

What Makes a Teacher EFFECTIVE?

a summary of key
research findings on
teacher preparation

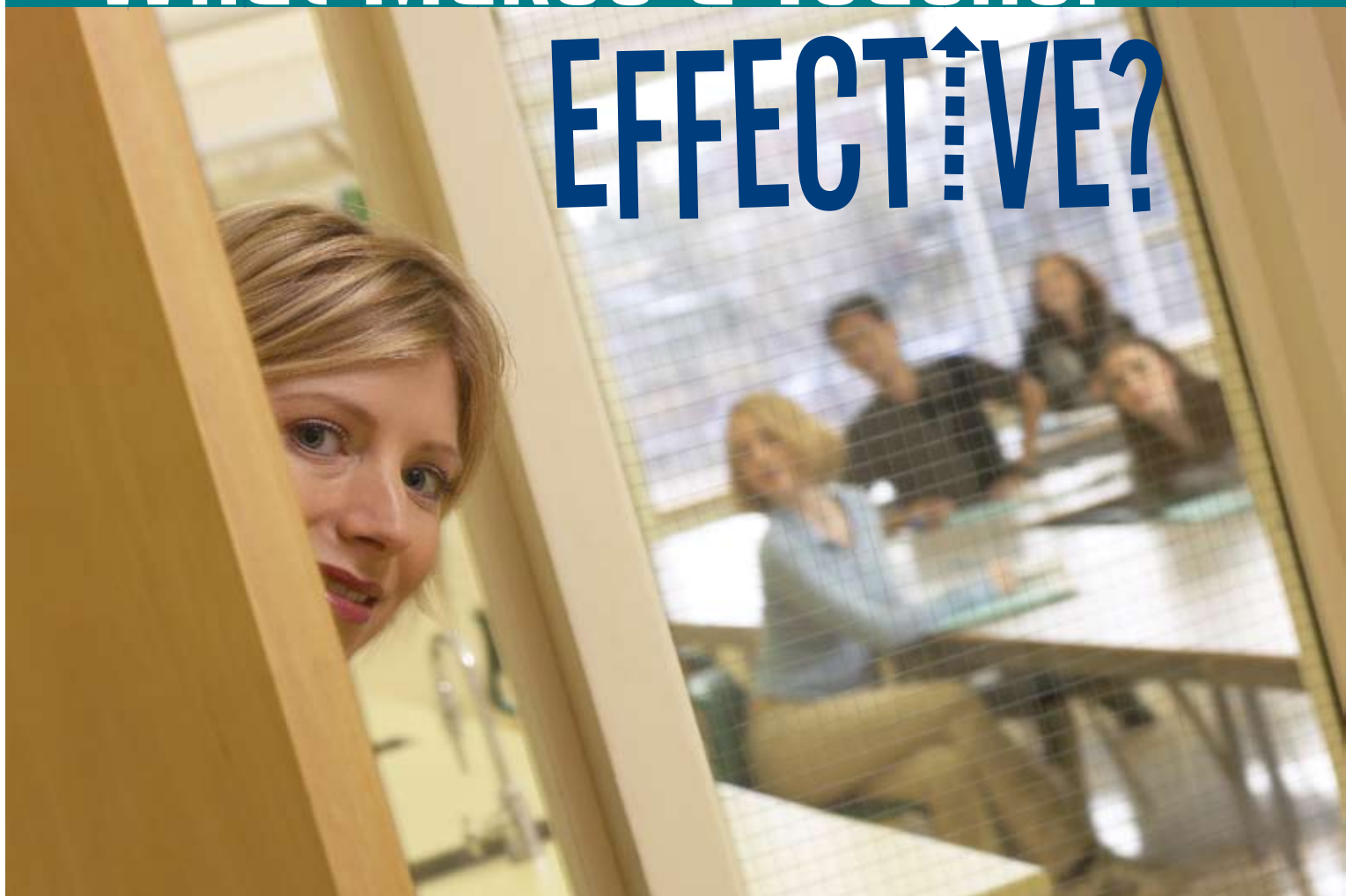
NCATE

National Council for Accreditation of Teacher Education

The Case for High Quality Teacher Preparation:

RESEARCH EVIDENCE • INDUSTRIALIZED NATIONS' EXPERIENCE

What Makes a Teacher EFFECTIVE?



Well-prepared teachers are more likely to remain in teaching...

What Research Says About Teacher Preparation

What makes a teacher effective? Research indicates that teacher preparation/knowledge of teaching and learning, subject matter knowledge, experience, and the combined set of qualifications measured by teacher licensure are all leading factors in teacher effectiveness.¹

Recently, some critics have questioned the role of teacher preparation as a key to teacher effectiveness. It's time to separate fact from fiction, truth from myth about teacher preparation. Most of the research findings on pre-service teacher preparation are consistent with common sense and the experience of those in the classroom. Here are five key findings from the existing research on teacher preparation:

- 1) Teacher preparation helps candidates develop the knowledge and skill they need in the classroom
- 2) Well prepared teachers are more likely to remain in teaching
- 3) Well prepared teachers produce higher student achievement
- 4) Leading industrialized nations invest heavily in pre-service teacher preparation
- 5) NCATE makes a difference in teacher preparation

Available research supports the idea that high quality teacher preparation is important. Well prepared teachers outperform those who are not prepared. No credible research reveals any advantage to students of having teachers without preparation.



The Issue

Substitute Test Results for Teacher Preparation?



Some policymakers have recently advocated that a passing score on a test of subject matter knowledge and a background check are all that is needed to become an effective teacher. Moreover, some policymakers have embraced approaches that permit teachers with no preparation in pedagogy or child/adolescent development to be classified as “highly qualified,” if they pass a test of subject matter knowledge (usually a licensing exam).



New studies refute this idea. Daniel Goldhaber, University of Washington researcher, says that “licensure test performance is clearly not a silver bullet.”² Licensing tests are usually paper and pencil tests of subject matter knowledge and on occasion, pedagogical knowledge.

This finding argues for a much more comprehensive system for assessing teachers to determine their preparedness to enter the classroom as sole practitioners.



Two components are critically important in teacher preparation: *teacher knowledge of the subject* to be taught, *and* knowledge and skill in *how to teach* that subject. Research and common sense tell us that subject matter knowledge is necessary for effective teaching. But there is a second part of the equation: knowledge and skill in how to teach is also a must. Effective teachers understand and are able to apply strategies to help students increase achievement. They understand and apply knowledge of child and adolescent development to motivate and engage students. They are able to diagnose individual learning needs. They know how to develop a positive climate in the classroom in order to make it a stimulating learning environment.

Just because an Einstein knows the subject is no guarantee that he or she will be effective in the classroom.

While content knowledge is important and necessary, it alone cannot determine whether the teacher is able to teach so that students learn. That is why the National Council for Accreditation of Teacher Education (NCATE), the professional teacher preparation accrediting body, requires the parallel development of teaching knowledge that is specific to the content being taught, as well as general pedagogical knowledge and knowledge of child and adolescent development as applied to teaching.

Following are some key converging findings from research on teacher preparation—a compilation of research from the nation’s leading scholars, along with references to their work. The works cited represent the collective knowledge base on teacher preparation today.

The Research Findings

Finding 1: High Quality Teacher Preparation Helps Candidates Develop Essential Knowledge and Teaching Skill

THE NATIONAL ACADEMY OF EDUCATION


The National Academy of Education, a blue-ribbon group of education scholars, asked its Committee on Teacher Education to answer the question: what do new teachers need to know and be able to do? The resulting report, *Preparing Teachers for a Changing World*, sets forth a common core of knowledge and skills that a beginning teacher should have.

Critics of education have used disagreements about standards and best practice to claim that since there was little consensus, education schools were marginal in their effectiveness. The National Academy of Education report has helped dispel that argument. With this volume, experts across the country came together across philosophical lines and reached general agreement on the foundational knowledge and the skills that new teachers need. The report includes an 85-page bibliography of research.

However, the knowledge base in all professional fields changes over time. With advances in educational research, and the rapidly changing demographics of students in America, the knowledge base in education will never be ‘complete’ or finished. Instead it will always be a work in progress, as it is in all other professions. Professional standards strive to incorporate research and best practice as it is known currently.

The scholars of the Academy

- 1) conclude that “there is a base of verifiable evidence [and] knowledge”...on “effective teaching” and outline it in their report.³
- 2) recognize the need for adequate preparation in understanding and applying the knowledge base: “Practice must be based on what is known by the profession as a whole...which requires of professionals that they be aware of the current knowledge base” (15–16).
- 3) Recognize that effective teachers—those who know the knowledge base on teaching and learning and are able to apply it—help raise student achievement: “...measuring the value added by pedagogical training ...[is] a strong predictor of student achievement gains”(26).



Rachel Roth-Haverland, a high school junior from Royal Oak, Michigan said she’s felt the frustration of having a teacher who knew the subject well, but just couldn’t explain it to all students. She dropped out of Royal Oak’s Kimball High School in January, in part because she became overwhelmed in her precalculus class. She said her math teacher tried to explain the concepts...but just couldn’t connect with her. “I felt like he was trying to explain Latin,” Roth-Haverland said.

The Detroit News, Sunday, April 16, 2006

“I felt like, ok, I did the workshops; I know science; and I care about these kids. I had the motivation, but I didn’t have the skill.... I just didn’t have the tools, and I didn’t even know I needed them before I went in [to the classroom].... I wasn’t equipped to deal with it.”

Recruit to short-term induction program who later went to medical school. In Darling-Hammond, *Powerful Teacher Education*. San Francisco: John Wiley & Sons. 30.

- 4) recognize that content knowledge alone does not adequately prepare teachers for the challenges they will face in today's classrooms, where "teachers need to be prepared for learning differences and disabilities that are prevalent" (36).

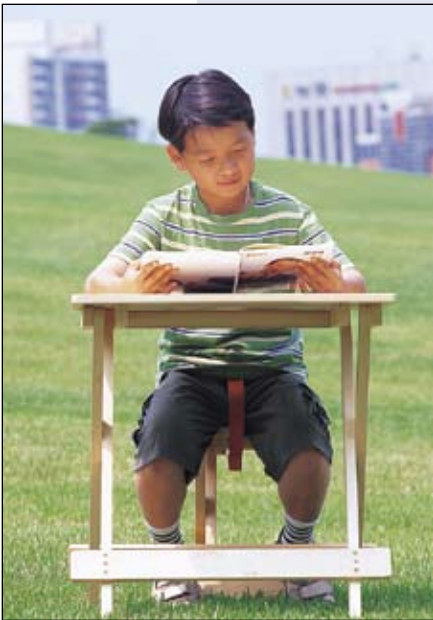
Alignment with National Professional Standards

An analysis of the common core of knowledge in the research report finds compatibility and correlation with NCATE standards, which are used by over 700 schools of education, producing two-thirds of the nation's new teachers each year.

THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

An American Educational Research Association Panel of nationally recognized scholars analyzed the empirical evidence relevant to practices and policies in preservice teacher education in the U.S. Findings specific to education programs that produce successful teachers include:

- 1) collaborative arrangements between university programs and local school districts—known as *professional development schools* (PDSs)—have a positive impact on K–12 students in measurable ways such as increases in standardized test scores.⁴
- 2) planned, guided and sustained interactions with pupils within early field and student teaching settings is important (316).
- 3) seven of eight studies reviewed found positive correlations between licensure and student achievement, especially in mathematics education. AERA's conclusion is that the available evidence favors licensure in the field gained by university-based teacher preparation, as an indicator of effective teaching and student achievement (614).



The Panel noted that "research on teacher education has made progress in terms of quantity and quality over the past 30 years, but more progress is imperative" (336). The Panel notes that more research is needed in every area of teacher preparation. Few empirical studies met the Panel's criteria for inclusion in its review of research on pedagogical approaches (426). The Panel cited lack of funding for complex studies as an impediment to answering some of the research questions it sought to answer (336).

Review of Research on Professional Development School (PDS) Outcomes

AERA's finding on PDSs corroborates a review of research conducted by Lee Teitel on the effectiveness of PDSs. A growing body of research reveals increases in P–12 student achievement and positive outcomes for educators in PDSs.⁵



NATIONAL RESEARCH COUNCIL

The National Research Council's Division of Behavioral and Social Sciences and Education has published several in-depth research reports which point to the necessity for adequate teacher preparation. The summaries reinforce each other. Effective teaching requires teachers with a deep knowledge of the subject, an understanding of how people learn, and an ability to use principles of learning and teaching to stimulate student learning and achievement.

A video of Harvard graduates answering incorrectly when asked the scientific basis for the changing of the seasons illustrates how students' mistaken ideas may persist even after teaching occurs. "For example, students at a variety of ages [including Harvard graduates] persist in the belief that seasons are caused by the earth's distance from the sun rather than by the tilt of the earth....Effective teaching elicits pre-existing understandings of the subject matter."⁶

Only then can teachers address misconceptions. This process takes work, expertise, and knowledge of the teaching/learning process.

CENTER FOR THE STUDY OF TEACHING AND POLICY

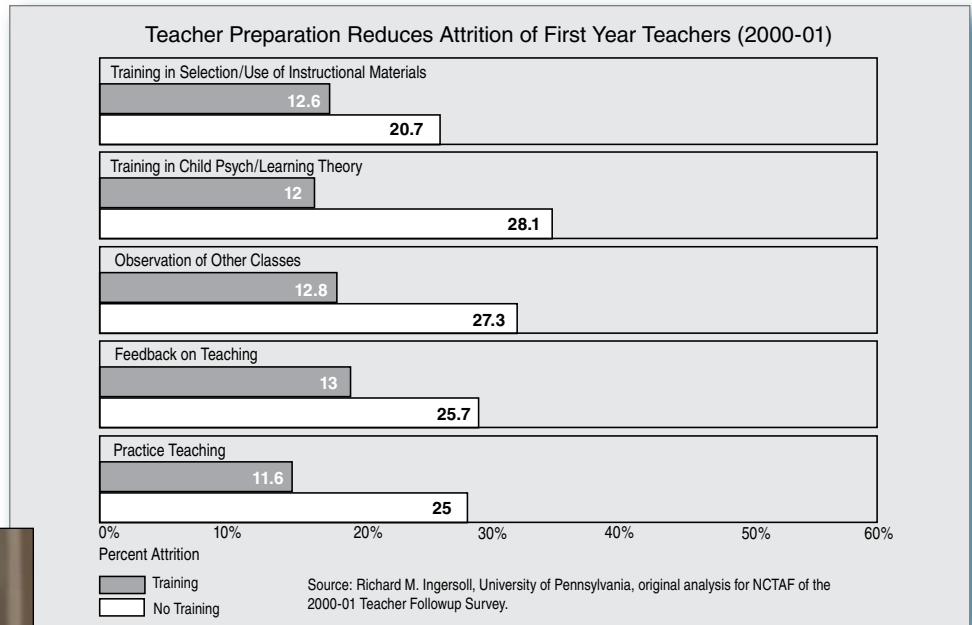
This report, commissioned by the U.S. Department of Education, summarizes what research says about five key issues in teacher preparation: subject matter preparation, pedagogical preparation, clinical training, pre-service teacher education policies, and alternative certification. The report analyzed fifty-seven studies that met specific research criteria and were published in peer-reviewed journals.

On subject matter, research shows a positive connection between teachers' preparation in subject matter and their performance in the classroom. The report also says that the way subject matter is taught for those entering teaching may need to be restructured to give them a better understanding of concepts. The report concludes "the solution is more complicated than simply requiring a major or more subject matter courses." The example of mathematics is used.⁷

Regarding the 'how to teach,' or pedagogical preparation, subject specific methods courses in education have a positive impact (2). The report concludes "the pedagogical aspects of teacher preparation matter, both for their effects on teaching practice and for their ultimate impact on student achievement"(2). In terms of clinical practice, the report notes that "in field experiences with focused, well-structured activities, significant learning can occur"(3).

EDUCATION COMMISSION OF THE STATES

In 2003, ECS published a report on teacher preparation. Its panel reviewed 92 studies out of 500 which were considered for inclusion. ECS concluded that though knowledge of how to teach particular subjects is important, content knowledge alone "does not necessarily develop understanding of how...concepts related to that subject are best learned."⁸ Nonetheless, the report questions the utility of pre-service preparation.



Finding 2: Teacher Preparation Increases Beginning Teacher Retention

Well prepared graduates are more likely to remain in teaching and contribute to the development of a strong professional learning community in the schools they serve. Ingersoll finds that when teachers are prepared according to six key elements, attrition of first year teachers is cut in half.⁹ The rates of beginning teacher attrition are almost half the level found in beginning teachers who have not had this kind of preparation.

Ingersoll's findings reinforce an earlier study by Shen. Shen examined attrition rates among 1,702 teachers who had graduated from college within five years, and found that 34 percent of the sample had left teaching. In comparing teachers with pedagogical training and those without it, he found that teachers with no training were more than three times as likely to leave teaching during any given year. Those who completed student teaching, acquired certification, and participated in induction were 111 percent more likely to stay in teaching than those who had no training.¹⁰

In addition, reinforcing both Ingersoll and Shen's findings, Boe et al. analyzed data from the *Schools and Staffing Survey* and found that teachers with full certification (including preparation in content and pedagogy) were less likely to leave teaching than those who were only partially certified.¹¹

Finding 3: High Quality Teacher Preparation Makes a Difference in Student Achievement

Research related to teacher preparation and individual student achievement

Studies on unprepared and underprepared teachers versus fully prepared teachers consistently show that the students of teachers who are prepared show stronger learning gains.

Goldhaber analyzed ten years of student test scores linked to individual classrooms and teachers. He examined over 700,000 student records in grades 4–6, and the licensing records for almost 24,000 teachers.

Goldhaber found that teacher education makes a difference. He concludes that “students of teachers who graduate from a North Carolina-approved training program outperform those whose teachers do not” [i.e., those who get a degree from an alternative state program or a program from outside the state].¹² The effect is significant though not large. It does mean that schools of education in North Carolina are effective. A distinguishing characteristic of North Carolina institutions is a 1980s state requirement that all be NCATE accredited; only two states have had such a longstanding requirement.

Studies on underprepared teachers working with at-risk students vividly demonstrate how we are failing our most vulnerable students. Researchers, after randomly assigning students in 17 high-poverty schools to a Teach for America (TFA) teacher or a non-TFA teacher,



administered a standardized test. They then compared the performance of the students of TFA and non-TFA teachers.¹³ Although initially claims were made that TFA teachers were more effective than the other novice teachers, an analysis by the Center for Teaching Quality

(formerly the Southeast Center for Teaching Quality) reached a different conclusion. The Center demonstrated that the results showed that neither TFA nor the other novice teachers in the control group were able to substantially or significantly increase student achievement. The Center also brought to light that the novice control group teachers actually had *less* teacher preparation than their TFA counterparts in the study (all TFA teachers had at least four weeks of student teaching, but over half the novice control group teachers had no student teaching experience at all).¹⁴

The Center for Teaching Quality noted in its analysis: “the findings illustrate the failed teaching policies that plague our nation’s urban schools.” The student achievement of both TFA teachers and the control group was “abysmal.” For example, the achievement scores in reading for the students in the sample went from the 13th to the 14th percentile for the control group and increased at the same rate (from the 14th percentile to the 15th percentile) for TFA teachers. Thus only 15 percent of the students were reading at an acceptable level. The percentage was about the same in math—both unacceptable teaching outcomes, and *both groups of students were taught by individuals not adequately prepared.*



Unprepared teachers often end up blaming the students for their own lack of skills.

“I knew if I wanted to go on teaching there was no way I could do it without training. I found myself blaming my kids because the class was crazy and out of control, blaming the parents as though they didn’t care about their kids. Even after only three-fourths of a semester [in a teacher preparation program] I have learned so much that would have helped me then.”

A recruit who later entered a California teacher preparation program

Darling-Hammond, (2005), “Powerful Teacher Education”(14).



Research related to Teacher Preparation and Student Performance at the School Level

School-level studies have found significant relationships between the percentage of teachers on emergency permits and student scores on state exams. A few are mentioned here, but many studies support these findings.¹⁵

Fetler notes, “The experience and education of mathematics teachers predicts student achievement. Schools with more experienced and more highly educated mathematics teachers tended to have higher achieving students. Schools with higher percentages of teachers on emergency permits tended to have lower achieving students.”¹⁶

Goe had similar findings. “Generally, the more emergency permit teachers there are in a school, the lower the school’s achievement. This phenomenon is examined in the context of other contributors to student achievement, such as socio-economic status and school size....Researchers and policymakers can now clearly connect student achievement (at the school level) with a number of other variables, including the percentage of underqualified teachers. Seeing these connections...can be shocking.”¹⁷

In a study of fully versus alternatively prepared teachers in New York City, fully prepared teachers outperformed those who were alternatively prepared in the first years of teaching. The students of alternatively prepared teachers showed smaller initial student gains in math and English language arts than the gains of students who had fully prepared teachers.¹⁸ Differences between students of fully prepared and alternatively prepared teachers diminished as the teacher cohorts matured. This is not coincidental; the alternatively prepared teachers in New York City are required to gain master’s degrees to gain professional knowledge about teaching and learning, and complete the same licensure requirements as those teachers who were fully prepared upon entry.

The experience and education of mathematics teachers predicts student achievement. Schools with more experienced and more highly educated mathematics teachers tended to have higher achieving students.

In a study on mathematics teaching, Goldhaber concluded that the effects of teacher licensure on student achievement is greater than that of a content major in the field, suggesting that what licensed teachers learn in methods/education coursework/practice adds to their abilities in the classroom. “We find [that] students of teachers who are either not certified in their subject...or hold a private school certification do less well than students whose teachers hold a...certification in math.”¹⁹

Likewise, using data for more than 2,800 students, David Monk found not only that content preparation was positively related to student achievement in math and science, but courses in methods of teaching math and science also shared the same positive relationship to student achievement. In mathematics, additional teaching methods courses had “more powerful effects” than additional preparation in the content area. Monk concludes “it would appear that a good grasp of one’s subject area is a necessary but not a sufficient condition for effective teaching.”²⁰

Research Related to Teacher Preparation and Student Performance at the District and State Levels

A district level study shows that fully licensed teachers consistently produce significantly stronger student achievement gains than do unlicensed teachers. The study found that Teach for America recruits negatively affect student achievement relative to licensed teachers, and perform about as well as other unprepared teachers.²¹ TFA recruits who became licensed did about as well as other licensed teachers in supporting student achievement gains, indicating that effectiveness depends substantially on preparation for teaching.²² However, the vast majority of TFA recruits in the study had left teaching by their third year, just as they became more effective.

Examining state policies that potentially improve teacher preparation, Darling-Hammond also found that measures of teacher preparation and certification are by far the strongest correlates of student achievement in reading and mathematics, both before and after controlling for student poverty and language status.²³ The analysis suggests that policies adopted by state regarding teacher education...may make an important difference for teaching and learning in the state (1).





Finding 4: High Standards for Teacher Preparation in Leading Industrialized Nations Lead to High Student Achievement

International surveys of student achievement have sparked interest in the educational systems of other countries, since their students often outperform students in America. In 2002, the Council for Basic Education undertook a comparative analysis of teacher preparation, induction, roles, and rewards in nine industrialized nations including the U.S.

All of the countries surveyed require formal undergraduate or graduate training in content and pedagogical knowledge, and all require student teaching/practicum experiences prior to licensing. Several of the other countries have significantly more rigorous requirements than the U.S.

The report concludes, “the emphasis [in other countries] remains on teacher training and support. Teachers are required to know more and to be well qualified. In turn, “this emphasis may be a reason for stronger student achievement and less public concern with teacher effectiveness” (23).

Teacher Preparation in Other Leading Industrialized Nations

Other industrialized nations see the benefit of rigorous pre-service preparation programs.



FRANCE

Three years of study in the discipline to be taught, followed by two-year subject area (content-pedagogy) study at a teacher training institution. New teachers are paired for two years with a senior teacher.²⁴



GERMANY

A major in two or more subject areas plus pedagogy for secondary teaching; a major in one subject area plus pedagogy for elementary. New teachers must complete two years of student teaching and complete a second examination on teaching ability and classroom performance. New teachers have a reduced class schedule, participate in observation and assisted teaching opportunities, and receive regular professional development (9–11).



JAPAN

A compulsory year-long induction program after preparation. Induction includes school-based mentoring for a minimum of 90 days, lectures and practical training sessions for at least 30 days, and a nine-day retreat at regional professional development centers (8).



Finding 5: NCATE Makes A Difference in Teacher Preparation

NCATE is the profession's mechanism for supporting high quality teacher preparation. It is the teaching profession's largest collective organization, sustained by more than 30 member organizations that represent millions of Americans.

Professional accreditation standards embody the consensus of the field on what is important in teacher preparation today. NCATE sets professional standards for P-12 educator preparation and determines which schools of education meet them. The immediate outcome is the accreditation of those schools of education which meet the standards; the ultimate outcome is qualified educators who are able to help students learn. NCATE's structure is designed to reach out to all segments of the professional education and policymaker community, and to the public as it accomplishes its mission.

Impact on Teacher Candidates

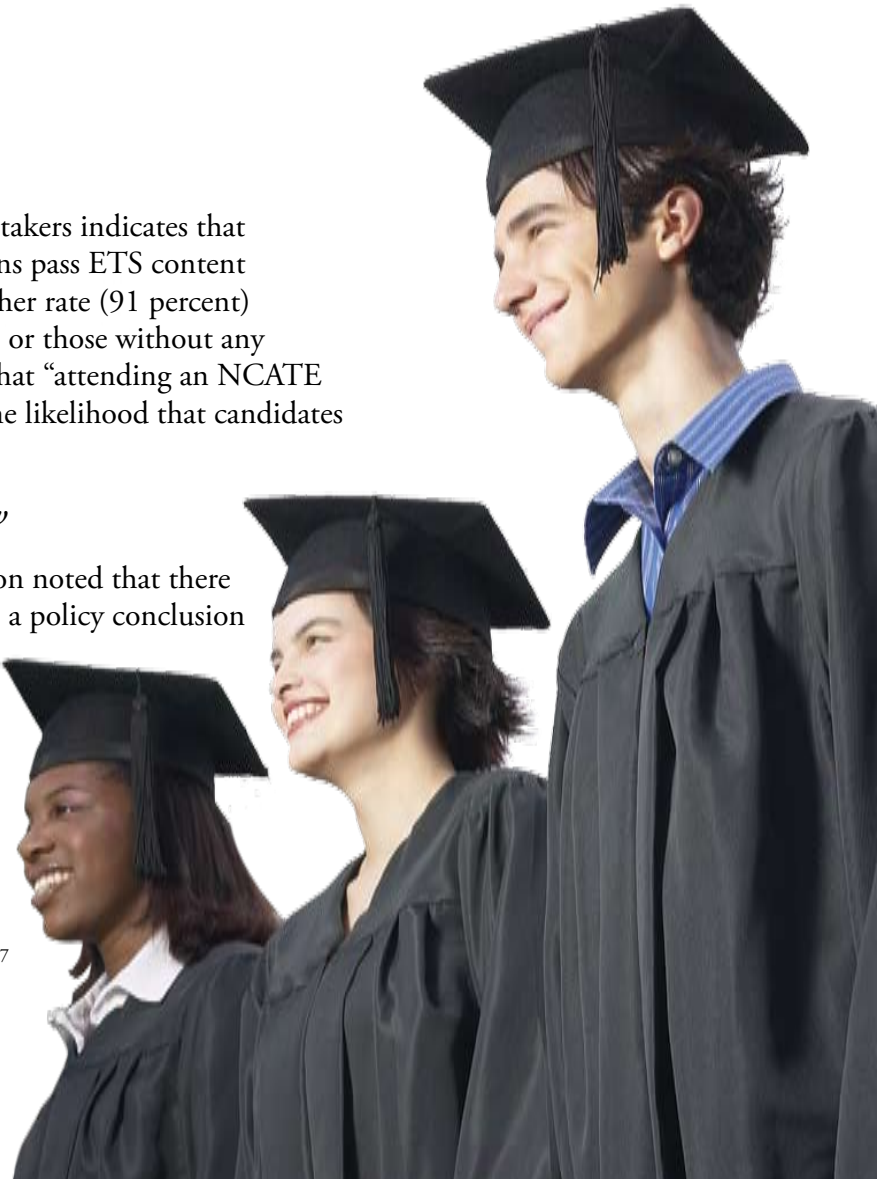
ETS Study

An ETS study of 270,000 PRAXIS II test takers indicates that graduates of NCATE accredited institutions pass ETS content examinations for teacher licensing at a higher rate (91 percent) than do graduates of unaccredited colleges or those without any preparation for teaching. ETS concludes that “attending an NCATE accredited institutions seems to increase the likelihood that candidates will meet state licensing requirements.”²⁵

ECS Study and Darling-Hammond review

The 2003 ECS study on teacher preparation noted that there was no available research on which to base a policy conclusion regarding teacher preparation accreditation.²⁶

However, Darling-Hammond found that the strongest predictor of the percentage of well qualified teachers (both a major and full certification) in a state is the percentage of teacher education institutions in a state that meet national accreditation standards through NCATE.²⁷





Members of the established professions in the United States, such as medicine, nursing, engineering, physical therapy, social work, architecture and law, graduate from an accredited program of study, pass rigorous examinations, and continue to receive professional development on the job.

Center for the Study of Teaching and Policy

This report commissioned by the U.S. Department of Education, whose findings on pedagogy are cited in Finding 1, examined four studies focused on successful policies and strategies to improve teacher education. The authors cite the findings of the ETS study and also the Darling-Hammond study on state policy evidence, noted in Finding 3. The authors note that Darling-Hammond's report "demonstrated a statistically significant correlation between the percentage of colleges in a state that were NCATE accredited and the percentage of teachers in the state who are well qualified (have full certification and a major in their field)..."²⁸ Wilson et. al say that Darling-Hammond's study offers "provocative evidence" of the effects of professional accreditation and "suggests a direction for further research"(25).

Established professional fields in the United States rely on professional accreditation and state licensing as major quality assurance mechanisms. Accrediting bodies in other professions have not been the subject of studies, since accreditation is a requirement for licensure—it is a professional norm long ago accepted by the states. Virtually all preparation programs in the established professions undergo accreditation.

Williams v. California Case

In the late 1990s, nearly 50 percent of entering teachers in California did not have a teaching credential. These teachers were hired in districts serving the neediest students. This figured prominently in a school lawsuit, *Williams v. California*, which charged that many students were deprived of their right to an education [due to] underqualified teachers.

[The] teachers asserted that they did not feel adequately prepared to teach...They had a difficult time with curriculum development...and classroom management. All...ascribed their inadequacy [to the lack of] a formal teacher education program before entering the profession. [*Williams v. California*, Malabed Deposition, v.2, 308:19–309:17].



Darling-Hammond, *Powerful Teacher Education*. (2005). 25.

“My impeccably planned morning went smoothly for a grand total of eight minutes...then chaos ensued. We entered into negotiations. Would they work for a prize? How about a ten minute break afterward?...I stood in a classroom wearing ugly, rubber-soled shoes, shouting at eleven year olds. I felt I had aged twenty years in two months.... Who ever thought this could be done by anyone, and without any training?”

Christina Asquith, former journalist for the “Philadelphia Inquirer,” who taught in Philadelphia for a year.

The Emergency Teacher, Washington, D.C., West Parley Press, 2005. pp. 47; 68–70.

A study on teacher preparation accreditation per se would be confounded by state use of NCATE’s standards. Most of the states have adopted or adapted NCATE’s unit standards as their own state standards. Almost all states have either adopted, adapted, or aligned their program standards with NCATE’s national program standards for the various teaching disciplines.

More research on assessment and pedagogical approaches are needed and NCATE could use the results to help guide its accreditation system.

Summary of Practices

Mitchell provides a systematic investigation into how NCATE accredited institutions met NCATE standards relating to (1) candidate subject matter and pedagogical knowledge and skills, and (2) the development of assessment systems. The report provides summaries of key practices and assessment techniques used by NCATE accredited schools of education to provide data on candidate knowledge and skills.²⁹

Survey of Accredited Institutions

In 2005, Mitchell conducted a survey of deans and coordinators in the NCATE system. Seven hundred fifty eight individuals responded, for a total response rate of 66 percent.³⁰ Of those that responded:

- **95 percent** of NCATE deans and coordinators reported that their candidates benefit from attending an NCATE accredited teacher preparation institution
- **93 percent** say working with the NCATE standards led to better alignment between standards, curriculum, instruction, and assessment
- **83 percent** say working with the NCATE standards has improved the clinical practice component of preparation
- **84 percent** say working with the NCATE standards has led to more attention to candidate knowledge/skill in helping all students learn.



Conclusions and Policy Recommendations

The research findings from the sources cited present solid evidence that high quality teacher preparation produces increased student achievement. Many of the works cited are exhaustive compendiums of research that span the current collective knowledge base on teaching and learning.

The research and facts presented in this booklet support the following:

- 1) **High quality pre-service teacher preparation provides beginning teachers with the knowledge and skills** needed for effective teaching in today's heterogeneous classrooms. The findings from the research are clear.
- 2) Programs that circumvent high quality pre-service teacher preparation place the beginning teachers—and the students they serve—at a disadvantage. Many unqualified beginners leave the field; those who remain and acquire professional knowledge and skills through required master's programs eventually catch up. However, in the meantime, vulnerable children suffer and the achievement gap persists.
- 3) Based on the conclusions above, high quality pre-service preparation should enjoy strong support from federal, state and local policy.
- 4) All preparation programs—not just those being studied for research purposes—should provide evidence that they prepare candidates with the foundational knowledge and skills to positively affect student learning, or they should be closed. NCATE accredited institutions must provide such evidence.
- 5) **All pathways to teaching should undergo review according to national standards.** Unless there are agreed-upon standards, there is no way to determine whether candidates following alternate pathways measure up. NCATE is the teaching profession's quality assurance mechanism and is prepared to review all preparation programs.
- 6) **Professional development schools should become the norm for teacher induction.** Teachers, like other professionals, do not emerge from universities and colleges as fully formed professionals—but they do have a foundation of knowledge on which to base their practice. Under competent supervision, they become increasingly effective.

- 7) **To help solve the most egregious failure of our current system, many hard-to-staff schools should be re-configured as professional development schools.** Such schools should be staffed by master teachers who have a track record of successful teaching in similar settings. States and districts should coordinate approaches and form partnerships with teacher preparation programs so that many teacher candidates gain clinical experience in hard-to-staff schools. PDSs increase the ratio of adults to students in hard-to-staff classrooms in a setting that helps students and novice teachers learn.
- 8) **More comprehensive assessments of teacher knowledge and performance are needed** for teacher licensing. Foundations and the federal government should invest in the development of assessment instruments to strengthen state licensing.

Findings from the research on teacher preparation are consistent with educators' experience and common sense. After all, school districts hire only qualified teachers when they can. Only districts that cannot attract qualified teachers hire unqualified personnel. Much more empirical research is needed, but the research that we do have supports the idea that high quality pre-service teacher preparation is important.

All members of the established professions in the U.S. graduate from an accredited program of study, pass rigorous examinations, and continue to receive professional development on the job. Likewise, other developed nations provide for extensive teacher education prior to entry to the classroom and thereafter. America owes its children no less.



References/Resources

1. Darling-Hammond, L. *Powerful Teacher Education: Lessons from Exemplary Programs*. (2006). San Francisco: John Wiley and Sons, Inc. 21.
2. Goldhaber, D. *Everybody's doing it, but what does teacher testing tell us about teacher effectiveness?* <http://www.crpe.org>. Center on Reinventing Public Education. Paper presented at the AERA annual meeting April 4, 2006, 31. (pdf article on crpe.org website. Search by author or title on website).
3. Darling-Hammond, L. and Bransford, J. (Eds.) (2005). *Preparing Teachers for a Changing World: What Teachers Should Learn and Be Able to Do*. National Academy of Education, Committee on Teacher Education. San Francisco : Jossey Bass, Inc., 12. www.josseybass.com
4. Cochran-Smith, M. and Zeichner, K. M. *Studying Teacher Education: The Report of the AERA Panel on Research and Teacher Education*. (2005). American Educational Research Association. Lawrence Erlbaum Associates, Inc., 329. www.erlbaum.com
5. Teitel, L. (2004). *How Professional Development Schools Make A Difference: A Review of Research*. 2nd Ed. Revised. Washington, D.C. National Council for Accreditation of Teacher Education. www.ncate.org. Click on Publications.
6. Schneps, M. and Sadler, P. *A Private Universe: Minds of our Own*. Harvard-Smithsonian Center for Astrophysics, as noted in Bransford, J.D., Brown, A.L., and Cocking, R. R., Eds. (2000). *How People Learn: Brain, Mind, Experience, and School*. Committee on Developments in the Science of Learning, National Research Council. Washington , D.C., National Academies Press. 15–16. www.nap.edu

Additional relevant National Research Council publications:

Donovan, M. S., and Bransford, J.D., Eds. *How Students Learn: History, Mathematics, and Science*. (2005). Committee on How People Learn, A Targeted Report for Teachers, Center for Studies on Behavior and Development, National Research Council. Washington , D.C.: National Academies Press. www.nap.edu
National Research Council publications are written by Committees “selected for their special competencies and with regard for appropriate balance” How People Learn: copyright page.

How People Learn: Bridging Research and Practice. (1999). M. Suzanne Donovan, John D. Bransford, and James W. Pellegrino, Editors; Committee on Learning Research and Educational Practice, National Research Council, National Academies Press. www.nap.edu

7. Wilson, Suzanne M., Floden, Robert E., and Ferrini-Mundy, Joan. *Executive Summary: Teacher Preparation Research: Current Knowledge, Gaps, and Recommendations*. (2001). Center for the Study of Teaching and Policy, University of Washington in collaboration with Michigan State University, 2. Prepared for the U.S. Department of Education's Office for Educational Research and Improvement. The report is available at <http://depts.washington.edu/ctpmail> or google the Center for the Study of Teaching and Policy. Publications are listed in alpha order.

8. Allen, Michael. *Eight Questions on Teacher Preparation: What Does the Research Say? A Summary of the Findings* (2003). Education Commission of the States, 1.
 9. Ingersoll, R. University of Pennsylvania. Original analysis for NCTAF of the 2000–01 Teacher Followup Survey. In *No Dream Denied*, January 2003. National Commission on Teaching and America's Future. 84. www.nctaf.org
 10. Shen, J. (2003). New teachers' certification status and attrition pattern. A survival analysis using the Baccalaureate and Beyond Longitudinal Study 1993–97. Paper presented at the AERA annual meeting, Chicago.
 11. Boe, E.E., Bobbitt, S.A., Cook, L.H., Whitener, S.D., & Weber, A. L. (1997). Why didst thou go? Predictors of retention, transfer, and attrition of special and general education teachers from a national perspective. *The Journal of Special Education*, 30 (4), 390–411.
 12. Goldhaber, D. *Everyone's doing it, but what does teacher testing tell us about teacher effectiveness?* <http://www.crpe.org>. Center on Reinventing Public Education. Paper presented at the AERA annual meeting April 4, 2006, 31. (pdf article on crpe.org website. Search by author or title on website).
 13. Decker, P.T., Moyer, D. P., Glazerman, S. *Effects of Teach for America on Students: Findings From a National Evaluation*. Mathematica Policy Research. (June 2004). (Click on 'Full Report' on navigation bar for complete study).
 14. Analysis by Barnett Berry, Southeast Center for Teaching Quality (now Center for Teaching Quality). www.teachingquality.org
 15. Darling-Hammond, L. *Powerful Teacher Education: Lessons from Exemplary Programs*. (2006). San Francisco: John Wiley and Sons, Inc. 21–25.
 16. Fetler M. (1999). High school staff characteristics and mathematics test results. *Education Policy Analysis Archives*. 7(9) <http://epaa.asu.edu/epaa/v7n9.HTML>, 9.
 17. Goe L. (2002). Legislating equity. The distribution of emergency permit teachers in California. *Educational Policy Analysis Archives*, 10(42), 20. Retrieved from <http://epaa.asu.edu/epaa/v10n42>
- See also Betts, J.R., Rueben, K.S. and Danenberg, A. (2000). *Equal resources, equal outcomes? The distribution of school resources and student achievement in California*. San Francisco, Public Policy Institute of California.
18. Boyd, D., Grossman, P., Lankford, H., Loeb, S., Wyckoff, J. How changes in entry requirements alter the teacher workforce and affect student achievement. In *Education Finance, and Policy* Vol. 1, Issue 2, Spring 2006. Cambridge: MIT Press., pp. 176–216.
 19. Goldhaber, D.D., and Brewer, D. J. (2000). Does teacher certification matter? High school certification status and student achievement. *Educational Evaluation and Policy Analysis*, 22, 139. pp. 129–145.

20. Monk, D. (1994). Subject area preparation of secondary mathematics and science teachers and student achievement. *Economics of Education Review*, 13(2), 142, pp. 125–145.
21. Darling-Hammond, L., Holtzman, D., Gatlin, S., and Vasquez-Heilig, J. (2005). Does Teacher Preparation Matter? Evidence about Teacher Certification, Teach for America , and Teacher Effectiveness. <http://schoolredesign.net>
22. Darling-Hammond, L. *Powerful Teacher Education: Lessons from Exemplary Programs*. (2006). John Wiley & Sons, 30.
23. Darling-Hammond, L. Teacher Quality and Student Achievement: A Review of State Policy Evidence. (2000). *Education Policy Analysis Archives*. 8(1). 31.
24. Stoel, C. F. and Thant, Tin S. *Teachers' Professional Lives: A View from Nine Industrialized Countries*. Council for Basic Education with support from the Milken Family Foundation. April 2002, 9. Available on the Milken Family Foundation website: www.mfff.org.
25. *The Academic Quality of Prospective Teachers: The Impact of Admissions and Licensure Testing* (1999). Gitomer, Drew S., and Latham, Andrew S. Educational Testing Service, 25. www.ets.org
26. Allen, Michael. *Eight Questions on Teacher Preparation: What Does the Research Say?* (2003). Education Commission of the States, 6.
27. Darling-Hammond, L. Teacher Quality and Student Achievement: A Review of State Policy Evidence. (2000). In *Education Policy Analysis Archives*. (8)1. 31.
28. Wilson, Suzanne M., Floden, Robert E., Ferrini-Mundy, Joan (2001). *Teacher Preparation Research: Current Knowledge, Gaps, and Recommendations*, 25.
29. Mitchell, A., Allan, S., and Ehrenberg, P. *Spotlight on Schools of Education: How Institutions Responded to NCATE Standards 1 and 2*. (2006). Washington, D.C.: National Council for Accreditation of Teacher Education.
30. Mitchell, A. *What Deans and Coordinators Think About the NCATE Unit Standards*. (2005). Washington, D.C.: National Council for Accreditation of Teacher Education. <http://www.ncate.org/institutions/articles.asp?ch=37>