers and college students in general.

Conclusions about quality indicators of teachers is limited by the lack of comprehensive, comparative data. Breakdowns by gender, race and ethnicity, SES, and age are also limited. Because of different state and local requirements, it is difficult to compile comparable data and make meaningful interpretations about education majors, teacher tests, certification status, and alternative programs.

Constructing a quality profile is also limited by the use of current indicators that rely heavily on such variables as college entry test scores, GPAs, college majors, teacher tests, and certification status. Without comparable data from other professions, it is difficult to draw conclusions about the academic ability and achievement of the teaching profession. In addition, questions have been raised about whether teachers' intellectual attributes, narrowly defined and measured, capture the qualities important for good teaching.

The few studies that have examined the impact of differences in teacher ability and achievement, largely measured by test scores, have focused on correlations with pupils' test scores, rather than with other outcomes or with differences in teachers' classroom practices.

The Research We Need

The research and policy communities need to develop a comprehensive, timely database on the quality profile of prospective, current, and reserve pool teachers. This should be broken down by demographic variables as well as by information about how teachers are prepared, where they teach, and how long they stay in teaching.

We need comparative research on the academic ability and achievement of college students, in general, and on those who enter teaching as well as other occupations. This should be broken down by demographic variables.

Research should assess the impact of institutional and state policy changes with regard to minimum GPAs, SAT/ACT, and teacher test cutoff scores on the ability and achievement profile and the demographic profile of teacher education students and entering teachers.

We need to develop quality profiles of teachers based more on broadly defined conceptions of academic ability and other personal qualities than on standardized college entry tests.

Although pipeline and other studies focusing on individual teachers is useful, we also need research that looks at how larger social and economic factors, the ethos of the occupation, and the structure of schools shape the quality profile of teachers.

The research community needs to conduct predictive validity studies of GPA, SAT/ACT, and teacher tests in relation to teacher performance and student

achievement. But we also need research on teacher quality that expands the conception of pupil outcomes beyond standardized achievement test scores. We need to know how quality and demographic variables interact with and relate to measures of teachers' knowledge, attitudes, practice, and pupil outcomes.

Of particular importance is research that explores whether and how the nonrepresentative distribution of "quality" teachers contributes to the achievement gap among students of different races and ethnicities and SES backgrounds.

The research and policy communities need longitudinal databases with information about pupils, families, teachers, and school variables. These can be used to examine the impact and interaction of quality indicators, but should also be supplemented with qualitative research that probes the relationships indicated but not explained by large-scale data analyses.

In light of claims that verbal ability and content knowledge are the most important attributes of highly qualified teachers, we especially need research that examines the relative contribution of all of the different quality indicators, including the value of teacher education programs, workplace context factors, and teachers' dispositions and personality traits.

TOPIC 3: RESEARCH ON THE EFFECTS OF COURSEWORK IN THE ARTS AND SCIENCES AND IN THE FOUNDATIONS OF EDUCATION

Background

For many years, collegiate teacher preparation programs and now many alternative route programs have been organized around several key components of preparation, including preparation in subject matter, general arts and sciences, the foundations of education, pedagogy and teaching methods, and classroom teaching. The third and fourth sets of questions the panel investigated are companions to each another, posed to investigate the evidence regarding these components. The third set focuses on the evidence regarding the outcomes of teachers' preparation in subject matter knowledge, other arts and sciences content, and knowledge of the foundations of education. (Readers should note that to avoid redundancy, research dealing with culture, multicultural education, and teaching diverse populations is considered under Topic 6, rather than under Topics 3, 4, and 5. Research dealing with preparing teachers to teach pupils with disabilities and special needs is considered under Topic 7.)

Guiding Questions

What are the outcomes of teachers' subject matter preparation; general arts and sciences preparation; and preparation in the foundations of education for teachers' learning, knowledge, and professional practice; and for pupils' learning?

What We Have Learned About the Topic

The Impact of Subject-Specific Study There is very little research on the impact of subject-specific study on learning except in the area of mathematics. Studies of secondary-school mathematics teachers show a positive association between prospective teachers' college study of mathematics and the mathematics learning of their high

school pupils. The implication is that teachers gain valuable teaching knowledge from college mathematics courses. The details about *what* mathematics prospective teachers should study need further examination. The number of studies in other subject areas and for other grade levels is small and inconclusive.

Studies that examine prospective teachers' knowledge of subject matter indicate that a majority of those studied have only a "mechanical" understanding of the subject they will teach. They know rules to follow, but cannot explain the rationale behind the rules.

Studies of the impact of individual subject matter courses (typically studies of a single course, studied for one semester) on prospective teachers are also few in number, again with mathematics being the most frequently studied subject area. These studies typically examine particular instructional modules or techniques, documenting that students gained knowledge in the area the instructor intended, but not addressing general questions about the impact of subject-specific studies on teachers' knowledge.

The Impact of General Arts and Sciences Coursework Our literature search did not identify any publications that met the criteria for inclusion and examined the impact on prospective teachers' knowledge of arts and science courses outside of the teaching candidate's teaching field.

Because general arts and science coursework occupies a large part of college-based teacher preparation and is also usually included in alternative certification, we looked outside the studies that met our criteria to get some evidence of the effects of the study of arts and sciences on knowledge that might improve teaching performance. In particular, we looked at two standard references on what students learn from going to college, one of which is a literature review.

These sources report that college attendance leads to increases in areas that might be valuable for teachers, including verbal and mathematical skills, general cognitive skills (e.g., being able to evaluate new ideas and techniques), and written and oral communication. The research indicates that college also has a modest effect on social conscience, humanitarian values, and interest in politics. The influence college has on students is related to their field of study, with quantitative skills enhanced more for those college students majoring in areas such as mathematics or engineering, and verbal skills for those majoring in areas such as the social science. There is evidence that writing and rewriting papers help students develop critical thinking ability.

Impact of Education Foundations Courses The research on the impact of education foundations courses (e.g., educational psychology, sociology of education, philosophy of education, and history of education) on teachers' knowledge is scant. As with studies of the impact of individual subject matter courses (i.e., single courses, typically studied for a single semester), the studies of foundations courses found that prospective teachers learn the content intended by the instructors in special course modules (e.g., about statistical reasoning) or from particular instructional methods (e.g., from analyzing cases in light of course content). Like the studies of individual subject matter courses, the benefit for those outside the institution is largely as a source of promising practices, where promise is based on success in one context and on the practical judgment of the college faculty members who invested in the development and study of these approaches. Put simply, the studies offer evidence about the effects of a small set of instructional practices used in the context of foundations courses, but do not provide evidence about the overall effect of foundations coursework.

What We Have Learned About the Research

Our literature review revealed that the evidence about the effects of arts and sciences courses and educational foundations courses on teachers' knowledge is extremely thin, with the exception of studies about the connections between secondary-school pupils' mathematics achievement and the amount of college mathematics taken by those pupils' teachers. That thin research base can be explained in part by the absence of datasets that include both explicit information about teachers' education and good measures of the outcomes of that education, whether direct measures of teachers' knowledge or pupil achievement data that can be interpreted as a measure of teachers' effectiveness. The thin research base can also be attributed to the difficulty of studying effects in the complex context of teachers' learning. Natural variations among these are difficult to describe and to study. But the success that scholars have had in the work on content study for teaching secondary mathematics demonstrates that the challenges of data gathering and analysis can be overcome.

The research uses a mix of approaches, from regression analyses of national datasets to small studies of individual students in one course. Across the board, the work has limited implications for major policy questions such as the coursework that should be required for teacher certification or the value of additional arts and science or education foundations courses. Although the studies attempt to account for differences in the characteristics of K–12 pupils, they generally do not account for the differences prospective teachers bring to their preparation programs in the first place. Thus, although one can use the association between study of mathematics and pupil achievement to identify which teachers in the current system are most likely to achieve higher pupil gains, those associations do not offer a strong basis for making predictions about the consequences of increasing the mathematics coursework for all new teachers.

The Research We Need

To build greater understanding of the effects on prospective teachers' knowledge of subject matter courses, other arts and science courses, and educational foundations courses, researchers must work on three fronts.

- **Improving measures of teachers' knowledge, skills, and dispositions.** To accumulate knowledge about college courses' effect on teachers' knowledge, the research community needs greater agreement on what effects should be studied and how these outcomes can be measured. Connection to the learning of K–12 pupils is an important criterion for selecting these measures. The connection to pupil learning can be directly addressed by using "value added" as an outcome measure for teacher education, but the temporal and conceptual distance between teacher education and effects on K–12 pupils makes it difficult to attribute effects to particular components of teacher preparation. Thus, research that uses impact on pupil learning as an outcome measure needs to be coupled with studies that explore the connections between teachers' knowledge and pupil learning and with work that looks at the more immediate effects of teacher education coursework on teachers' knowledge.
- **Creating and making use of national and international datasets.** In the last decade, the strongest empirical research base has come from analyses of large, representative national data bases: NAEP, NELS, LSAY. Existing databases may

support additional analyses, both in mathematics and in other subject areas; creation of additional datasets, within the United States and across nations, will allow exploration of new questions. Work at the course level will likely be more productive than attempts to attribute teachers' learning to entire programs. The challenge will be to improve the sophistication of data systems to reach a level of detail beyond course counts.

- **Drawing on other research on learning to sharpen the vocabulary for describing college coursework.** In national surveys, courses are described only by general content area (biological science vs. physical science) and level (undergraduate vs. graduate). Those differences matter, but each category covers an enormous range of variability. To build understanding, a more precise, commonly shared vocabulary is needed, which can highlight features with the greatest promise for influencing teachers' learning.

TOPIC 4: RESEARCH ON METHODS COURSES AND FIELD EXPERIENCES

Background

As noted previously, the panel approached the fourth set of questions as a companion to the third set. This fourth set focuses on the evidence regarding the outcomes of teacher candidates' preparation in teaching methods and supervised classroom teaching. (Again, readers should note that in order to avoid redundancy, research dealing with methods courses and fieldwork preparing teachers to teach traditionally underserved populations is considered under Topic 6, rather than under Topics 3, 4, and 5. Research dealing with methods courses and fieldwork preparing teachers to teach pupils with disabilities and special needs is considered under Topic 7.)

Guiding Questions

What are the outcomes of preparation in teaching methods and in student teaching and other fieldwork and classroom experiences for teachers' learning and knowledge, teachers' professional practice, and pupils' learning? This set focuses on the evidence regarding the outcomes of preparation in teaching methods and supervised classroom teaching.

What We Have Learned About the Topic

Our literature review revealed that in many instances methods courses and fieldwork experiences are tightly connected aspects of teaching candidates' pre-student teaching experiences. The instructors of methods courses who are reporting on their research often state that they are working from an assumption that prospective teachers' beliefs before they begin a course or field experience must be addressed, particularly when their beliefs run counter to research on student learning. These researchers examine changes in beliefs and the relationships among beliefs and actual teaching methods. Therefore the term *method* has come to signify something more complex than learning a set of teaching techniques.

Methods Courses Across the studies it is clear that the term *methods course* has evolved from a training environment in which specific strategies are transmitted and

practiced or from a text- and lecture-based environment. The researchers see teaching and learning as very interactive and at times even collaborative. Methods courses are seen as complex and unique sites in which instructors work simultaneously with prospective teachers' beliefs, teaching practices, and creation of identities. A methods course is seldom defined as a class that transmits information about particular methods of instruction and ends with a final exam.

Methods courses and field experiences can impact prospective teachers' thoughts about practice and actual teaching practices, but implementing a practice based on one's beliefs is neither linear nor simple. Simply intending to engage in a desirable teaching practice is insufficient. The research documents numerous situations in which prospective teachers and even teacher educators want to teach in desirable ways but are not able to move easily from intention to action.

Across content areas and across elementary- and secondary-school settings, the studies document that prospective teachers often feel conflict among the messages they receive from differing university instructors, field-based teacher educators, and school settings. It is also the case that prospective teachers resist coherent messages when they find it difficult to engage in recommended practices. When field placements reinforce and support the practices advocated by the teacher education program, individuals may still resist changing their own beliefs or practices because they are personally uncomfortable with the competing beliefs and practices. Teaching practices and beliefs are mediated by numerous factors, including their prior beliefs and experiences, coursework, and current perceptions of curriculum, students, and pedagogy.

Field Sites When the teaching practices that are allowed and encouraged by teachers in field experiences are congruent with the teaching practices advocated by teacher education program instructors, it is much easier to help prospective teachers move from simply wanting to implement a desired practice to actually being able to do so.

Professional development schools and other collaborative models are examples of sites that not only exhibit such congruence but also are perceived as beneficial professional learning opportunities for both experienced teachers and prospective teachers. There is also some indication that the students in professional development schools also benefit from collaborative arrangements.

What We Have Learned About the Research

Research on methods courses and field experiences is increasing over time and across the content areas. Much of the current research on methods and fieldwork is conducted by teacher educators interested in learning about the impact of their own courses.

Researchers have examined teacher candidates' actions, reactions, and beliefs about the nature of subject matter knowledge, such as studies of candidates' understandings of what constitutes mathematics and mathematical learning or studies of their understandings of pupils' reading preferences and abilities. Much of the research is concerned with how new teachers are socialized into the profession or how their beliefs and actions do and do not change as a function of methods courses and field experiences.

There is a growing attempt to study teacher candidates as they begin student teaching, and there are beginning to be more year-long studies of students that begin in methods courses and follow the students as they apply their course work during

student teaching, as opposed to studies that begin and end with one course. There are still only very few studies in which the graduates of teacher education programs are followed into the first years of teaching. In addition, there is almost no joint inquiry conducted by university researchers and classroom teachers in professional development schools or other collaborative settings.

Qualitative methods relying on observations and interviews are predominant in the literature. Typically, researchers select one to three preservice students to illustrate dominant trends in students' responses during the course and field experience. Case study designs are the methods researchers use most often, which necessarily limit any causal claims or any efforts to generalize. There are few quantitative studies examining the impact of methods course or field experiences on immediate practice and virtually none that examine impact on long practice over time or on students' learning once the novice teachers are in charge of their own classrooms.

Research within any particular content area is seldom informed by research in a different content area, and researchers across content areas seldom address common questions.

There is wide variation in the extent of detail provided on data collection and analysis procedures, with some studies offering minimal information. This makes following the trail from research questions to conclusions very difficult.

The Research We Need

We need more studies within and across content areas that use similar conceptual or theoretical frameworks, questions, and methods in different settings and with varying populations. We need well-conceptualized, long-term programs of research in this area. Currently there are too few studies investigating similar questions and starting from similar theoretical bases to enable us to learn by aggregating across studies. The ability to aggregate is critical if we hope to learn about more and less effective practices as advocated by teacher education programs.

In addition, there is little research that includes the perspectives, questions and voices of cooperating teachers and prospective teachers. Instead the voices and perspectives of university-based researchers predominate. We need to examine the perspectives of the diverse participants involved in conducting, interpreting, and reporting on research. We need to pay attention to differences in racial and linguistic backgrounds, as well as differences in role groups and research methodologies.

We also need research frameworks that go beyond simply studying teaching techniques or, on the other hand, simply studying teachers' thinking. We need research that examines the interactions of these as well as how they relate to pupil outcomes. We also need frameworks that go beyond a limited focus on the individual, either alone or in a group. These frameworks need to be more complex and be informed by sophisticated knowledge about how practice is shaped not only by what individuals may believe or hope to achieve but also by contexts, materials, and other people.

Many of the studies about the impact of teacher preparation coursework and fieldwork treat teacher candidates' beliefs and attitudes as outcomes. However we need research that examines the impact of coursework and fieldwork on other outcomes, such as on teachers' practices and knowledge growth, and we need well-developed measures to assess these.

An approach to research that would enable several researchers using complementary, but mixed, methodologies that combine internally and externally generated

analyses of teaching and learning would not only enable us to discern trends across analyses but also help us guard against the power relations that are obtained when data collection and analysis are only conducted within an instructor's own course or program.

It is important to commit both financial and temporal resources to conduct research across many varieties of teacher education settings, including teaching without any formal preparation, and programs based in universities that are not located in research-intensive universities and departments. We also need teacher education research structures that encourage collaboration and long-term work—structures that are not currently embedded in traditional promotion and tenure arrangements and even less in schools and school districts. Field sites and those who work in them are responsible for far more than participating in research, and an expectation of such may decrease schools' willingness to accept prospective teachers. We do not have institutions (schools or classrooms) dedicated to promoting field-based research, and we have policies that discourage experimental designs or quasiexperimental designs that investigate variations among prospective teachers' learning, development, practice, or impact in varying field settings, teaching methods, or entire teacher education programs.

TOPIC 5: RESEARCH ON PEDAGOGICAL APPROACHES IN TEACHER EDUCATION

Background

There are a number of pedagogical approaches that are widely used in teacher education. The panel's intention with this question was to review the literature on pedagogical approaches in teacher education, particularly the teaching methods, strategies, instructional approaches, assignments, and learning opportunities common to teacher education programs and projects at many institutions and within many program types. The panel was interested in what evidence existed regarding the contributions of particular pedagogical strategies to teacher preparation outcomes and the contexts and conditions under which these occur.

Guiding Questions

What are the outcomes of the pedagogies used in teacher preparation (specifically the various instructional strategies and experiences commonly used in teacher education courses, projects, and programs) for teachers' learning and knowledge and professional practice and for pupils' learning? Under what conditions and in what contexts do these outcomes occur?

What We Have Learned About the Topic

The literature on teacher education pedagogy focuses on how teacher candidates are taught and how various approaches affect what they learn. The research reviewed in this chapter focuses on five approaches: laboratory experiences, case methods, video and hypermedia materials, portfolios, and practitioner research.

Laboratory Experiences The studies of laboratory experiences include both microteaching and computer simulations, with the majority of studies focusing on

training preservice teachers in the use of specific skills that researchers posit are related to effective teaching. Studies in this area are strongly rooted in principles of behavioral psychology, reflecting in part the historical context of these studies. The behavioral model also underlies the pedagogical approach, with its emphasis on feedback and targeting of specific skills. The primary outcome investigated in these studies is teacher behavior, although a few more recent studies look at teacher cognition as the outcome. Studies suggest that microteaching and computer simulations can help students develop targeted skills. However, little research has looked at how the preservice teachers might use these skills in the context of actual classrooms.

Case Methods Despite enthusiasm for “the case idea,” there is more descriptive work about what people are doing in their teacher education classrooms than systematic studies of how case-based pedagogy influences teacher candidates’ learning. The available studies provide initial evidence that cases may help improve the reasoning skills of preservice teachers, enabling them to identify issues and analyze an educational problem more effectively. It is also clear from the research that the instruction around cases matters not only in the use of case materials per se but also in candidates’ learning. This suggests that it may be worthwhile to study the instructional interactions around case methods. A small body of research has looked at the substantive knowledge preservice teachers gain from reading cases. Finally, several researchers argue that case-based analyses and discussions can reveal the thinking of preservice teachers, giving teacher educators a better window into how their students think. Most of the research in this area focuses on cognitive outcomes. Because existing studies have not looked at impact on practice, the field lacks evidence that the use of case-based pedagogy affects preservice teachers’ classroom practice.

Video and Hypermedia Materials A number of studies found that preservice teachers had positive attitudes about the uses of interactive video, and several studies found that viewing videotapes can improve preservice teachers’ understanding of a teaching strategy or concept. A few of these studies tried to untangle what preservice teachers learned from videotapes as opposed to what they learned from other approaches, such as role-plays, live observations, or written materials. These studies suggest that video materials can be at least as effective as other approaches in helping teacher candidates learn about instructional approaches. However, the studies do not reveal whether preservice teachers were better able to implement these approaches in classrooms.

Portfolios The research suggests that the portfolios used in teacher education share some common elements (lesson plans and reflective pieces), and most serve at least the dual purpose of helping teacher candidates reflect on their practice and assessing their learning. The research suggests that how portfolios are used in the context of teacher education influences teacher candidates’ perceptions of their value. Even within the same preparation program, teacher candidates had different views of the value of portfolios depending on particular instructors and the quality of the feedback provided. Despite the challenges of constructing portfolios, most teacher candidates seemed to value the process. However, despite the claim that portfolios can contribute to preservice teachers’ ability to reflect on their practice, only one study looked at how the portfolio assignment affected the content of teacher candidates’ reflections.

Practitioner Research Although many teacher educators value practitioner research, there is little empirical evidence about the outcomes of engagement in practitioner research during preservice teacher education. Studies suggest that student teachers find it difficult to find the time to engage in sustained inquiry while student teaching and that negotiating their research agendas with their cooperating teachers can be challenging. Placing student teachers with more experienced teacher-researchers can ease the difficulty of these negotiations and provide teacher candidates with not only support but also a perspective on teaching that is inquiry oriented. However, there is little evidence that engaging in practitioner research affects actual classroom practice.

What We Have Learned About the Research

The most recent research in this area is almost exclusively qualitative and consists largely of studies conducted by teacher educators on their own programs. The studies generally examine only one pedagogical approach (e.g., case methods or use of portfolios) and seldom compare the effectiveness of different pedagogical approaches. The studies in this area generally do not provide extensive information on how particular pedagogical approaches are implemented, or on how an approach used in a specific course relates to approaches used in other parts of the curriculum.

The outcomes investigated in these studies range from shifts in perceptions, changes in knowledge and beliefs, changes in the ability to reflect or identify issues—all cognitive outcomes of one form or another—to attitudes toward the pedagogy or feelings of self-efficacy—more affective outcomes. Few, if any, of these studies attempted to investigate the difficult problem of the relationships among pedagogy used in teacher education, the practices of beginning teachers, and the learning of their students (Wilson, Floden, & Ferrini-Mundy, 2001). The shifting nature of outcomes in this research makes any form of meta-analysis or aggregation of results difficult if not impossible. The studies are simply not looking for the same thing. But even when different researchers attempt to study a common outcome, they generally use different instruments or analytic procedures, leading to a wide variability in methodology. Our field does not yet have a tradition of using similar instruments or common ways of analyzing data, and, in fact, few common tools exist for studying student teachers' learning.

Finally, very little research in this area, other than the research on microteaching, is truly programmatic in nature. A few researchers have continued to study facets of case methods over time, but there are relatively few examples of research programs in this area.

The Research We Need

To build a more robust understanding of the outcomes of various pedagogical approaches in teacher education, we will need more programmatic research that is well grounded in theory. The most useful theoretical frameworks would go beyond the particulars of a specific pedagogical approach to help us understand more broadly the relationship between the pedagogies of professional education and those of professional practice.

A program of research in this area should encompass a broader territory than a single instance of a pedagogical approach—such as the use of portfolios in one teacher

education program—and then investigate that territory more deeply and systematically. For example, the emerging research on case-based pedagogy might develop into a program of research in which researchers investigate how different kinds of cases—textual, video, and hypermedia cases—used in different contexts influence what prospective teachers learn with regard to a variety of outcomes, including cognitive outcomes such as ability to reason through a classroom dilemma as well as outcomes related to classroom practices. Such programmatic research could also investigate interactions between particular pedagogical approaches and characteristics of either the prospective teachers or the programmatic contexts in which the approaches are used. A program of research might also involve more explicitly comparative work, very little of which currently exists.

Finally, researchers in this area need better tools for studying the outcomes of teacher education. In order to understand more about how different forms of pedagogy result in different kinds of outcomes, we need better tools for understanding distinct facets of teacher learning. If researchers could borrow from a common set of toolkits for looking at teacher learning as a field, we might find ourselves working on the same problem in ways that allow us more easily to build on each other's work. As a field, research on teacher education has spent relatively little time developing the tools of the trade. Yet, if researchers want to be able to build on each other's work, they may also need to use more common tools for both data collection and data analysis.

TOPIC 6: RESEARCH ON PREPARING TEACHERS FOR DIVERSE POPULATIONS

Background

A major challenge facing teacher education today is preparing teachers with the knowledge, skills, and dispositions to work successfully with an increasingly diverse pupil population, particularly with those whose cultural, language, racial, and ethnic backgrounds differ from those of the mainstream and with those who live in poor urban and rural areas. The panel wanted to know what evidence existed about the contributions to teacher preparation outcomes of deliberate efforts to prepare teachers to work with these groups and in these settings and the contexts and conditions under which these outcomes occur.

Guiding Questions

What is the research base for preparing teachers to be effective in teaching traditionally underserved student populations and students in traditionally underserved areas? What is known about the conditions and contexts under which specific efforts to prepare teachers for work with these populations contribute to teacher education outcomes?

What We Have Learned About the Topic

The literature on preparing teacher candidates to teach underserved populations has been organized in this chapter around four aspects of the preparation of preservice teachers: candidates' predispositions, preservice preparation of prospective teachers, the experiences of teacher candidates of color, and program evaluations.

Candidates' Predispositions Studies of candidates' predispositions are based on the premise that teachers' knowledge frames and belief structures are the filters through which their practices, strategies, actions, interpretations, and decisions are made. This means that knowledge and beliefs play an important mediating role in what candidates learn during their teacher education programs and also how and what they teach once they are in classrooms. Studies reveal that in addition to being White and middle-class females, the majority of teacher candidates are from suburbs or small towns and have limited experience with those from cultures or areas different from their own. Although many have negative attitudes and beliefs about those different from themselves, they often say they are willing to teach in urban areas.

Preparation of Teacher Candidates Many of the studies about the preparation of teacher candidates for work with underserved populations can be grouped according to their focus on prejudice reduction, equity pedagogy, field experiences, and the experiences of candidates of color. Studies of prejudice reduction reveal that prior experiences, early socialization, and ways of thinking influence teacher candidates' attitudes and beliefs. A variety of teacher education practices intended to reduce prejudice in teacher candidates have been studied. The majority yield short-term positive impacts on candidates' attitudes and beliefs. However, none of these studies is longitudinal and none includes followups of candidates' beliefs and attitudes.

Equity pedagogy refers to the use of students' cultural and experiential background to facilitate learning and to provide students with the skills necessary to support the development of a more equitable society. This includes creating curriculum and instruction based on students' backgrounds, fostering self-determination, and attending to oppressed and underserved groups. Studies in science methods courses and in language arts methods courses suggest that how candidates understand subject matter can either interfere with or support their openness to equity pedagogy. In some methods courses, teacher candidates can learn and apply knowledge of equity pedagogy to their planning of classroom instruction. Studies that focus on teacher candidates' learning about equity pedagogy do not reveal the extent to which candidates are actually able to implement equity pedagogy to improve the academic performance of students of color.

Studies about field experiences intended to prepare candidates to work with underserved populations focus on community-based fieldwork, relocating candidates to urban settings, candidates' responses and emphases in urban settings, the use of biographies and storytelling, and the application of multicultural knowledge to classroom practice. Most of these studies indicate short-term positive impacts, including enhanced awareness, sensitivity, and acceptance of those from other cultural backgrounds. The studies also identify candidates' concerns about understanding, instructing, motivating, and developing relationships with their students and mentors. Studies suggest there are limited opportunities for candidates to implement or observe multicultural practices in classrooms.

Studies about the experiences of teacher candidates of color reveal that teacher candidates currently find teaching a less attractive career, as apposed to how it was regarded in previous years, and they confront more barriers to admission than do their White counterparts. They also often face financial, social, and personal difficulties and are hindered by inadequate academic preparation. Candidates of color are more likely to come from working-class backgrounds and have a better understanding of inequities in the society and a stronger commitment to social justice than do their

White counterparts. There is some evidence that candidates of color benefit from cohort placements or programs with a focus on social justice and preparation for diversity.

Program Evaluations Studies of programs reveal that a small number of university programs offer carefully crafted programs that prepare candidates to teach students from diverse populations. However, many programs do not yet have the capacity to address cultural and linguistic diversity. Studies that followed teacher candidates once they left the program found that program emphases did not necessarily translate to school practices.

What We Have Learned About the Research

The majority of studies on the preparation of candidates for diverse students are qualitative. Most of these qualitative studies are conducted in a single course or field experience, drawing on narrative data from course assignments, field notes, and transcriptions of classroom observations. Because most of these studies do not include much information about the larger context of the teacher education program, it is difficult to account for the impact of the program and other variables. This is especially true of self-studies conducted by instructors in their own courses. In the research on field experiences, little information is provided about the field site or the experiences and preparation of the supervising practitioners. This information is important in accounting for the impact of a particular intervention and for looking at the impact of an intervention across studies.

The majority of the quantitative studies employ surveys or questionnaires focused on candidates' beliefs and attitudes. These follow traditional survey research designs for data collection, analysis, and reporting. Some researchers used self-constructed surveys and questionnaires that had not been validated, or the validation procedures were not described. The majority of the quantitative studies addressed the predispositions of candidates upon entering a teacher preparation program and upon completion. Limitations characteristic of many of the studies on the preparation of candidates for diverse students included short-term investigations of candidates' behaviors, experiences and attitudes during teacher preparation programs without followup to practice in the field; small sample sizes that may not have been representative of the larger population from which the sample was drawn; and self-studies in courses taught by the researcher. These characteristics limit the trustworthiness and transferability of the findings from these studies.

The Research We Need

Research is needed to identify particular attributes, prior knowledge, and background experiences that increase the probability for learning to teach diverse students. The existing research shows the short-term impact of specific approaches used during teacher preparation on candidates' attitudes, beliefs, and classroom practices; however, this research does not track candidates based on their characteristics upon entering teacher preparation programs to determine whether some candidates are more likely than others to learn to teach diverse students based on the characteristics they bring to teacher preparation. Also, research is needed on the academic and experiential preparation needed by teacher educators to support candidates in learning to teach diverse students. More needs to be known about approaches to professional

development for teacher educators who have had little contact with diverse students in elementary and secondary schools and who have not spent a great deal of time in diverse and urban communities.

Much of the research on prejudice reduction indicates short-term benefits; however, there is need for longitudinal and follow-up studies that investigate the sustainability of these gains in actual teaching situations with diverse student populations. We need to inquire into how candidates who receive training in prejudice reduction accompanied by training in traditional content methodology compare with their peers who receive training in prejudice reduction combined with training in content-specific equity pedagogy in their ability to adapt instruction to the needs of diverse and underserved student populations. Also, more research is needed to determine the impact of training in general multicultural concepts on candidates' classroom practices.

The majority of the studies on the preparation of candidates for diverse students were qualitative; however, most were lacking rich descriptions of the context of the teacher preparation programs. Rich descriptive studies are needed that clearly document the internal operation of teacher education programs and that show how courses within a program are related to one another and to field experiences. Survey studies and qualitative studies employing informal and structured interviews with cooperating teachers and other practitioners who support candidates' field experiences that reveal their academic and professional preparation, their understanding of the teacher preparation program with which they are affiliated, and their attitudes and beliefs related to diverse populations are needed to better inform practices related to field experiences. Such studies can be used as a basis for understanding how to construct programs that better prepare candidates for diverse students. Studies employing mixed methodological approaches are needed to show the relationship between the preparation of candidates and learning outcomes of the diverse student.

Finally, studies on the preparation of teachers of color reveal differences in their background experiences and in the challenges they face in gaining entrance into the profession, when compared to White candidates. A few studies found that candidates of color had limited opportunities during student teaching to use their cultural insider knowledge when teaching students with similar cultural and experiential backgrounds; however, these studies did not indicate how candidates of color were supported in learning to apply their cultural insider knowledge to professional practice. Experimental studies are needed to provide a comparison of the performance of candidates of color, to provide support for learning, and to apply cultural insider knowledge to professional practice with candidates of color who have not had such training.

TOPIC 7: RESEARCH ON PREPARING TEACHERS TO WORK WITH STUDENTS WITH DISABILITIES

Background

Nearly all teachers currently teach classes comprised of pupils with a wide range of abilities and disabilities. The panel wanted to know what evidence existed about the contributions of deliberate efforts to prepare teachers to work with pupils with disabilities and the contexts and conditions under which these outcomes occur. The focus of this set of questions was not on the preparation of educational specialists

whose particular area of expertise is working with pupils with disabilities, but on the preparation of general education teachers to teach groups of pupils that include those with disabilities.

Guiding Questions

What is the research base for preparing teachers to be effective in teaching students with disabilities? What is known about the conditions and contexts under which specific efforts to prepare teachers for work with pupils with disabilities contribute to teacher education outcomes?

What We Have Learned About the Topic

In general, the field of teacher education has demonstrated a commitment to including preparation for teaching students with disabilities as a normative expectation for preservice programs. This commitment is visible in requirements in the majority of states that prospective teachers study special education and in national standards for individual teacher candidates and teacher education programs that address teaching students with disabilities. Preservice students are concerned with acquiring the knowledge and skills to help them work well with students with disabilities and view this as part of their professional responsibility.

Preservice students expect their preservice programs to provide experiences and instruction that will ensure they have the range of knowledge and skills needed to teach students with disabilities. Although there is evidence that preservice students can gain confidence in this regard, they do not uniformly believe they are well prepared for this responsibility.

Relatively few studies of pedagogy for preparing general education teachers to work with students with disabilities have been conducted. Among them, modest indications are emerging that cases and problem-based learning are starting to be implemented to address this issue.

Often teacher education programming relies on the delivery of special education content and application by general teacher education faculty, either alone or in collaboration with special education faculty. General teacher education faculty who have responsibility for providing instruction in working with students with disabilities do not always feel prepared for or confident in their roles delivering instruction on topics related to teaching students with disabilities.

Understanding the relationship between disability as a form of diversity and diversity of race, class, culture, and language is limited. Special educators who are concerned about diversity of race, class, culture, and language present these topics in the teacher education literature in special education as a means of providing a general understanding of the issues for professionals in the field. The specific, complex relationship among diversities is not typically addressed.

What We Have Learned About the Research

The attitudes teacher education candidates hold toward working with students with disabilities is a dominant focus of the research. Studies indicate that preservice students' attitudes are concerned with acquiring the knowledge and skills to be successful with students with disabilities. These studies contrast with early studies of teacher attitudes, which focused on the global disposition to support or reject inclusive education.

It appears that for the most part prospective teachers accept this responsibility but are worried about how to carry it out.

Research is most often conducted within instructors' preservice classes as a form of self-study by teacher educators. This small-scale research is often conducted by faculty in special education and sometimes by teams of special and general teacher educators. In these studies, outcomes are often measured in terms of preservice students' perceptions on a variety of issues related to working with students with disabilities.

Despite the trend toward preparing prospective teachers to work with students with disabilities, few studies of program effects have been conducted. When they have, measures of P-12 student learning for students with disabilities are not usually selected as outcome measures.

The Research We Need

There is a pressing need to conduct longitudinal research on program effects so that we can begin to answer the question: How well are programs preparing graduates to foster learning for their students who have disabilities? These studies need to include not only measures of pre-service candidates' knowledge and skills, but also outcome measures for P-12 students with disabilities.

The growing number of programs based on collaboration across general and special education provide an opportunity for joint, cross-institutional programmatic research that is aligned and that uses the same variables and the same instruments across several institutions of higher education. Research consortia should be considered as a major focus of future efforts.

We do not have documentation on what actually takes place in general teacher education classes with regard to working with students with disabilities. How do general teacher education faculty actually address this topic? To unpack this black box phenomenon, qualitative studies of faculty discourse across general teacher education classes are needed. For example, what is actually said or done in the name of accommodation and modification within general methods classes? How are general education pedagogies connected and applied specifically to working with students with disabilities?

As a function of longitudinal research, qualitative studies of preservice student decision making about pedagogies and curriculum for students with disabilities are needed. What pedagogies are considered to be appropriate for students with disabilities, and what pedagogies are actually implemented? What choices are being made with regard to the complexity of the curriculum?

In addition to studies about how disability is addressed in methods classes, qualitative studies are also needed on how disability is addressed in classes on multicultural education. How is the relationship between diversity of race, class, culture, and language, on the one hand, and disability, on the other, presented? We also need research that tracks how teacher education grapples with changes in classification regulations.

As the use of portfolios continues to increase, qualitative studies of portfolio entries on diversity are needed to document the choices teacher education students make in portraying their knowledge and skills. Do they address diversity generally? Do they use disability as the only example of diversity? Do they address issues of race, class, culture, and language and not of disability, or vice versa? What practices are described as evidence of meeting the needs of students with disabilities? A critical research-related issue is the development of frameworks that organize and conceptualize how we ought to consider outcomes for different students with different needs.

TOPIC 8: RESEARCH ON ACCOUNTABILITY PROCESSES IN TEACHER EDUCATION

Background

Teacher preparation across the nation is governed by a number of governmental and nongovernmental accountability processes and procedures. The most common of these are state-regulated initial certification of new teachers, state-required teacher tests for initial licensing, and voluntary professional accreditation of teacher preparation programs and institutions. The panel wanted to know what evidence existed about the effectiveness of these accountability processes and their impacts on various measures of teacher quality. (Readers should note that research comparing teachers certified through “traditional” and “alternative” routes is considered under Topic 9, rather than under Topic 8. Research about the relationship between accountability procedures and teacher quality indicators—for example, between teacher tests and the academic ability of teacher candidates—is considered under Topic 2 rather than under Topic 8.)

Guiding Questions

What is the research base for the range of accountability processes currently used in teacher preparation, specifically certification, teacher testing, and accreditation? What is known about the outcomes of these processes for teachers’ learning and knowledge and teachers’ professional practice and for pupils’ learning?

What We Have Learned About the Topic

Certification Certification is the process by which states assess the qualifications of individuals to teach. Individual states are responsible for certifying and licensing teachers; most states award an initial teaching certificate after successful completion of an approved preparation program. All states require that teacher candidates possess a B.A. in education or in a content area. Most states also require that teacher candidates have some supervised student teaching experience, which varies from 9 to 18 weeks. The literature on certification is limited, but the weight of the evidence generally favors certification over noncertification or undercertification, as measured by student achievement.

Testing Forty-two states require some form of teacher testing. Teacher tests can include tests of basic skills, general knowledge, subject matter knowledge, or professional knowledge. Unlike other professions where the same test is used across most states, over 600 tests are currently used in the United States. The research on teacher testing is outdated, focusing primarily on tests that are no longer in use. The research that does exist suggests that such tests have content and concurrent validity. However, there is very little evidence that such tests have predictive validity—that is, there is little evidence that there is a relationship between teachers’ scores on such tests and their teaching success (measured in terms of teacher behavior, principal ratings, or student achievement).

Accreditation Accreditation is the process by which an institution (a college or university) provides evidence to the public and other institutions of its program’s

soundness and rigor. All states require that teacher preparation programs receive state approval, which is typically based on state standards. Approval standards and licensure requirements are unique to each state. Unlike other professions such as architecture, medicine, and law, national accreditation is not required in teacher education. Over half of the approximately 1,300 teacher education programs in the United States are regionally accredited by the two national accrediting organizations.

The research on accreditation is primarily informational. Most published articles describe the process of participating in accreditation review and feature recommendations for other institutions as they prepare for reviews. Empirical studies on the impact of accreditation policies and processes are almost nonexistent.

What We Have Learned About the Research

Given the impassioned debates around accountability in teacher education, it is both surprising and troubling that there is so little relevant empirical research. Teacher tests are often locally- or nationally-developed tests that are adapted to state requirements and needs. This makes it difficult to compare teacher testing results across states. The developers of teacher tests do not claim that these tests have predictive validity (that higher scoring candidates will be better teachers), even though the tests are often used in policy environments in which such claims are made.

Typical research on teacher testing has focused on validating the concurrent or content validity of tests, not their predictive validity. Furthermore, because teacher testing is a state level decision, contrasting the effects of teacher tests on the teacher pool—does the use of such tests improve teacher quality?—is nearly impossible: Either everyone in a state takes a test or does not. We found one study that took advantage of a natural experiment—the suspension of the teacher testing requirement for a few years—to examine the effects on the teacher candidate pool.

Typical research in this area attempts to correlate teacher test scores with other measures of college success, for example, grade point average in liberal arts and teacher education classes. A few studies examine the relationship between teacher test scores and locally developed measures of teacher classroom behavior, student achievement, or other measures of teacher effectiveness. In some cases, researchers found significant relationships between teacher test scores and student achievement.

The Research We Need

The use and impact of accountability processes related to teacher preparation is a research domain in need of sustained, intensive work. First, we need research about the current tests being used, including research on their content, and concurrent, predictive, and consequential validity. Further, we need research that explores alternative formats and arrangements for teacher testing. All of the research on teacher testing needs to be much more subtle and sophisticated in its recognition of important variations in tests and their use. In particular, we need to do research on whether and how different state policies concerning teacher testing have an impact on student achievement and effective instruction.

In terms of future research on teacher certification, we need to understand the multiple forms of certification that exist within and across states. This includes understanding the variability in what one form of certification (e.g., emergency credentials) might exist. In addition, we have almost no research on the impact of teacher certification in areas other than mathematics teaching. We need to broaden the fields

investigated to include both the full range of subject matters in which teachers are certified and the grade levels. We also need research that compares teacher certification processes with those of other professions and examines the impact of these.

Given the often fuzzy line between certification and licensure, it is important to separate the two processes in research and look for the differential effects of one or the other. Finally, because certification is most often the combination of a number of different requirements (completion of a subject matter major or B.A., completion of a teacher education program, teacher testing, and other requirements), research needs to be designed to investigate the relative contributions of the individual proxies that are used to make the certification decision.

With so little existing research, almost any research in the area of program accreditation would help, particularly studies of the impact of accreditation policies and processes. In particular, the field would benefit from studies that linked program accreditation with impact measures, including pupil learning and effective instruction. Given the coexistence of several different models of accreditation (TEAC, NCATE, state reviews that involve primarily paperwork, and state reviews that involve visiting teams), it also seems appropriate to conduct research on the relative effectiveness of different models of accreditation.

TOPIC 9: RESEARCH ON TEACHER EDUCATION PROGRAMS

Background

One of the most heavily debated issues in teacher education has to do with the effectiveness of different kinds of teacher education programs and entry routes into teaching. Many states now permit multiple entry routes into teaching, some of which require very limited professional preparation prior to the assumption of full responsibility for a classroom. This chapter examines the research evidence related to the impact of different structures of preservice teacher education programs on various aspects of teacher recruitment and retention, teacher quality, and student learning.

Guiding Questions

What is the evidence related to the impact of different forms of preservice teacher education on teacher recruitment, teacher retention, teacher quality, and student learning? The comparisons examined in this summary are 4- and 5-year programs, state-sponsored alternative programs and traditional programs (4-year undergraduate or 5-year university-based extended programs), university-sponsored alternative programs and traditional programs, school-district-sponsored alternative programs and traditional programs, and comparisons of multiple programs. Several in-depth case studies of multiple teacher education programs are also examined for what they can teach us about examining teacher education programs and teacher learning during preservice teacher education.

What We Have Learned About the Topic

Though the research has examined the effects of different program structures, because of the significant amount of variation that exists within teacher education institutions,

in programs of a given structural type (e.g., 4-year undergraduate program) and in state policy contexts, it does not make sense to attempt to define program effectiveness according to the general structural characteristics of programs alone.

Studies comparing the effectiveness of various kinds of traditional and alternative teacher education programs and 4-year versus 5-year programs in relation to a variety of outcomes generally provide conflicting findings about the efficacy of different forms of teacher preparation and do not enable us to identify the specific program features that are related to the achievement of particular outcomes. Across the studies, there is a lack of information about the programs, about the teachers who enter the programs, and about the places teachers teach after program completion. These omissions, together with the vague criteria often used to assess teaching, limit the value of these studies in helping us understand the relative impact of different kinds of alternative and traditional programs on aspects of teacher quality and student learning.

The four case studies reviewed in this summary represent efforts by researchers to probe more deeply into teacher education programs, the opportunities that they provide for teacher learning, what teachers actually learn, and the identification of program characteristics that are responsible for desired outcomes. Although the researchers do not establish clear links between evidence in their data and characteristics of program excellence, these studies provide examples of how researchers can more carefully study the process of teacher education.

Regardless of the type of teacher education program completed, the subject matter specialization of teachers seems to matter in terms of teacher retention. Specifically secondary mathematics teachers sometimes had lower retention rates than did teachers in other subject areas.

There is some evidence that during the beginning of their first year of teaching, teachers with no or minimal preservice professional preparation prior to becoming teachers of record perform at a lower level of competence than do teachers who have completed either traditional or alternative programs with significant professional preparation. Although the former group appears to “catch up” to the later group by the end of the year, the students who are assigned to teachers during the period of catching up may suffer academic losses by being taught by teachers with minimal professional preparation.

Only four studies were reviewed that attempted to connect teacher education programs to student learning. Although three of these studies used various forms of matching and controls in an attempt to isolate the effects of teacher education programs, none of these studies is free from methodological weaknesses that rule out alternative explanations for the findings. Also, very limited information is provided in these studies about the programs being compared, which makes it impossible to link the findings back to specific program characteristics.

What We Have Learned About the Research

The research examined compares the efficacy of 4- and 5-year programs and different kinds of alternative programs. The outcomes examined in these studies include how many teachers completed different programs and entered teaching and what kind of schools they entered, teachers’ ratings of the effectiveness of their preparation in relation to particular tasks of teaching, and the professional teaching knowledge of graduates from different programs.

In addition, various aspects of teaching quality were examined after program completion including the self-ratings by teachers of their own teaching abilities; teacher self-reports of the teaching practices and problems faced in the classroom; observations of teaching by researchers; principals', supervisors', or mentors' ratings of the quality of teaching; and measures of pupil learning. Teachers' commitment to teaching as a career, their sense of efficacy and career satisfaction, involvement in leadership activities, and actual teacher retention were also assessed.

As mentioned previously, few definitive statements can be made about the effects of different structural models for preservice teacher education programs based on this body of research. Inconsistent and contradictory findings across studies and various conceptual and methodological problems with the research reveal limitations that should guide future inquiry. Future research needs to include descriptions of the attributes that teachers bring to their teacher education programs; the curriculum, pedagogy, and social relations in the teacher education programs; the institutional and state policy contexts in which the programs are embedded; the school and community contexts where program graduates teach; and the criteria and comparison groups used in the evaluation of teacher performance.

Generally the research has not distinguished program effects from the influence of the characteristics that teachers bring to their preparation programs (selection effects) and from the effects of the contexts in which teachers teach. Because these studies have not carefully examined the actual process of teacher education, teachers' entering characteristics, and the contexts in which teachers teach, it is not possible to explain the contradictory findings.

It is difficult to aggregate findings across studies because studies used different definitions of alternative and traditional teacher education programs.

The Research We Need

Research on teacher education programs needs to describe the characteristics that teachers bring to their programs, the opportunities for learning that the programs provide and what teachers learn from these opportunities, the institutional and state policy contexts in which programs are embedded, and the characteristics of the schools where program graduates teach. Attention to these things will better enable researchers to disentangle the effects of programs from selection effects and the effects of contexts and to identify the critical features of programs that make a difference in achieving desired outcomes.

It is important that researchers use consistent definitions for alternative and traditional teacher education programs.

Systematic quantitative studies of distinct and carefully described alternative program alternatives are needed. These studies should utilize matching, controls, or random assignment to isolate the effects of particular teacher education program characteristics from other influences. These studies should include specific information about the features of the programs being compared that goes beyond a general label taken from their structural characteristics. These studies also need to compare teachers who are teaching the same subjects to the same kind of students at the same grade levels.

In-depth case studies of teacher education programs are needed that illuminate what teacher education students learn from the opportunities they are provided within their programs. These studies should attempt to link specific program characteristics to various outcomes.

Studies that combine systematic quantitative analyses of distinct preparation alternatives and in-depth qualitative analyses of the nature and meaning of these alternatives are especially needed. These studies will provide both the systematic comparisons and the rich contextual data needed to be able to explain the findings.

More studies on teacher education programs should include attention to the links between teacher education and student learning. In addition to students' growth on standardized achievement tests, other ways of assessing academic learning and assessments of other kinds of learning such as social and civic learning should be addressed.

Better measures of teacher performance are needed in research that attempts to connect preparation programs to the teaching performance of their graduates. Instruments and rating scales to assess teaching performance should use clear, specific criteria and address broader definitions of teaching performance that incorporate multiple aspects of teaching performance.

A RESEARCH AGENDA FOR TEACHER EDUCATION

The main recommendation of the panel, elaborated in the remainder of this summary, is that research about teacher education needs now to be undertaken using methods that will increase our knowledge about important features of teacher education and its connections to the outcomes that are important in a democratic society. We recommend attention to the full variety of research approaches available, recognizing that multidisciplinary and multimethodological approaches are necessary.

We caution, however, that although empirical research can inform important decisions about research and policy, it cannot tell us what to do. Simply because something has been researched does not tell us much about what people actually do or should do in preparation programs. Indeed, we see many instances where the same research is interpreted to justify dramatically different practices and policy decisions. As we note throughout this report, education and teacher education pose many kinds of questions, including those that are grounded in moral, ethical, social, philosophical, and ideological concerns. Although questions like these can be shaped and understood more fully on the basis of evidence, they cannot be settled by empirical evidence alone. Evidence always has to be interpreted, and there are many influences on teacher education practice besides research findings. However well-designed studies, such as natural experiments that take advantage of naturally occurring variations among teacher preparation programs and arrangements, can provide evidence to guide policy and practice decisions.

Of course, the arguments we make about research on teacher education are relevant in any applied field, including medicine and the health professions, where policy decisions depend not only on a synthesis of the empirical evidence but also on local circumstances, costs weighed against benefits, and the availability of personnel, equipment, and technology. This in no way suggests that empirical research related to teacher preparation has no role in policy. On the contrary, the empirical research agenda recommended here can inform policy and practice by providing evidence concerning the outcomes of particular strategies, arrangements, and components of preparation and by providing analyses of the impact of programs and policies at the local level. Decisions about teacher education will always be

influenced by a mix of values, experience, politics, and empirical evidence. However, we currently have relatively little evidence about the impact of teacher education and even less agreement about what counts as evidence in the first place. In this volume we are calling for multiple programs of empirical research on teacher education, which will require more sophisticated theoretical frameworks and research designs. Sound empirical research on teacher education can help us better understand the contexts and conditions within which teacher education is associated with enhanced pupil learning and other outcomes, as evidenced by multiple rather than by unitary indicators. This empirical evidence ought to guide decisions about policy and practice.

Recommended Research Designs and Important Methodological Issues

The panel recommends that researchers carefully develop research designs along the lines that follow and also attend to the noted methodological issues noted as they conduct research on teacher education. Some of the standards the panel calls for apply to all good research; others are more specific to teacher education.

Research Situated in Relevant Theoretical Frameworks Particular conceptions of teaching and learning to teach are embedded in the curriculum, instructional strategies, and organizational structures of teacher education programs. Without locating empirical studies in relation to appropriate theoretical frameworks regarding teacher learning, teaching effectiveness, and pupil learning, it will be difficult to explain findings about the effects of particular teacher education practices.

Clear and Consistent Definitions of Terms All aspects of teacher education including instructional approaches, curriculum, and organizational arrangements should be defined clearly, consistently, and with enough specificity to enable the accumulation of knowledge across studies about the nature and impact of different aspects of teacher education.

Fuller Description of Data Collection and Analysis Methods and Research Contexts Studies need to provide detailed information about how data were collected and analyzed, how courses were situated within program and institutional contexts, and the characteristics of the school and community contexts in which teachers work.

Development of More Programs of Research More programs of research in teacher education wherein researchers consciously build on each other's work to pursue particular lines of inquiry are needed. Productive research programs allow researchers to pursue different aspects of particular problems and questions, accumulating and extending knowledge with each new study.

Attention to the Impact of Teacher Education on Teachers' Learning and Professional Practice Researchers should examine the impact of various aspects of teacher preparation programs and routes on teachers' learning, particularly their knowledge and beliefs and their professional practice in classroom and school settings. Especially important are studies that examine these issues over time and studies

that examine the connections among teacher preparation, teacher learning, teacher practice, and pupils' learning.

Research That Links Teacher Education to Pupil's Learning Much more research is needed about the relationships between teacher education components, pathways, and experiences, on one hand, and various aspects of pupil's learning, including but by no means limited to learning as measured by standardized test scores, on the other. We need both more studies that closely examine the outcomes of teacher education for pupils' learning and broader views of what constitutes pupils' learning in the first place. We also need studies that try to sort out the many factors, including teacher preparation, that influence pupils' growth over time.

Multidisciplinary and Mixed-Methods Studies To generate knowledge that is useful to policymakers and practitioners, we need multidisciplinary research, mixed-methods studies, and a multimethodological approach. Given the complexity of teacher education and its connections to various aspects of both teacher quality and student learning, it is clear that no single methodological approach can provide the knowledge we need. Rather, the field needs experimental and quasiexperimental designs, case studies, ethnographic analyses, and many other approaches to address the array of complex issues that are critical in the field.

Reliable Measures of Teachers' Knowledge and Skills Researchers need to use better and more consistent measures of teachers' knowledge and skills and how these are linked to teacher preparation programs and routes. Of particular importance are measures that connect particular teacher preparation components to the teaching of candidates and graduates of various programs, especially studies that address multiple aspects of teaching and use multiple indicators of performance.

Experimental Research Comparing Programmatic Alternatives in Terms of Outcomes Given the large size and scale of teacher education as well as the tremendous natural variation that occurs in programs across the country, there are many opportunities for experimental research designs that compare the impacts of program variations on teachers' knowledge, their professional practice, and pupils' learning.

Recommended Research Topics and Issues

The panel recommends that research be conducted on a number of topics that are especially important and amenable to productive research, but where either little research has been done, or what has been done has been limited to very small samples or short-term study. In addition, there are several important topics that are virtually unexplored.

Preparing Teachers to Help Close the Achievement Gap The status quo in teacher preparation has failed to prepare teachers to meet the needs of the increasingly diverse population of public school students, thus failing to close the gap in achievement and other school outcomes among White students and their peers of color. In particular, we need research on how to prepare teachers to work with English-language learners, how to work effectively with students with disabilities, how to recruit and retain a more diversified teacher workforce, and how to prepare teachers

for particular settings, such as urban and rural areas, where the achievement gap is particularly pronounced.

Contexts and Participants in Teacher Education Much more research is needed regarding the impact of the varying contexts and participants in teacher preparation. In particular, we need to know more about who is teaching and supervising teacher education courses and fieldwork experiences and what instructional strategies and texts and programs they are using. We also need more information about the conditions under which these are most effective.

Teacher Education Curriculum, Instruction, and Organization The panel recommends that more research be conducted about the conditions under which different conceptual and structural arrangements within teacher education programs are connected to various outcomes. In particular, we need research about the nature of the instructional interactions that occur in coursework and fieldwork contexts and the impact of these on teachers' learning and performance and on pupils' learning, including the impact of the racial and ethnic composition of participants.

Organizational and Structural Alternatives for Teacher Preparation There are many variations among programs and pathways into teaching in terms of organizational and structural arrangements, timing, and requirements before, during, and after designation as teacher of record with full responsibility for pupils' learning. Much more research is needed regarding the processes, experiences, and impacts of these variations.

Predictive Validity of Teacher Education Program Admission Criteria Current initiatives in teacher education are utilizing a variety of admissions criteria for programs, pathways, and alternatives. We need research that analyzes the predictive validity of these for effective teaching and retention in the teaching profession, particularly in urban, rural, and other hard-to-staff schools.

National Databases on Teacher Candidates, Teachers, and Reserve Pools The panel strongly recommends that national databases be established that include accurate longitudinal data on how the demographic and quality profiles of the nation's teachers are interrelated as well as on how teachers with different quality and demographic characteristics are prepared for teaching and where and whether they enter, stay, or leave the teaching profession.

Research on Teacher Preparation in Various Subject Areas We need more research on the impact of preparation in various subject areas on teachers' performance and knowledge as well as on their pupils' learning. In particular, we need to know the impact of arts and sciences study and engagement on teachers' performance and knowledge and on their pupils' learning. In particular, we need research that disentangles the effects of programs from those of subject areas.

Systematic Analyses of Alternative Preparation Programs and Routes The panel recommends an array of research designs intended to explore the impacts of clearly identifiable alternative routes, programs, and organizational structures in teacher education. Although this array could include randomized trials, the panel recommends that various forms of matching and controls are better alternatives for

research in teacher education, because random assignment of pupils to teachers with no preparation carries important ethical considerations.

In-Depth Case Studies of Programs Although expensive and complicated to carry out, the panel recommends that more in-depth, large-scale, and multi-institutional case studies of teacher education programs and components are needed. Targeted resource allocation would make this kind of study possible.

Research That Links Preparation With Practice and Pupils' Learning Although it is exceedingly complex and difficult to do, the panel recommends that a series of well-designed, theory-grounded studies examine the complex links among teacher preparation programs and contexts, teacher candidates' knowledge growth, teachers' professional practices, and pupils' learning within the contexts of schools and classrooms.

Unexplored Topics Related to Teacher Preparation There are many important aspects of teacher preparation that are virtually unexplored in the research literature. Although many small-scale studies during the last decade focused on teacher candidates' beliefs, there has been almost no research that examines connections between those beliefs and graduates' performance as teachers, let alone the connections among beliefs, teacher performance, and the performance of their pupils. Research is needed that systematically explores the relationships among teacher candidates' beliefs, attitudes, skills, and practices and pupil's learning opportunities, attitudes, achievement, and growth. In addition, research is needed on the impact of subject matter and general education preparation of teachers, the role of psychological and social foundations, and the impact of these on teachers' and pupil's performance. We also need to know how different policies and accountability processes affect teacher education's impact on pupils' learning. Although there are major national reform initiatives calling for greater university responsibility for teacher preparation and greater engagement of the arts and sciences in teacher preparation, there is virtually no research in this area. In addition, there has been little research on the impact of different accountability systems and different state and federal policies on teacher education outcomes.

A Needed Infrastructure for Research on Teacher Education

To develop the body of research that is needed to inform policy and practice in teacher education, a number of investments in infrastructure need to be made.

Funding and Other Resources for Research on Teacher Education Especially in light of the fact that much of teacher education research has been conducted by individuals using small samples, the panel recommends that federal and other funds be provided so that large-scale and other kinds of systematic studies can be carried out. This is needed in areas other than mathematics and science. Federal and foundation funding should be targeted for specific areas with the potential for important results.

Preparing Educational Researchers and the Peer-Review Process The panel recommends that the preparation of researchers in the area of teacher education be made a top priority for foundations and government training grants so that researchers understand the complexity and interdisciplinarity of research in this area

and gain the methodological, substantive, and theoretical education needed to carry out productive research. In addition, the panel suggests that rigorous standards for evaluating research on teacher education be established by the educational research community and applied in the peer-review process for refereed journals as well as for books. In particular, clear criteria need to be established for describing the teacher education students, components, and policy contexts under study as well as describing the research protocols, instruments, and terms that are used.

Research Partnerships The panel recommends the development and support of research partnerships and collaborations that cut across institutions and involve focused assessment agendas related to teacher preparation and desirable outcomes, especially pupil learning outcomes. In addition the panel recommends that the databases generated through self-studies used for state program approval and national accreditation be linked and made available to researchers engaged in national assessments, comparisons, and evaluation studies. Comprehensive national datasets on teacher education students, teacher educators, curriculum, and instruction would allow analysis of the impact of components, pathways, and learning opportunities on pupil learning and other desirable school and pupil outcomes. Research partnerships that pool resources and researchers can alleviate the limitations of individual researchers studying single courses or program aspects and move toward understanding the larger patterns involved in teacher education and various outcomes.

The syntheses developed by the AERA Panel on Research and Teacher Education point to many promising lines of research that can be built on to expand what we know about the impact of various kinds of teacher preparation and the impact of various local and larger policy decisions. We are at a turning point, however, with more attention than ever before focused on the recruitment, preparation, and retention of highly qualified teachers. As a field, we need to develop a rich portfolio of studies that addresses many of the most important questions about teacher education from multiple perspectives and uses many different research designs. The panel recommends that some of the most promising places to start are the construction of accurate national databases, strategic investments to support both large-scale studies and indepth case studies, and significant improvement in the peer-review process and the preparation of teacher education researchers.

REFERENCE

- Wilson, S., Floden, R., & Ferrini-Mundy, J. (2001). Teacher preparation research: Current knowledge, gaps and recommendations. Washington, DC: Center for the Study of Teaching and Policy.