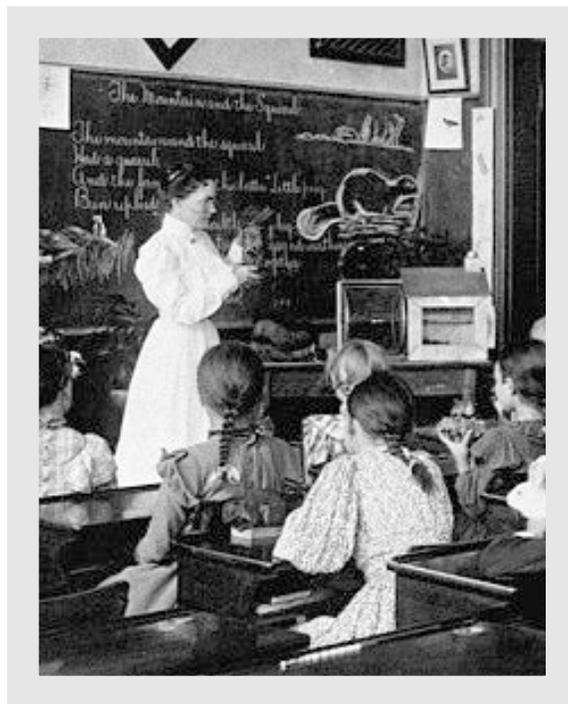


TEACHER CERTIFICATION RECONSIDERED:
STUMBLING FOR QUALITY



THE ABELL FOUNDATION

2001



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Any errors remain my own.

Kate Walsh
Senior Policy Analyst



EXECUTIVE SUMMARY

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Maryland's requirement that individuals must complete a pre-
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scribed body of coursework before teaching in a public school is
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deeply misguided. This process, known as teacher certification,
.....
is neither an efficient nor an effective means by which to ensure a
.....
competent teaching force. Worse, it is often counterproductive.
.....

The importance of good teaching to the academic success of students is intuitively obvious to any parent and is well substantiated by a body of sound research. Correspondingly, ensuring that good teachers staff public schools is a critical policy objective in Maryland and across the nation. All states, including Maryland, have developed regulatory policies under the seemingly logical theory that requiring credentials of teachers is simply good government in action. These regulations prescribe the process for certifying teachers, whereby individuals who want to teach must first complete extensive coursework (usually completed in an undergraduate program), in both the field of education and the subject they intend to teach.

At the heart of this policy is a claim by the education establishment that taking the coursework needed to obtain certification is not only the best,

but also the only acceptable means for preparing teachers. This assertion, some claim, is supported by a body of research consisting of 100 to 200 studies. This report reveals in detail the shortcomings found in this research. In fact, the academic research attempting to link teacher certification with student achievement is astonishingly deficient.

To reach this conclusion, we reviewed every published study or paper—along with many unpublished dissertations—cited by prominent national advocates of teacher certification. We found roughly 150 studies, going back 50 years, which explored or purported to explore the relationship between teacher preparation and student achievement. To our knowledge, there has been no comparable effort by analysts to drill systematically down through these layers of evidence in order to determine what value lies at the core.



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The following deficiencies characterize the work advocating teacher certification:

- Research that is seen as helping the case for certification is cited selectively, while research that does not is overlooked.
- The lack of evidence for certification is concealed by the practice of padding analyses with multiple references that appear to provide support but, once read, do not.
- Research is cited that is too old to be reliable or retrievable.
- Research that has not been subjected to peer review is given unmerited weight, with particular reliance on unpublished dissertations.
- Instead of using standardized measures of student achievement, advocates design their own assessment measures to prove certification's value.
- Basic principles of sound statistical analysis, which are taken for granted in other academic disciplines, are violated routinely. Examples include failing to control for such key variables as poverty and prior student achievement; using sample sizes which are too small to allow generalization or reliable statistical inference; and relying on inappropriately aggregated data.

SEEKING EFFECTIVE TEACHERS

For as long as the teacher certification process has existed, there has been dissatisfaction with it. One after another reform of the process has been promoted, usually from within the ranks of the education establishment. These reforms do not address a fundamental weakness of the certification process: its crude capacity for ensuring quality under any configuration. This process consists primarily of counting course titles, showing no regard for the possibility that knowledge can be acquired by means other than coursework, for the actual content of a college course or the quality of the instruction, for the educational standards of the college, or for even the grade earned. These omissions render the process incapable of determining the true quality of teacher candidates.

Certification deems substandard all uncertified candidates, no matter what other attributes they possess, including those attributes that research correlates with effective teaching.

There is a scientifically sound body of research, conducted primarily by economists and social scientists, revealing the attributes of an effective teacher, defined as a teacher who has a positive impact on student achievement. This research does not show that certified teachers are more effective teachers than uncertified teachers. In fact,



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The teacher attribute found consistently to be most related to raising student achievement is verbal ability.

the backgrounds and attributes characterizing effective teachers are more likely to be found *outside* the domain of schools of education.

The teacher attribute found consistently to be most related to raising student achievement is *verbal ability*.

Most researchers understand verbal ability, usually measured by short vocabulary tests, to be a measure of a teacher's general cognitive ability. Recent research has altered significantly our understanding of cognitive ability or intelligence. A person's cognitive ability is no longer understood to be an exclusively innate quality that depends entirely on our genetic composition at birth. Verbal ability is to some degree plastic in nature, capable of being improved at all levels of schooling, including college.

Not surprisingly, the importance of verbal ability aligns with similar findings that teachers who have attended selective colleges are more likely to raise student achievement. Private school principals routinely seek out teachers who appear to be bright and use the selectivity of the teacher's college as a possible indicator of a teacher's aptitude. On the other hand, Maryland and its public school districts not only fail to recognize the importance

of these qualities, but also often eschew them, a rejection that contains a strong undercurrent of anti-intellectualism.

Certification is an inhospitable process, deterring from entering public school teaching many capable individuals who possess the most powerful attribute identified for raising student achievement.

THE PRACTICE IN MARYLAND

The Maryland State Department of Education appears to place considerable confidence in traditional teacher certification process, without any evidence that its certification regulations improve teacher quality. It has never sought to determine the value of its costly and time-consuming certification process. Absent any Maryland study justifying teacher certification, the State cites 12 national studies, newsletters, and articles as proof of certification's value. Only three of these even attempt, none successfully, to make the case that teacher certification improves student achievement. The remaining nine make no such case and any references to research are ambiguous (see Appendix A).

Maryland, not unlike other states, lists 66 different kinds of teaching certificates in its regulations. This regulatory excess contrasts with medicine,



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law, accounting and dentistry, for which states typically issue only one license. Teach for America, a national organization that supplies teachers to under-resourced school districts, identifies Maryland's regulations as "the most stringent" of any of its fifteen regions located across the United States.

If Maryland's complex regulations governing teacher credentialing do not accomplish their purpose and, in fact, undercut that purpose by discouraging potentially excellent teaching candidates, then deregulation is in order.

In its 1990 report, the Maryland Governor's Commission on School Reform put education reform at the forefront of policy changes needed in the State. The report called for the elimination of rules, regulations, and other constraints on school staffs, specifically citing its suspicion that state teacher certification requirements impede quality education.

The Commission's findings led to some early and important reforms, including the creation of the State's alternative teaching certification program, known as the Resident Teacher Certificate, along with a reduction of education coursework required for traditional certification. However, these reforms were largely eroded in the late nineties, mainly by a 30 percent increase in the requirements for education coursework created by the State's reading initiative. This initiative, though well meaning, may represent regulatory

overkill, incapable of distinguishing between the needs of different schools and different teachers in the State.

There are no direct consequences to State officials for poor school performance yet these officials are the gatekeepers of the teaching profession.

new teachers since its inception in 1990, though nearly 50,000 teachers have been hired in the State during this same time period. Resident teachers, by virtue of the high academic requirements for the certificate, bring strong academic credentials, outscoring traditionally trained teachers on the national teacher's exam, a good indication that they have higher verbal ability on average than the traditional teacher candidate.

Although the State holds its nearly 1,400 schools accountable for their student outcomes, by various punishments and rewards, it restricts these schools' ability to decide freely the single most important teacher variable in student achievement: the quality of their teachers. In contrast, the State is accountable to no one. There are no direct consequences to State officials for poor

Maryland has also placed further regulatory obstacles on the issuance of its Resident Teaching Certificate. Never embraced by State or local district education officials, this alternative route has provided only 500



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school performance yet these officials are the gatekeepers of the teaching profession.

Private Schools and Public Colleges. In contrast to its policy regulating public school teachers, Maryland does not regulate private and parochial school teachers; nor does it regulate teaching faculties at either public or private colleges and universities. Given this disparity and the lack of research to support its regulations, Maryland's zeal for certifying public school teachers does not appear to be premised on certification's ability to assure teacher quality, but rather on protecting the power wielded by the State's education establish-

ment and national teacher organizations such as the National Commission on Teaching and America's Future (NCATF) and the National Council for the Accreditation of Teacher Education (NCATE). Their overwhelming self-interest is aligned with rigid state regulations of the teaching profession.

RECOMMENDATIONS

1. **Maryland should eliminate the coursework requirements for teacher certification,** in favor of much simpler and more flexible rules for entry.





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The only fixed requirement should be a bachelor's degree and a passing score on an appropriate teacher's exam. This exam must assess foremost a teacher's verbal ability, along with the basic knowledge and skills needed by an elementary teacher, including knowledge of research-based reading instruction, and the specialized content knowledge needed by secondary teachers.

2. As an accountability measure, **the Maryland Department of Education should report the average verbal ability score** of teachers in each school district and of teacher candidates graduating from the State's schools of education.

3. **Maryland should devolve its responsibility for teacher qualification and selection to its 24 public school districts.** It should encourage these districts to place hiring decisions primarily in the hands of school principals.

4. **School districts and principals should rely on more productive methods for helping teachers gain the instructional skills and knowledge needed to be effective:** comprehensive new teacher induction programs, reduced teaching loads for first-year teachers, ongoing professional development closely associated with the curriculum, including the teaching of reading, and outcomes-based performance evaluation.

Unless hiring authority is delegated to individual

A principal's judgment may be fallible, but it is certainly no more fallible a measure than the current regulatory approach that decides who teaches.

schools, hiring decisions will shift only from a state-level bureaucracy to a district-level bureaucracy. School principals, most appropriately, must bear the responsibility for their hiring decisions; and both the State and the school districts must hold these leaders accountable for results. A principal's judgment may be fallible, but it is certainly no more fallible a measure than the current regulatory approach to deciding who teaches.

Such an overhaul represents a direct threat to schools of education and other education groups that benefit from the flawed certification process. Although these groups will readily admit that the teacher preparation system is in dire need of repair, their reform agenda consistently leads to heavier state regulation, more time for prospective teachers in schools of education, and a crackdown on alternative certification routes and waivers. It is patently insufficient to consider another re-tooling of the certification process. Reinvention is in order.



1. SEARCHING FOR TEACHER QUALITY

All parents worry about who will be assigned to teach their children in school.

The fundamental connection between the quality of teaching and the quality of the education that will ensue is understood intuitively. This connection is not bound by social class or income; the highest priority for families in both private and public schools is the assignment of a good teacher.

Almost everyone would agree that good teachers matter, but quantifying how much they matter is a newer development. In the process, researchers are discovering both the significant extent to which inferior teachers impede student achievement and the disproportionate effects that good and inferior teachers have on children who are poor.

The importance of teacher quality has not been lost on policymakers and professional educators who regulate the teaching profession. However, the resulting regulations are largely ill-advised, misinformed by a tradition of shoddy education research, and distorted by the interests of colleges of teacher education. And although

advantaged families, many of whom send their children to private schools or who can navigate assignment of their children to the best classrooms, may never confront the more harmful consequences of these policies, poor families do so regularly.

Educators, policymakers, the media, and the public mistakenly equate teacher quality with teacher certification.

- In February 2001, an article appeared in the Baltimore Sun lamenting the lack of certified teachers in Baltimore city's worst schools. Under the banner "Least-prepared teachers are at worst city schools: One-third lack basic credentials for certification," the article equates



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lack of certification with a general lack of effectiveness.¹

- Several months later, a Baltimore community group's study bemoaned the fact that more uncertified teachers were teaching in the city's high-poverty, predominantly African-American schools than in the city's whiter, more affluent schools.²
- In a 2001 letter to the Maryland General Assembly reviewing the progress made in the Baltimore City public schools, the State Superintendent singled out teacher recruitment and retention as the single most important issue facing the city, citing a lone criterion that characterized the city's poor teacher quality: its low number of fully certified teachers.³
- Baltimore City, reacting to ongoing pressure from the State Department of Education to recruit more certified teachers, decided in 2000 to stop targeted recruitment for its 10-year-old Resident Teacher program, a program established to recruit individuals with strong academic records who had chosen not to pursue the traditional teacher training route.

The Baltimore Sun article, the community report, the admonitions from the State department of education and State legislators, and the reaction of Baltimore City educators reflect a view

of certification that is shared instinctively by the public. By insisting that teachers be certified, the thinking goes, we will guarantee children, most importantly children who are poor, teachers of quality.

The claim that there is a body of research proving the value of teacher certification, estimated to consist of 100 to 200 studies, is specious. These views may be understandable, but they are built on quicksand. As this report shows, the claim that there is a body of research proving the value of teacher certification, estimated to consist of 100 to 200 studies, is specious.⁴ The intent of this study is to analyze education research from the past 50 years cited as evidence that teacher certification improves student achievement.

¹Daemmrich, J., "Least prepared teachers are at worst city schools," *The Baltimore Sun*, February 28, 2001.

²"Learning the hard way" *City Paper*, May 16, 2001, Baltimore, Maryland.

³Letter from Dr. Nancy Grasmick, State Superintendent of Schools, to Chairs of House and Senate committee on education: Clarence Blount, Sheila Hixson, Barbara Hoffman, Howard Rawlings, February 22, 2001.

⁴NCATE's president, Arthur Wise, estimates that there are "over 100 studies [that] show that qualified teachers outperform those with little or no preparation in helping students learn" (NCATE newsletter, 1999, 9(1); NCATF's Executive Director, Linda Darling-Hammond, estimates that there are "more than two hundred studies [that] contradict myths that 'anyone can teach and that teachers are born and not made... Teacher education, as it turns out, matters a great deal'" (1997; page 10).



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What is Teacher Certification?

Every state requires that teaching candidates obtain formal approval to teach in public school classrooms, a process that is known as teacher certification (or licensure). State officials review and count course titles on college transcripts to verify that state requirements for teacher preparation have been successfully fulfilled. Most new public school teachers in Maryland have graduated from a state-approved program located at a college or university, where that institution ensures certification requirements have been fulfilled.

Coursework Requirements. States differ on their requirements. Generally, teaching candidates must complete 27 to 36 credits of prescribed education coursework, depending both on state requirements and the college attended. In Maryland, elementary teachers are required to take 27 credit hours of education coursework and 48 credit hours of content coursework in the academic fields taught in elementary education.* Secondary teachers are required to take 27 hours of education coursework and generally 36 hours of content coursework in the subject matter to be taught. The coursework requirements include a student teaching experience.

Alternatives. If a teaching candidate has not completed an approved program at the undergraduate level, he or she can satisfy the State's coursework requirements through a post-baccalaureate program, in two ways. The candidate can enroll in a State-approved graduate-level program in a school of education, which results in a *master's degree in teaching*. The alternative is a somewhat arbitrary process, termed a credit count, where the State reviews case by case the courses listed on a college transcript and determines how many and what courses the teaching candidate needs to take before certification will be granted.

Resident Teacher Certificate. Since 1990, Maryland has offered another alternative route known as the Resident Teacher Certificate. In theory, this alternative route allows an individual to bypass Maryland education coursework requirements, provided certain academic standards are met. This certificate has fallen victim to "regulation drift," (see Chapter 5), whereby State officials have steadily increased the course requirements. Teachers recruited by Teach for America, a national organization that provides highly able teachers to under-resourced school districts usually teach under this certificate.

Teacher's Exam. All teachers in Maryland whether they come in through an alternative or traditional route, must pass the teacher's exam (the Praxis) that is administered by the Education Testing Service. The first part of this exam (Praxis I) tests basic skills. The second part of this exam (Praxis II) tests knowledge a teacher is expected to know in a particular subject area, content-related pedagogy and general pedagogy.

Certification is mandatory. Certification is eventually required even if an individual is first hired without being certified. If a teacher is not certified before they enter the classroom, then they must work towards achieving certification within one to four years, depending on the number of courses they need (COMAR 13A.12.01.05). The hundreds of provisional teachers that Baltimore hires each year must enroll in classes in their off-time, if they want to continue teaching in a Maryland public school.

**Some Maryland colleges exceed the State requirements. The two leading producers of certified teachers in Maryland are Towson University and the University of Maryland College Park. Towson requires 34 credit hours in education courses at the elementary level and 29 at the secondary level, while the University of Maryland requires 36 hours and 21 hours respectively. An elementary teacher must take 12 credits in English, 3 in geography, 9 in history, 3 in any social studies, 3 in biology or physical science, 9 in any science, 6 in mathematics, and 2 credits each in music, art and physical education.*



A FAULTY PREMISE

To begin, even the most committed advocates of certification do not claim the currently structured certification process works well. In part, this dissatisfaction stems from certification's limitations. Absent the wholesale reinvention of what it means to be certified, these limitations cannot be avoided.

Reduced to its essence, teacher certification currently consists of no more than counting the course titles taken by teacher candidates. It is incapable of providing any insight into to an individual's ability, intellectual curiosity, creativity, affinity for children, and instructional skills. Acting as a very crude proxy for teacher quality, the process is incapable of distinguishing between significant, justifiable reasons for denying uncertified candidates access to the profession and insignificant, unjustifiable reasons. A highly able candidate who did not take a required course is no more likely to be allowed to teach than the candidate who is poorly educated

and unable to pass the teacher's examination.

Determining who is qualified to teach is a task fraught with ambiguity and nuance, far more so than the mechanical process of counting a teacher's coursework suggests. Given the faulty principles upon which certification is based, it is not surprising that its value cannot be proven. Regulatory policy cannot supplant the need for human judgment. Policymakers may be uncomfortable acknowledging this truth; relinquishing their authority is but a remote possibility.

CERTIFICATION'S HARM

Because the intent of teacher certification is to ensure that teaching candidates have taken a prescribed set of coursework, certification serves as a barrier to anyone who has not done so. In a time of teacher shortage, districts feel the strain of trying to enforce the certification criteria while facing the reality that every classroom of children requires an adult, certified to teach or not. In poor districts such as Baltimore City, this strain preceded the current, well publicized, teacher shortage. Even in the best of times, Baltimore faces considerable teacher turnover, with roughly 15 percent of its teaching force leaving each year. This chronic high level of vacancies often force the City to hire a teaching force that is predominantly uncertified, known as *provisional* teachers.



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The Maryland State Department of Education attributes some of the dishearteningly low student achievement in Baltimore City and Prince George's public school systems to the high number of uncertified teachers in these districts.⁵ However, this view remains unsupported by sound research.⁶ No controlled study has isolated the certification variable and uncovered a connection with student achievement. As states do not measure teachers' verbal ability, the only measurable variable that is most likely to partially explain the lower student achievement in Baltimore city schools is unreported and unknown.

Exceptions to the Rule. It is important to stress that certification is a barrier to teaching in the State's public schools only. Private schools do not require certification, nor is there any record of the State having suggested they do so.

DEFINING AN EFFECTIVE TEACHER

We found no credible research that supports using the teacher certification process as a regulatory barrier to teaching. Much of the research that is cited in support of certification reflects a level of scholarship that would not be tolerated in other

professions. Even when such research is well done, it is often misinterpreted.

However, there is a body of credible research, conducted primarily by economists and social scientists, that examines the relationship between teachers and student achievement, briefly summarized here:

- **Teacher quality is a critical determinant of how much students, rich or poor, White, Hispanic or Black, will learn.** Estimates by even the most skeptical researchers have produced findings revealing the powerful effect of teacher quality. In the course of a single school year, students who are assigned to a good teacher can learn a full-grade level more than students who are assigned to a bad teacher (Hanushek, 1992; *see also*: Murnane, 1975; Murnane and Phillips, 1978; Armor, et al., 1976; Ferguson, 1991; Goldhaber and Brewer, 1997, 1999; Sanders and Horn, 1998; Sanders and Rivers, 1996).
- **Experienced teachers are more effective than new teachers.** There is a great deal of conflicting research on teacher experience, making it difficult to state firm and specific conclusions about its importance. Much of the research

⁵Maryland State Department of Education, correspondence with The Abell Foundation, August 30, 2000.

⁶In fact, a number of studies dispute directly the notion that poor districts employ more uncertified teachers (Boorman and Rachumba, 2000; Lippman et al., 1996; Ingersoll, 1997), citing other teacher variables that distinguish poor schools from more affluent schools. These national findings do not reflect the low number of certified teachers employed in Baltimore.



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has found that teachers get better with a few years of experience; but at some point their effectiveness drops, viewed as an inverted U-shaped pattern of effectiveness and perhaps caused by “burnout” or the promotion of better teachers out of the classroom.⁷ The effect of experience can be distorted or obscured because teachers who enter the profession at the same time tend to share certain common attributes having nothing to do with experience. However, these attributes may be mistakenly interpreted as the effect of experience rather than as a manifestation of common traits that represent a particular cohort of teachers.⁸ Another reason the effect of experience is so hard to measure is that teachers who have seniority can choose to teach in the better schools.⁹

- **Much of the research indicates that matching a teacher’s race with students’ race does not consistently improve student achievement** (Alexander

et al.,1987; Ehrenberg, Goldhaber and Brewer, 1995; Farkas et al., 1990; Ferguson, 1991; with more mixed evidence provided by Ehrenberg and Brewer, 1995; and contrasting evidence from Murnane, 1975).

- **The most consistent finding is that effective teachers score higher on tests of verbal ability and other standardized tests.** These tests generally appear to be a reflection of a teacher’s cognitive ability or intelligence (Bowles and Levin, 1968; Bruno and Droscher, 1981; Coleman, 1966; Ehrenberg and Brewer, 1995; Ferguson, 1991; Ferguson and Ladd, 1995; Greenwald, Hedges and Laine, 1996; Hanushek 1971, 1972, 1992; Greenwald and Hedges, 1996; Kain and Singleton, 1996; Levin, 1976; Massey and Vineyard, 1958; Murnane and Phillips, 1978, 1981b; McLaughlin and Marsh, 1978; Murnane 1975, 1983; Strauss and Sawyer, 1986).
- **Teachers who have attended more selective colleges produce higher student achievement**

⁷ Coleman (1966) found marginal effects on student achievement from teacher experience; Hanushek found inconsistent effects (1971; 1986; 1992); Hanushek, Kain and Rivkin (1998) find that one or two years of experience improve a teacher’s quality, but that additional years have an insignificant impact; Murnane (1975) found beginning teachers were significantly less effective; Murnane and Phillips (1981) found a direct and positive correlation for experience, as have Greenwald, Hedges and Laine (1994, 1996); Summers and Wolfe (1977) found that poor children did better with inexperienced teachers; Ferguson (1991) found some small effects of experience on student achievement; both Ferguson and Ladd (1996) and Goldhaber and Brewer (1998) found no effect; Kain and Singleton (1996) found that beginning teachers and teachers with more than 20 years experience were both less effective than other teachers; Lippman et al. (1996) found a positive correlation of experience with student achievement.

⁸ For the best explanation of these mixed results, see Murnane and Phillips (1981).

⁹ Hanushek (1989) observes this phenomenon, stating, “causation may run from achievement to experience and not the other way around”(page 47).



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(Murnane and Phillips, 1978; Ehrenberg and Brewer, 1995; Ferguson, 1991; Winkler, 1975; Summers and Wolfe, 1977; Monk and King, 1994). Selectivity of college is most likely another way of measuring teacher's verbal ability (Ferguson, 1998).

- **At the secondary level, teachers who know more about their subject matter are generally more effective, at least in science and mathematics.**

(Goldhaber and Brewer, 1996, 1998; Hawkins, 1998; Monk and King, 1994; Monk, 1994; Rothman, 1969; Rowan et al, 1997). Very little research has been done on the importance of teacher's subject matter knowledge in English and social studies.

- **At the elementary level, there is no research indicating the amount or type of college coursework that is necessary or optimal for these teachers to have taken in various academic disciplines.**

Only one piece of research on the relationship between elementary teachers' coursework in any of the major academic disciplines and student achievement was found (Eberts and Stone, 1984), but it did not find a relationship between fourth

graders' mathematics achievement and teachers' coursework in mathematics.¹⁰

- **There is limited evidence that methodology coursework taken by high school science and math teachers may contribute to higher student achievement** (Monk, 1994).

- **Teachers with master's degrees are not significantly more effective than those without, unless the teacher is at the secondary level and the master's degree is *in the academic discipline being taught*** (Greenwald, Hedges and Laine, 1996; Goldhaber and Brewer, 1997, 1998; Monk, 1994; Murnane, 1983; Hanushek, 1989, 1992; Harnisch, 1997; Larson, 2000; Link and Ratledge, 1979; Rivkin, Haushek and Kain, 1998; Summers and Wolfe, 1977; Ehrenberg and Brewer, 1994; Kiesling, 1984; contrasted with small effects found by Ferguson, 1991; Ferguson and Ladd, 1995).¹¹

- **There is little evidence that the content and skills taught in preservice education coursework is either retained or effective** (Murnane, 1983; Veenman, 1984).

¹⁰ One published dissertation written in 1959 found that students in grades 4, 5, and 6, whose teachers only had two years of college, did no worse on a mathematics achievement test than students of teachers with four years of college (Smail, 1959). However, the age and unpublished status of the paper precludes it from inclusion in any review of sound research.

¹¹ Kain and Singleton (1996) found that schools that serve poor children have more teachers without advanced degrees but do not attribute the lack thereof to lower student achievement.



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- **New teachers who are certified do not produce greater student gains than new teachers who are not certified** (Lutz and Hutton, 1989; Bradshaw and Hawk, 1996; Stoddart, 1992; Bliss, 1992; Miller, McKenna and McKenna, 1998; Goldhaber and Brewer, 2000; Raymond et al., 2001).

Most importantly, all of the positive teacher attributes described above have a greater impact on students who live in poverty because school has a disproportionately stronger effect on children who are poor (Coleman, 1982; Ferguson, 1998; Wright, Horn and Sanders, 1997).

BEST KEPT SECRETS ABOUT TEACHER QUALITY

A particularly unfortunate consequence of certification is that it is counterproductive, discouraging those individuals who are more likely to produce greater student achievement from entering the profession.¹² Nationally, teachers generally

score about 40 to 70 points lower on their college entrance exams than do college graduates who choose other professions (Vance and Schlechty, 1982; Galambos, 1985; Educational Testing Service, 1999). Teachers who did not prepare in college for teaching careers, but who chose to teach anyway, were more likely to have scored in the top quartile of their entering college class than were those teachers who were prepared in college to teach.¹³

THE IMPORTANCE OF VERBAL ABILITY

No evidence linking a particular teacher attribute with student achievement is stronger than the evidence on verbal ability. Teachers with higher verbal ability produce greater achievement gains in students. Most researchers understand verbal ability, usually measured by short vocabulary tests, to be a measure of a teacher's general cognitive ability. This firm scientific finding must do battle with unsupported assertions minimizing the importance of a teacher's intelligence compared to other teacher qualities.¹⁴ State policymakers,

¹²The Digest of Education Statistics, 2001, <http://nces.ed.gov/pubsearch/pubsinfo>.

¹³ *Ibid.*

¹⁴For example, in 1999, Linda Darling Hammond asserts that research shows that teacher's intelligence or general academic ability has a small and statistically insignificant effect on teacher performance. She differentiates between cognitive ability (using research done in the 1940s that looked at teachers' IQ) and verbal ability. She provides a singular definition of verbal ability, which she perceives "as a more sensitive measure of teachers' abilities to convey ideas in a clear and convincing ways," though the tests of verbal ability used in the research have all been written, vocabulary tests (page 9). Also, researchers Victor Vance and Phillip Schlechty (1982) encountered considerable criticism for an article that they wrote examining the lower academic ability of teachers, stating that they were "challenged to defend our use of measures of academic ability as a gauge of teacher quality" (page 22).



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regulators, higher education officials, and the national accrediting body for teaching (known as NCATE) largely disregard the most effective and best substantiated quality of teacher effectiveness.

There are strong social and political issues at play here that may explain why verbal ability is undervalued. The unique disregard for the benefits of intelligence on the classroom may stem from a worry that the access to the teaching profession might become less democratic. The steps Maryland's poorest districts, Baltimore City and Prince George's County, could take to upgrade teacher quality are often met with charges of intellectual elitism, despite evidence that poorer children can derive even greater benefit from having such teachers than other children (Summers and Wolfe, 1997).

Whatever motivating factors may be working against acceptance of the findings on verbal ability, its importance is treated as an aside in discussions of teacher quality and preparation. Nationally, the current structure does little to target teaching candidates of strong aptitude. To its



credit, Maryland has funded strategies to recruit into teaching top-performing students,¹⁵ but these efforts are diluted by mainstream processes for recruiting, identifying, and credentialing new teachers.

Implications for Teacher Training. Recent research has altered significantly our understanding of cognitive ability or intelligence. A person's cognitive ability is no longer understood to be an exclusively innate quality that depends entirely on our genetic composition at birth. Instead, through frequent and increasingly complex exposure to oral and written language, cognitive ability can develop and be sustained successfully throughout life. In short, verbal ability is to some degree plastic in nature, capable of being improved at all lev-

¹⁵ MSDE provides a signing bonus for top students. Also, the Maryland Distinguished Teacher Scholarship also aims to recruit academically talented candidates into teaching.



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els of schooling, including college. With this understanding in mind, teacher training programs could turn out more effective teachers by shifting the typical curriculum to a more intellectually challenging course of study that concentrates on improving oral and written language skills and reading increasingly challenging books.

Individuals who demonstrate strong verbal ability may or may not turn out to be good teachers, but the odds are considerably more in their favor than for less able individuals.

MARYLAND'S ERRANT PURSUIT OF TEACHER QUALITY

Course Counting. Like all states, Maryland reduces the complex task of teacher selection to counting course titles and credits. Either indirectly or directly, all teaching candidates are subjected to a State count of their college coursework as the primary criterion for being allowed to teach. In most cases, this process is subsumed into the col-

lege or university school of education, which must seek State review and approval of its teacher preparation program in order to ensure that the right number and type of courses are taken by all of its graduates. For any teaching candidate who does not graduate from a State-approved program, the State reviews each individual transcript, classifying and counting courses.

Maryland regulations appear to reflect the belief that by counting the courses on a transcript, it can ensure that the State's teachers are prepared adequately for the classroom. This approach vastly underestimates the ambiguity and complexity involved in hiring good teachers, yet it is often echoed by district-level personnel offices.

THE ROLE OF SCHOOL DISTRICTS

Currently, most Maryland school districts deny their school principals the discretion to hire uncertified teachers; most district personnel offices turn away any uncertified candidate before the school principals get involved. Given the burden of trust that school districts place on their principals to progress toward meeting the State's accountability and assessment standards, the State should extend that trust to shaping the faculty necessary to achieve those goals. A principal is likely to be a better judge of a school's hiring needs than an employee in the district personnel office. Most importantly, principals are held accountable for



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their hiring decisions; despite their authority, State officials bear no responsibility for the poor performance of a school.

Mixed Messages. Districts appear to be reluctant to take full advantage of the little regulatory flexibility that the State does provide for teacher selection because it

comes with a mixed message. Although the State Superintendent has stated publicly her support for alternative paths to teaching, the State department of education tells districts directly and repeatedly that they must improve teacher quality by focusing on recruiting more certified teachers. In reporting to House and Senate chairs in the Maryland General Assembly on the status of the State-City partnership, Dr. Nancy Grasmick writes: *"I find little evidence that BCPSS has a coordinated strategy for recruiting teachers and promoting their full certification in a way that will increase the number of*

Principals are held accountable for their hiring decisions; despite their authority, State officials bear no responsibility for the poor performance of a school.

*qualified teachers in the classroom. I challenge the new CEO to make this her number one priority."*¹⁷

THE PRIVATE SCHOOL OPTION

Those schools in Maryland with the lowest proportion of certified teachers, lower than Baltimore City public schools, are private and parochial schools. Given that families of sufficient means, including many professional educators, elect to send their children to these independent schools and that children in these schools achieve enviable academic achievements each year, the lack of certification of their teachers is not an obvious impediment to their success. Principals in private schools have always been considered the best judge of teacher quality.

Essentially, a principal's judgment may be fallible, but it is certainly no more fallible a measure than the current regulatory approach that decides who teaches in Maryland. A principal's choice is not without flaws (human judgment never is), but it is the principal who is held most directly accountable for student academic performance. The school principal has more motivation than anyone to make a good hiring decision.

¹⁶ Letter from Dr. Nancy Grasmick, State Superintendent of Schools, to Chairs of House and Senate committee on education: Clarence Blount, Sheila Hixson, Barbara Hoffman, Howard Rawlings, February 22, 2001.



2. CERTIFICATION AND STUDENT ACHIEVEMENT

Though public education from kindergarten through 12th grade is a \$300 billion industry, the research that helps to steer its course lacks depth and intellectual rigor. We are not the first to observe this weakness. Too often, education researchers do not adhere to the basic standards of academic inquiry that govern most other areas of research. This deficiency is nowhere more evident than in the research cited to support the theory that teacher certification is a surrogate for teacher quality.

As telling as the low academic standard in education research is the paucity of studies on teacher certification. We struggled to find 150 studies, going as far back as 1950, that explored the relationship between teachers' educational preparation and student achievement; and, even then, many of these were unpublished doctoral dissertations, which had not undergone a review process considered mandatory in most fields of

study.¹⁷

This lack of rigorous and legitimate evidence corresponds with a recent effort undertaken the Center for the Study of Teaching and Policy (Wilson, Floden and Ferrini-Mundy, 2001). Charged by the U.S. Department of Education to comb the existing research on teacher preparation and subject it to scientific standards used in other field of study, they eliminated all but 57 studies

¹⁷ *In the social sciences, unpublished doctoral dissertations do not carry the same scholarly weight as published journal articles. There are two reasons for this. First, by definition, the work is that of an apprentice who is learning to conduct independent research. More important, however, is the fact that unlike journal articles, dissertations have not passed independent peer review. Typically dissertation research requires months or even years of refinement by young scholars before it is ready for submission to a peer-reviewed journal. This problem is compounded in the area of education research. It is widely recognized within academe that the quality standards for Ph.D.'s in schools of education can be quite low. Moreover, in the case of Ed.D.'s, the scholarly bar is lower still, since the ostensible purpose of these degrees is to produce practitioners rather than researchers. Faculty at schools of education produce far more graduate degrees per capita -- MA's, Ed.D.'s, Ph.D.'s -- than do their colleagues in the social sciences, suggesting that quality control may be rather low. Moreover many of these graduate degrees are produced not at universities in the top ranks of research universities (AAU Research I or AAU research II) but at institutions lacking a research focus. Both of these facts suggest that research findings reported in School of Education Ph.D.'s or Ed.D.'s must be treated with caution.*



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written in the past 20 years. However, most of these 57 studies were "interpretive" case studies involving only a few teachers. The actual number of longitudinal or quasi-longitudinal studies that controlled for poverty and used student achievement as the measure of the effectiveness of teacher preparation was far fewer. Under their own standard, only six studies containing any evidence for teacher certification were left standing, a fact omitted in Wilson et al.'s text.¹⁸

Linking student achievement with teacher effectiveness. In the groundbreaking *Equality of Educational Opportunity* (1966), renowned sociologist James Coleman established a new standard for education research, in which the principal measure of a school's effectiveness is whether its students are learning.¹⁹ This connection may seem self-evident, but it was largely ignored until Coleman's study; most previous studies used supervisors' evaluations of teachers as the measure of teacher quality. Coleman also revealed a fundamental problem inherent in the American educational system, which had always focused on inputs (equalizing school resources) at the expense

of outputs (student performance).

In spite of significant contributions by Coleman and others, the field is still flooded with research that is flawed, sloppy, aged, and sometimes academically dishonest (see Appendices). The same limited research is quoted repeatedly, with frequent mistakes in interpretation; and one cannot help but conclude that the research was not actually read (or not read very carefully). We often had to track down the author in order to obtain a copy of studies that no longer are, or never were, available through a university library. Some unpublished studies proved impossible to find. Several authors complained that they had been misquoted and misinterpreted.

Scope of Study

For this analysis, we focused exclusively on research that examines the relationship between teacher attributes and education background with student achievement. Whether students are achieving more on comparable and valid measures of learning is the only measure of teacher

¹⁸ The six studies are: Darling-Hammond (1999); Hawk, Coble and Swanson (1985); Fetler (1999); Ferguson and Womack (1993); Guyton and Farokhi (1987); and Monk, 1994 and all are analyzed in Appendix B of this study.

¹⁹ Coleman's work also had the effect of demoralizing educators across the nation, as its overall conclusion appeared to be that schools are relatively powerless to overcome the effects of students' socioeconomic background. Though in later work, Coleman and others (Coleman, J, Kilgore, S., Hoffer, T., Public and Private Schools, New York: Basic Books, 1982) altered his position to show that poor children derive considerable and disproportionate benefit from a common academic curriculum and high academic expectations (and considerable harm from schools that lacked these characteristics), his initial conclusions in which home and background matter more than school has not been conclusively challenged.



QUALITIES OF GOOD RESEARCH

Greenwald, Hedges and Laine used the following standards in deciding what research merited inclusion in their 1996 meta-analysis (p.364). These standards offer useful guidance for independent analysis of research.

- The data are presented in a refereed journal or a book. Research published by research institutes is acceptable.
- The data originate in the United States to account for differences in educational systems in foreign countries.
- The outcome measure is some form of academic achievement. Standardized achievement tests offer the best measure of academic achievement because scores are comparable, valid and reliable.
- The level of aggregation of the data is at the level of school districts or smaller units. Greenwald et al. note that "moving beyond the level of school districts greatly limits the validity of the relation between inputs and outcomes."
- The model controls for socioeconomic characteristics or is either longitudinal (including a pretest and a posttest) or quasi-longitudinal (including IQ or a measure of earlier achievement as an input).

effectiveness we accepted as reliable (a rule shared by most researchers).²⁰ Though important in some contexts, evaluations by supervisors of teacher's classroom management are irrelevant if at the end of the year the supposedly "better managed" classroom of students has not learned. The most vocal proponents of teacher certification agree that the measure of teacher effectiveness should be student

achievement (Darling-Hammond, Wise and Pease, 1983; Evertson et al., 1985).

METHODOLOGY

We attempted to look at every published and unpublished study cited on this issue by the principal advocates of teacher certification and prepara-

²⁰ *There is considerably more research in education that looks at the relationship between a teacher's formal preparation and less quantifiable variables, such as a certified teacher is a better classroom manager, or can deliver certain kinds of instructional strategies more effectively, or is more nurturing. But these variables distract from the public's primary interests: whether or not students are learning. The majority of these studies also use supervisors' ratings as the measure. Ratings are unreliable predictors of teacher quality as they depend on the construct of the ratings instrument and generally do not control for critical variables, such as student poverty.*



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tion. This process, however, was akin to an archaeological dig. Typically, an assertion about certification made in Study A, published in the year 2000, would cite as supporting evidence Study B, often a literature review published perhaps two decades previously. Study B might cite as its only supporting evidence Studies C, D, and E, some of which were written as long ago as the 1940s and 1950s. To verify the accuracy of the assertion made in the year 2000, it was necessary to read the original source. Although many researchers have asked the same fundamental question – “does certification make a difference?” – we found no comprehensive effort by scholars in the field to drill down systematically through these layers of evidence to discover what of any value can be found at the core.

Certification Advocates. The principal proponent in the nation for the formal preparation of teachers is the National Commission on Teaching and America's Future (NCATF), led by its executive director, Linda Darling-Hammond. Darling-Hammond's writings figure quite prominently in our analyses, as she is both prolific and, arguably, the most effective and respected spokesperson-cum-researcher on teacher preparation.

“Certification is a leap of faith taken without benefit of supporting evidence.”

NCATF is joined in its advocacy by the National Council on the Accreditation of Teacher Education (NCATE). NCATE is the main accrediting body in the nation for schools of teacher education. It is assuming an increasingly powerful role in Maryland, as explored in a later section of this paper. Also figuring prominently is the Center for Teaching and Policy at the University of Wisconsin. In addition to these national sources, the Maryland State Department of Education has been a strong defender of teacher certification and provided us with many sources. The research that MSDE provided is reviewed separately in Appendix A.

FINDINGS

The theory that teacher certification leads to teacher quality is predicated more on what we think ought to be true (why wouldn't a systematic approach to teacher preparation lead to better teachers?) than on controlled experimentation. It is a leap of faith taken without benefit of supporting evidence.

Much of the research on teacher certification suffers from deficiencies that are so serious in nature that the research must be discounted. Generally, these deficiencies can be characterized by the frequent practice of making assertions without sufficient evidence and failing to apply norms of scientific rigor.



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Specifically, we found a pattern of the following types of errors:

1. Research that helps the case for teacher certification is selectively cited, while research that does not is overlooked.
2. The lack of support for the benefits of certification is concealed by padding analyses with imprecise or inaccurate evidence.
3. Less reliable, older research is not cited responsibly.
4. Conclusions are asserted absent any evidence.
5. Research that has not been subjected to peer review is treated as legitimate research, with particular reliance on unpublished dissertations.
6. Instead of using standardized measures of student achievement, advocates design their own assessment measures to prove certification's value.
7. Basic principles of sound statistical analysis that are taken for granted in other academic disciplines are routinely violated, with methodological errors going unchallenged:
 - Studies do not control for key variables critical to understanding student performance, most notably in the many studies which employ supervisor's ratings as the measure of teacher effectiveness.
 - Conclusions are drawn based on non-generalizable sample groups.
 - Conclusions are drawn based on samples that are simply too small to produce reliable results.
8. Studies suffer from serious statistical errors known as aggregation bias or ecological fallacy, producing findings that are significantly distorted.



3. DISSECTING THE RESEARCH BEHIND CERTIFICATION

In this section, we provide examples of common errors found in the research on teacher certification. The examples presented here are by no means exhaustive, but illustrate the low standards characterizing this research. Indeed, some are deeply troubling.

1. Research that helps the case for teacher certification is selectively cited, while research that does not is overlooked.

In 1996, Greenwald, Hedges and Laine conducted a sound review of 60 studies that had looked at which school resources have the most impact on student achievement. They found that a teacher's *verbal ability* had the most consistently positive effect on student achievement. The second most consistently positive finding was *teacher experience*. Coming in a distant third were studies looking at *teacher education*, measured by master's degrees. Researchers generally look at master's degrees as another way (besides teacher certification) to measure the effect of formal teacher preparation; most teachers' master's degrees are in education, not

in an academic discipline.

But in *Doing What Matters Most: Investing in Quality Teaching* (1997), Linda Darling-Hammond discusses in considerable detail Greenwald et al.'s 1996 study without conveying the minor importance of teachers' master's degrees.²¹ She presents a chart using an ambiguous term "Teacher Qualifications" which accounted for nearly half of the student achievement gains. The chart is accompanied by a statement that "spending on teacher education swamped other variables as the most productive investment for schools" (page 9) with no other explanation of the results. When we emailed one of the coauthors of the Greenwald et al. study, he had a different take than Darling-Hammond on his findings, responding, "*Teacher ability (which was generally measured as teacher's verbal ability) seems to show the strongest and most replicable effect on achievement.*"²²



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GREENWALD HEDGES AND LAINE (1996): BREAKOUT OF STUDIES ON TEACHER ATTRIBUTES

TEACHER ATTRIBUTE	NUMBER OF STUDIES AND THEIR CORRELATION TO STUDENT ACHIEVEMENT			
	POSITIVE AND SIGNIFICANT	POSITIVE ,BUT INSIGNIFICANT	NEGATIVE AND SIGNIFICANT	NEGATIVE BUT INSIGNIFICANT
VERBAL ABILITY	12	9	1	2
EXPERIENCE	20	2	28	18
MASTER'S DEGREES	7	6	16	16

Of the three teacher attributes examined by Greenwald, Hedges and Laine, the evidence supporting the value of a master's degree for improving student achievement is only marginal.

2. The lack of support for the benefits of certification is concealed by padding analyses with imprecise or inaccurate evidence.

In some research, the case for certification looks strong because of the volume of studies cited. However, once the evidence is examined, very few of the studies stand up to scrutiny. Typically, they are found lacking because they did not look at student achievement as the measure of a teacher's effectiveness, were unpublished dissertations, or suffered from insufficient sample sizes.

Ex: Darling-Hammond (1999, p.11) states that “teachers who have more formal preparation for teaching have higher ratings and greater student learning gains”, citing six studies: **Hice (1970), Lupone (1961), McNeil (1974), Roupp et al. (1979), Erikson et al. (1985), and Hansen (1988).**

Yet only two of these six studies, **McNeil** and **Hice**, address student achievement, and both of them suffer from inferior methodology. These studies used insufficient sample sizes of 38 and 40 teachers, respectively. McNeil made up his own measure of student achievement, making it

²¹ Darling-Hammond (1997) performs a similar grouping of teacher variables in her review of Ferguson (1991) which some researchers (Ballou and Pogursky, 2000) found misleading. Ferguson found a relatively small effect from teachers' master's degrees on student scores, accounting for only about 5% of the variance. However, Darling-Hammond does not separately report the effect size for master's degrees—critical to her premise that degrees in teacher education matter—but instead groups it with the much more significant effects from a test of teacher's verbal ability (which accounted for roughly 25% of the variance) and teacher experience (which accounted for roughly 10% of the variance). Together, she reports, these variables account for 43% of the variance (page 9) but the reader never learns that master's degrees were relatively insignificant.

²²Hedges, L., email correspondence with The Abell Foundation, February 26, 2001.



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impossible to verify the validity of his results. Hice, in an unpublished dissertation with serious flaws (*see Appendix B*), achieved mixed results, finding effects for girls but none at all for boys.

Ex: Darling-Hammond (1992, page 30) asserts that there are “consistently positive relationships between student achievement in science and the teacher’s background in both education courses and science courses.” She cites four studies: Davis (1964), Taylor (1957), Druva and Anderson (1983) and Perkes (1967) to support this assertion. They do not show the benefit of education coursework on student achievement:

1. **Davis (1964)** an unpublished dissertation studying 28 teachers, did not look at the effects of teachers’ background in education coursework.
2. **Taylor (1957)** an unpublished dissertation, first found a negative effect from education coursework on student achievement; nevertheless, he performs an unsupportable manipulation of the data to yield more positive findings by bundling the education coursework variable with other variables (such as subject-area coursework) that were significant.
3. **Druva and Anderson (1983)** in a review of 65 studies, looked at student achievement and found that science coursework correlated significantly with student achievement but that education coursework did not. Like Taylor, they too

bundled the education coursework variable with other measures that were significant, which appears to have generated a positive effect.

4. **Perkes (1967)** a study of 32 teachers, reported mixed effects from a teacher’s background in education coursework on student achievement in science. This study found that students who had teachers with more education coursework scored higher on a test of higher order thinking but *lower* on the science achievement test.

Certification advocates also assert often that education coursework is more important than a teacher’s knowledge of subject matter. They offer evidence that knowledge of subject matter has little effect on teaching performance.

Ex: Darling-Hammond (1999, page 6) states that “five studies have found no consistent relationship between the **subject matter tests** of the National Teacher’s Exam (NTE)²³ and teacher performance as measured by student outcomes or supervisory ratings.”

However, not one of the five found a negative relationship between student outcomes and the NTE subject matter tests.

1. **Andrews, Blackmon and Mackey (1980)** did not examine the relationship of the NTE to student achievement. In fact, they found a positive relationship from teachers’ scores on the NTE English and elementary subject



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matter tests with supervisors' ratings; the only negative relationship found was from teacher scores on the physical education and special education NTE tests with, again, supervisors' ratings.

2. **Ayers and Qualls (1979)** did not examine the relationship of the NTE to student achievement, only the relationship of teachers' scores on the NTE with their ratings by their students.

3. **Quirk, Witten and Weinberg (1973)** did not examine the relationship of teachers' scores on the NTE subject matter tests with student achievement, but only scores from the NTE Core Battery. They uncovered one mediocre study done in 1947, and it reported a *positive* relationship between the teachers' scores on the NTE and student achievement.

4. **Haney, Madaus and Kreitzer (1987)** present the same research found in Ayers and Qualls and Quirk, et al. One of the authors, George Madaus, told us that he was not aware of any research showing a negative correlation between the NTE subject matter test and student achievement.²⁴

5. **Summers and Wolfe (1977)** was the only

study of the five that explored the relationship of NTE subject matter tests with student achievement. It found a largely *positive* correlation with higher student achievement! However, they did find a “perversely” negative relationship between teachers' scores on the NTE Core Battery, a test of pedagogy and basic skills given to 6th grade teachers and their students' achievement.

See also Appendix B discussions for Darling-Hammond (1999, 2000) on Armour-Thomas (1989) and Taylor and Dale (1971).

3. Research that is old and irretrievable is cited.

The fact that research is relatively old does not automatically negate its relevance.²⁵ That said, older studies should be regarded skeptically. There are many reasons why older research is problematic:

1. Most studies written before sociologist James Coleman's 1966 seminal study did not use student achievement as the measure of teacher effectiveness; they were more apt to use supervisory ratings, which can be too subjective to measure teacher quality accurately, and which usually fail to control for critical teacher and student variables.

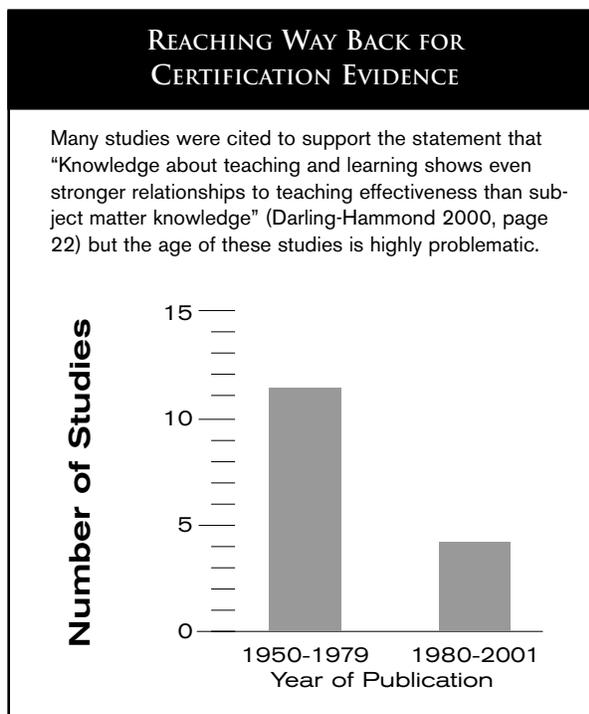
²³ *It is important to understand the distinction between the Core Battery portion of the National Teacher's Exam (NTE) and the subject matter portion of the NTE. The Core Battery was a test of basic skills and knowledge of pedagogy. The subject matter portion was a test of teacher's knowledge of the subject area that he or she was going to teach.*

²⁴ *Email correspondence from George Madaus to The Abell Foundation, March 27, 2001.*

²⁵ *We found a small amount of useful research dating back several decades, notably, in our view, one of the most superior studies of the past half-century written by Summers and Wolfe (1977).*



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2. Before the advent of the modern computer, circa mid-1960’s, some of the more sophisticated and more accurate analyses were not feasible. Goldhaber and Brewer (1996) note that many studies, “particularly those completed in the 1970s, had major deficiencies in empirical methodology and available data” (page 4).

3. Research needs to be subject to continuing academic scrutiny. The older the research is, the

less likely that it can be found through routine sources and verified by others.

4. The structure and makeup of schools change. To name but a few, the level of financing changes; average class sizes change; teachers arrive with different sets of common attributes; and students present a different set of social issues.

5. Older studies may not control for critical variables; for example, older studies may not control for either student poverty, not clearly established as a critical variable until the late 1960s, or prior student achievement.²⁶

Ex: Darling-Hammond (1999, page 6) claims there is “little or no relationship between teachers’ measured intelligence and their students’ achievement.” She supports this statement with two studies by **Soar, Medley and Cocker (1983)** and **Schalock (1979)**. These two studies simply recycle research from the 1940s and earlier, none of which is retrievable for scrutiny.²⁷

See also Appendix B discussions for Taylor (1957); Begle (1972, 1979); Begle and Geeslin (1972); LuPone (1961); Massey and Vineyard (1958).

²⁶Conversation with education researcher, Dr. Sam Stringfield, May 2, 2001.

²⁷Schalock cites Hellfritzch (1945), LaDuke (1945), Rostker (1945) and Morsh and Wilder (1954), most of whom showed small but positive correlations between measures of intellectual ability and “teacher effectiveness” (most likely measured by supervisors’ ratings.) Soar, Medley and Cocker (1983) do not actually cite any studies but refer to a “handful of studies” done in the 1940s (page 240), summarizing that “none of these studies found a correlation between teachers’ scores on any kind of written test and their ability to produce gains in student achievement.” Soar et al.’s conclusion has clearly been refuted by the firmly established effect of teacher’s verbal ability on student achievement .



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4. Conclusions are asserted absent any evidence.

Ex: Denton and Lucina's 1984 study is cited repeatedly by certification advocates for finding a positive relationship between formal teacher preparation and student achievement (Evertson, Hawley and Zlotnik, 1985; Darling-Hammond, 1999). Yet Denton and Lucina never looked at student achievement; their study measured the morale of student teachers and how supervisors rated them when student teaching.

See also Appendix B discussions for Taylor (1957); Ferguson and Womack (1993) and Darling-Hammond (1992) on Veenman (1984); Darling-Hammond (1999, 2000) on Begle and Geeslin (1972); Evertson, Hawley and Zlotnik (1985) on Denton and Smith (1983); Ferguson and Womack (1993).

5. Research that has not been subjected to peer review is treated as legitimate research, with particular reliance on unpublished dissertations.

The process of peer review, having researchers' fellow professionals review a study before it is

deemed worthy of publication, is a fundamental practice followed in all fields of serious scientific study. Yet, many assertions about teacher certification are largely, if not exclusively, dependent upon the evidence provided from unpublished dissertations, papers delivered at conferences but never published, or articles published in the many education journals that are not "refereed."²⁸

Ex: Ashton and Crocker (1987) cite numerous studies on teacher preparation to support their conclusion that education coursework is more important for teacher effectiveness than is subject matter coursework. They claim that nine of the 14 studies they found showed that subject matter coursework made no difference. Careful reading of the footnotes reveals that all but two of these studies were dissertations, unpublished and unavailable to scrutinize.²⁹

Ex: Druva and Anderson (1983) reported a largely positive link between education coursework and "successful teaching," but 54 of the 65 studies reviewed were dissertations or unpublished articles.

The difficulty of tracking some of these studies is worth noting. We tried to find one frequently

²⁸For example, many education magazines lack a system of blind peer review, including Phi Delta Kappan, Education Leadership, and American Educator. The journals published by the American Education Research Association are all refereed.

²⁹The two that were published are equally problematic as the unpublished studies. Rothman, Welch, and Walberg (1969) only studied 35 teachers and these teachers were accepted into an elite project developed by the Harvard Physics Project making it inappropriate to generalize the findings. The other study, Perkes (1967), produced mixed results: students whose teachers who took more subject matter coursework reported higher scores on an achievement test, but lower scores on a test of higher order thinking.



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cited unpublished paper, delivered at a 1990 AERA conference in Boston and written by **Gomez and Grobe**. It was not available from the archives of the AERA and could not be located through the services of a university library. Even the authors no longer had a copy of the paper, and none of the researchers who cited this study were either able or willing to produce the report.³⁰

6. Instead of using standardized measures of student achievement, advocates design their own assessment measures in an effort to prove certification's value.

Ex: McLaughlin and Marsh (1978) devised a new teacher attribute labeled a “sense of efficacy,” consisting of two questions designed to probe a teacher’s ability to motivate students. One of the two questions asked the teacher to respond “yes” or “no” to: “*If I try really hard I can get through to even the most difficult or unmotivated student.*” Only the most challenged respondents would have been unable to guess which answers were the “proper” answers. Without levity, the authors state that this measure had a stronger effect on student achievement than their measure of verbal ability.

See also Appendix B discussions for Hice (1970); McNeil (1974); Denton and Smith (1983); Rowan, Chiang and Miller (1997).

7. Studies in support of teacher certification routinely violate basic principles of sound statistical analysis that are taken for granted in other academic disciplines; methodological errors go unchallenged.

Sound statistical analysis requires careful design, ensuring that the group or sample tested is of adequate size. There is no rule that prescribes the right size for a study because the number

³⁰It took us weeks to find the authors, partly because the author's name was listed in several citations as "David" Gomez though in fact the author is not a male David, but a female "Deborie" Gomez. We only caught the problem when we found a reference to a "Grobe" writing education research in California who was married to someone named Gomez, who had been employed in a Texas education office. The authors no longer had a copy of the paper, nor did anyone in an alternative certification office in Dallas or Houston, but their own recollection of their findings differed significantly from others' interpretations (See Appendix B).



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needed depends on the degree of accuracy required, the degree of variability in the population, and the number of variables examined.

In addition, the group in the study should mirror the range of characteristics of the population. There are specific criteria for evaluating the validity of results and for ensuring that the analysis has not fallen prey to incorrect specification or excessive generalization.

Research on teacher certification routinely violates these rules.

STUDIES DO NOT CONTROL FOR KEY VARIABLES CRITICAL TO UNDERSTANDING STUDENT PERFORMANCE.

Ex: Darling-Hammond asserts that “students will achieve at higher levels and are less likely to drop out when taught by certified teachers” (1997, page 9). She supports this claim using three studies: Knoblock (1986), Sanders, Skonie-Hardin and Phelps (1984), and Council on School Performance (1997). None controlled for poverty. Studies of teacher effects on student achievement need to include controls for student poverty as this variable appears to be more important than any single variable for determining student achievement (Coleman, 1966; Greenwald, Hedges and Laine, 1996; Hanushek, 1986).³¹ She acknowledges this fact when she cites these three studies the second time in 1999 (page 9); it would have been more appropriate not to mention these studies.

See also Appendix B discussions for Begle (1979); Begle and Geeslin (1972); Council for School Performance (1997); New York City Board of Education (2000); and Popham (1971).

³¹For example, distinguished researchers Eric Hanushek and Larry Hedges will only include studies that control for poverty when they perform meta-analyses on the impact of school resources on student achievement. An exception is William Sanders, who does not control for student poverty or race in his well known value-added studies in Tennessee. However, he includes not just one prior test score, but often several years of prior test scores, allowing “each student to act as his or her own control.” His theory is that after controlling for prior student achievement, race or poverty do not matter in student gains.



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CONCLUSIONS ARE DRAWN BASED ON SAMPLE GROUPS THAT LACK THE RANGE OF CHARACTERISTICS OF THE GENERAL POPULATION.

Ex: The work of a respected mathematician in the mid-twentieth century, Edward Begle, is cited by certification advocates as one of five studies that “show no or negative relationship between teacher knowledge and student achievement” (Evertson, Hawley and Zlotnik, 1985). Indeed, Begle did not find that the number of mathematics courses a teacher had taken had a strong effect on the students’ achievement, but he calls attention to a critical limitation of this 1972 study that later citations of his work, including one by Evertson et al., do not. The teachers in the study were part of an elite group, all having been accepted to the National Science Foundation Summer Institute; they also felt comfortable volunteering to take a test of their mathematical knowledge for the study.

See also Appendix B discussions for Guyton and Farakhi (1997); Ferguson and Womack (1993); Olsen (1985).

CONCLUSIONS ARE DRAWN BASED ON SAMPLES THAT ARE TOO SMALL TO PRODUCE RESULTS WHICH ARE RELIABLE OR GENERALIZABLE.

Ex: Wilson et al. (2001) include inappropriately an “interpretive study” of only three teachers – all certified

– in their count of studies that they claim prove the value of certification.

See also Eisenberg (28 teachers); Hawk, Coble and Swanson (36 teachers); Hice (40 teachers); Perkes (32 teachers); McNeil (38 teachers); Thoman (29 teachers); Ashton and Crocker; Davis (29 teachers); Grossman, 1989 (3 teachers); Lins (27 teachers); Rothman, Welch, and Walbert, 1969 (35 teachers).

8. Studies suffer from serious statistical errors known as aggregation bias, producing findings that are distorted significantly.

Aggregation bias (also known as ecological fallacy) occurs when a researcher gets data at an aggregated level but wants to make a statement at a disaggregated level.

The following scenario may help explain this complicated and frequent statistical error.

A study compares the rate of bicycle ownership in two small European countries. The researcher finds that there are many more bicycles in the country with a much higher per capita income than in the country with a lower per capita income. Based on this finding, he theorizes that more affluent people are able to afford more bikes. In fact, if he had disaggregated further the data on



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bicycle ownership to measure more specific variables, he might have discovered the actual reason why there were more bicycles in the wealthier nation. By looking at the income level of the people who actually owned the bicycles or how wealth was distributed in the country, he might have learned that the poorest people were so poor that they could not afford cars, necessitating bicycles for transportation.

Education research contains many examples of studies that examine data aggregated at the state level; e.g., the number of certified teachers in the state. These data are used to reach conclusions about the qualities effective teachers need; for example, “certified teachers produce higher student gains.” For the same reason that the hypothetical researcher was not able to know that poor people were buying more bikes, it is not possible to know if certified teachers produce higher student achievement simply because a state with high test scores employs more certified teachers. It may well be that some other variable, one having nothing to do with teacher attributes, is responsible for student performance. Using state-level data, these variables are inordinately difficult to account for; this is the reason most researchers do not attempt state-level analyses.

Aggregation bias is one of the most debated and routinely committed errors in statistics (Hanushek,

Rivkin and Taylor, 1996). It is also one of the harder concepts to understand, because it can seem counterintuitive to suggest that analyzing large samples of data can create distortions that might not be present in smaller studies. Nevertheless, it is not the large sample size that presents the challenge for the researcher; it is the way in which the large amounts of data are analyzed.

Ex: In 1999, Darling-Hammond published a widely publicized study of the relationship between student performance on 4th and 8th grade national tests with the educational background of teachers employed in the state. She found that those states reporting higher student achievement also employed a greater percentage of certified teachers.

Her findings do not take into consideration two very important factors that statisticians recognize as aggregation bias:

1) Many other unmeasured variables might explain why scores were higher in some states than in others, but these are impossible to control. For instance, Darling-Hammond did not control for class size differences among the states.

2) The findings are biased because an average score is used to represent all student performance in each state. Different types of students, such as low achievers, high achievers, minority, white, or Asian, respond differently to different kinds of teachers; but in a state-level study, all of these



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heterogeneous effects appear homogeneous. For example, **Summers and Wolfe (1977)** found that African-American children who are poor learn more when taught by teachers who attended more selective colleges, and their gains are larger than for other types of students.

In the study, Darling-Hammond acknowledges the likely distortions of her findings: “Aggregating data to the state level produces different results than one would find on one looked at similar kinds of data at the individual student, teacher, school, or district level” (page 28).

Even conceding that the findings are probably not accurate, she maintains that the data is still useful “for the purposes of assessing broad policy influences at the state level.”

For more examples where aggregation bias may be a problem, see also Appendix B discussions on Armour-Thomas et al., (1989); Ferguson (1991);



Grissmer (2000); Begle (1979); Strauss and Sawyer (1986); National Center for Education Statistics (1994, 1992); Coleman (1966).



4. MARYLAND'S REGULATORY DRIFT

Although the research about teacher certification lacks substance, its impact on who can teach in Maryland classrooms is both tangible and troublesome. The State's insistence that teachers be fully certified is costly; the benefits are purely speculative. While the State holds its nearly 1,400 schools accountable for their student outcomes using various punishments and rewards, it restricts these schools' ability to decide freely the single most important variable to student achievement: the quality of their teachers. In contrast, the State is accountable to no one. There are no direct consequences on State officials for poor school performance, yet these officials wield considerable power.

In the early 1990's, when the State Board began to build its school accountability program, it also enacted more flexible policies toward teachers. However, these efforts have fallen victim to regulatory drift, the tendency of State officials to increase control by regulation. Regulations have been approved without any reference to supporting research. More importantly, the State has no strategy to measure the impact of these regulations.

REGULATIONS GOVERNING PRIVATE SCHOOLS AND PUBLIC UNIVERSITIES

Two sharply differing approaches to the selection of teachers are practiced in Maryland and across the nation. The first is the regulatory approach, enforced to some degree by every state on its public schools. This approach focuses on specific inputs, such as the courses teaching candi-



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dates must take before teaching. The second approach is the practice of every state concerning private schools: the only credential required for private school teachers is a bachelor's degree.

Maryland's hands-off policy toward private school teachers contrasts with its active regulatory role a propos other facets of private schools. The State imposes substantial restrictions on private schools (see box) but, other than a criminal background check and a bachelor's degree, private school teachers do not have to meet any State criteria to determine if they are qualified to teach.³² Perhaps this dichotomy indicates that even the State is ambivalent about certification's value.

Higher Education. The State's public colleges and universities also enjoy the same lack of regulatory control of their teaching faculties. There are no regulations about the credentials that faculty members must have in higher education. Individual colleges and universities impose their own credential requirements.

A SYSTEM OF MULTIPLE CERTIFICATES

Under the current system of certification, some teacher is always teaching without appropriate cer-

tification. Maryland lists 66 different school certifications, each with its own set of requirements.³³ This regulatory excess contrasts with medicine, law, accounting and dentistry fields in which states typically issue only one license to practice, no matter what branch of medicine or what area of law an individual may be practicing. A consequence of this bewildering system is that virtually no school district can ever fully comply.

SONDHEIM COMMISSION

In a remarkably progressive effort, the 1989 *Maryland Governor's Commission on School Performance*, known informally as the Sondheim Commission, called for the "elimination of rules, regulations, and other strictures that constrain school staffs." It specifically stated its suspicion that state certification requirements impeded quality education.³⁴ The Commission challenged the State to hold schools accountable for outputs and to avoid regulating the inputs. Although in 1990 the State Board of Education adopted enthusiastically the Commission's report, there has been little progress on reducing State regulations governing teacher training and certification.

³²COMAR 13A.09.09.06. *The State has one exception to these regulations: nonpublic schools receiving federal funding for service to special education students need to employ state-certified special education teachers.*

³³Maryland regulations (COMAR 13A.12.01 through 13A.12.04) list 45 different teaching certificates, 11 specialists' certificates, and 10 administrative certificates.

³⁴Report of the Maryland Governor's Commission on School Performance, 1989, page 22.



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STATE REGULATIONS GOVERNING MARYLAND'S PRIVATE, NON-RELIGIOUS SCHOOLS*

- A private school must be certified to operate, a process that includes direct observation by State officials.
- The content of the school's report cards must meet the State standard.
- All students are required to have a personal education plan.
- The number of books in the library must meet the State standard.
- The time that must be spent each day on certain subjects is prescribed by the State.
- The number of instructional days each year is prescribed by the State.
- There must be a written curriculum for each subject at each grade level.

YET

- *There are no regulations governing the credentials of these schools' teachers, other than a bachelor's degree and passing a criminal background check.*

* Private schools that are religious are subject to almost no regulation.

The Commission's report initially spurred considerable reform including:

- Creation of an alternative path to teaching, known as the Resident Teacher Certificate, in 1992;
- Reduction of the number of education courses required for certification between 1995 and 1998;
- Significant reduction of the number and type of subject-area coursework required for certification under the credit count, in 1995;
- Release of a report in 1995 calling for the "redesign" of teacher education.

Still, the Commission's challenge has gone largely unmet. The normal pull and tug of politics, shifts in priorities, the vocal interests of schools of education and professional teaching organizations, and the State's predilection for regulatory control

have blocked deregulation. Since 1995:

- Significant new education coursework requirements have been added as the State's response to low reading scores. The number of required education courses is now the highest ever in the State, and there is no mechanism in place to assess the effectiveness of these courses;
- A 1995 report, *Maryland's Redesign of Teacher Education*, introduced additional requirements for teacher training, again with no mechanism in place to assess effectiveness, and eliminating none of the existing requirements;
- The State has entered into consortia with national organizations that strongly resist deregulation and alternative routes into teaching.
- The original intent of the Resident Teacher



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Certificate to recruit bright, nontraditionally trained teachers has been undermined by more regulatory requirements.

- The State continues to rely on course counting as the means to assess teacher quality.

THE STATE'S READING INITIATIVE

In response to a well publicized series of reports in *The Baltimore Sun* over the mediocre achievement in State elementary reading scores, the Maryland State Board of Education voted in the summer of 1998 requiring all elementary teachers to complete four courses in reading instruction and all secondary teachers to complete two courses. This move reversed the reduction in education coursework requirements, advocated by the Sondheim Commission. The number of college credits in education courses now required is at an all-time high of **27 credits for elementary school teachers** and **21 credits for secondary teachers** (COMAR 13A.12.02.17 and 13A.12.02.40).

This new initiative, although well intended, demonstrates consistently flawed regulatory tendencies:

1. The State mandated this coursework without a strategy for measuring its impact on State reading scores. Absent any effort to collect data on the capacity of the particular courses (or of the institu-

tions in which they are taught) to improve State reading scores, the value of this costly and time consuming new regulation cannot be discerned.

2. The State did not adequately articulate the rationale for the number of courses. In fact, the only justification for four courses was that they will provide the depth and breadth necessary to cover all of the topics that were identified by the Maryland Reading Task Force. Yet this report was itself criticized by five national reading experts for providing little meaningful guidance to teachers and appearing to contradict evidence about the way children learn to read.³⁵

3. There is every reason to believe that some of the new reading courses may be the same ineffective courses, now under new titles and descriptions.³⁶ No matter how thorough the State's approval process may be, it cannot guarantee the quality and value of this coursework, taught by faculty from the same schools of education which had earlier advanced ineffective methods of reading instruction.

4. The initiative may be regulatory overkill, requiring teachers who do not need to teach reading fundamentals to take courses in the subject. The requirement applies equally to high school teachers of mathematics, art, music, technology, and English teachers.

5. The regulations do not distinguish between

³⁵The Baltimore Sun, "Md. reading plan flawed, experts say" October 3, 1998, page 1A.

³⁶The Baltimore Sun, "Bold reading reforms bog down in colleges" June 26, 2001, page 1A.

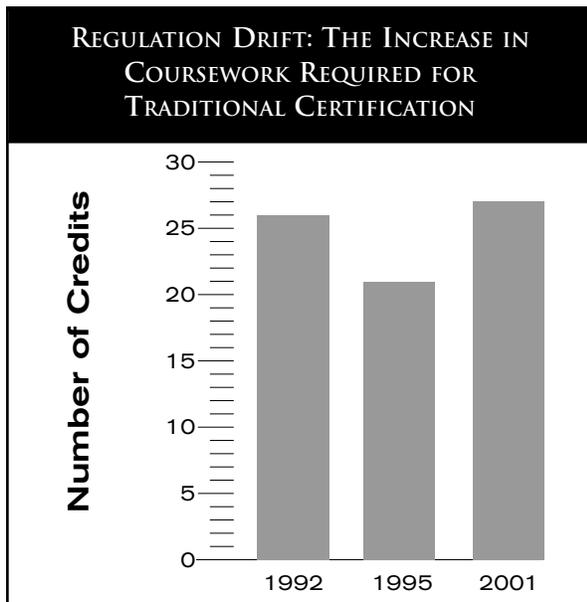


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the needs of different schools in the State.

Requiring teachers at Montgomery County's Walt Whitman High School, one of the best performing high schools in the nation, to take the same State-prescribed coursework as teachers assigned to a low-performing, reconstituted-high school will almost certainly result in some teachers wasting their time.

An alternative. Responding to some of these criticisms, the State is now allowing experienced teachers to “test out” of the requirements. There is no move, however, to allow *new* teachers to test out of the requirement. School districts and principals are not granted any discretion to ascertain the level of reading skills needed by teachers, both new and veteran.



Alternatively, the State could offer a tremendous service to districts and schools by providing them with sound reading assessments, tools that districts could use to judge the knowledge and skills of prospective teachers, as well as help determine the particular professional development needs of their veteran teachers.

MARYLAND'S REDESIGN OF TEACHER EDUCATION: MORE INPUTS?

The State Department of Education has responded timidly to the Sondheim Commission's challenge, stopping far short of adopting student achievement as the output by which to measure teacher effectiveness. The department has interpreted the mandate for “outputs over inputs” by collecting more data on teachers and schools of education (see MSDE, July 30, 1998: 30-31), but not by reducing many of the inputs.

The major purpose of its *Redesign of Teacher Education*, which became state policy in 1995, was to eliminate State-mandated inputs for traditional teacher education.³⁷ Yet the *Redesign* has very little to say about current teacher education requirements other than the important and commendable point that teachers need to know their subject matter.

The real focus of the *Redesign* is to prescribe the content of Maryland's mandatory student teaching

³⁷Letter from Dr. Nancy Grasmick to Mr. Robert Embry, The Abell Foundation, July 27, 2000.



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experience, which it renames a *clinical internship*. It prescribes three extensive portfolios that teacher candidates prepare at different points during their student teaching experience before the State grants certification. These portfolios do not replace the coursework that schools of education and the State require.

Furthermore, the *Redesign* never states how the clinical internship, which it advises to be a year long, will accommodate someone who has not enrolled in a formal teacher program at a university or college.

An alternative. A genuine commitment to the principles outlined by the Sondheim Commission would mean that the State stop requiring certain coursework or program approval for teacher preparation. Responsible but flexible governance by the State, first, would ensure that teaching candidates meet a minimal standard for entry, such as a bachelor's degree and a passing grade on a suitable teacher examination. Second, schools would be allowed to judge the true merits of particular candidates since they are held accountable by the State for student achievement.

MARYLAND'S ALLEGIANCE TO PROFESSIONAL TEACHER ORGANIZATIONS

A major impediment to substantial deregulation of teacher certification policies in Maryland is

the State's close alliance with powerful organizations whose interests align with maintaining or even strengthening the current regulations.

NATIONAL COMMISSION ON TEACHING AND AMERICA'S FUTURE

In 1997, Maryland entered into a consortium of states led by the National Commission on Teaching and America's Future (NCTAF), chaired by Linda Darling-Hammond. NCTAF is a private organization, funded by the Rockefeller and Carnegie Foundations.

The goal of NCTAF is to "professionalize" teaching, with an emphasis on formal teacher preparation. Though NCTAF acknowledges there are multiple paths into teaching, it in no way supports the deregulation of the profession. The only alternative routes that NCTAF endorses are those contained within traditional, university-based formal teacher preparation programs.

The NCTAF consortium shifts control of and policy making for the teaching profession away from public bodies, such as local school boards and state education agencies, to private accrediting bodies. (MSDE, July 30, 1998: v-vi). Consequently, as of 2001, the only body approved by the State Board of Education to accredit schools of education in Maryland is NCTAF's close ally, the National Council for the Accreditation of Teacher Education (NCATE), headed by Arthur Wise.



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MARYLAND'S NCATE-ACCREDITED INSTITUTIONS*

BOWIE STATE UNIVERSITY
TOWSON UNIVERSITY
COPPIN STATE COLLEGE
MORGAN STATE UNIVERSITY
SALISBURY STATE UNIVERSITY
UMBC
UMCP

NATIONAL COUNCIL FOR THE ACCREDITATION OF TEACHER EDUCATION

NCATE's relationship with the State of Maryland also tends to stifle reform. NCATE and MSDE conduct joint evaluations of Maryland's teacher preparation programs, providing each other feedback. Unfortunately, both NCTAF and NCATE oppose strenuously teachers who have not participated in formal teacher preparation programs and resist their entering the profession.³⁸ Therefore, NCATE's broad influence and partnership with the Maryland Department of Education bodes ill for flexibility and openness in teacher training. It is extremely unlikely that it would

endorse any Maryland program or effort to bypass the traditional approach to teacher preparation. NCATE's standards provide leverage only for *reversal* of Maryland's professed emphasis on outputs over inputs.

A NATIONAL RESERVOIR OF ILL WILL TOWARD NCATE

Whereas MSDE has embraced NCATE, many schools of education in the nation, especially independent colleges, find its standards so detailed and prescriptive that "that they have become unreasonable."³⁹ Only 500 of the 1,200 institutions that prepare teachers are NCATE-accredited, many of them opposing NCATE's review process.⁴⁰ Only one-half of the nation's top 50 schools of education have sought and received NCATE accreditation.⁴¹ There is such a backlash against NCATE's attention to process over product that the Council on Higher Education endorsed recently alternative accrediting body that regards itself as a renegade. Though far more flexible than NCATE, this organization, known as *Teacher Education Accreditation Council*, is not permitted to accredit Maryland schools of education.

³⁸Darling-Hammond, *Doing What Matters Most*, NCTAF, 1997.

³⁹Remark made by Sandra Cohen, the director of teacher education for the education school at the University of Virginia in Charlottesville, one of top twenty programs in the country as ranked by US News and World Report, reported in *Education Week*, May 23, 2000, Vol XX (37): 13.

⁴⁰Phi Delta Kappan, *January 2001*, page 39.

⁴¹<http://www.usnews.com/usnews/edu/college/rankings> and <http://www.ncate.org>.



5. MARYLAND'S REGULATORY HURDLES

Neither the ten-year-old alternative teaching certificate, known as the Resident Teacher Certificate, nor the State's Credit Count procedure offer prospective teachers significant ways to circumvent the State's cumbersome regulatory hurdles.

THE UNMET POTENTIAL OF THE RESIDENT TEACHER CERTIFICATE

The Resident Teacher Certificate represents a genuine effort by the State Board of Education to give school districts (not individual schools) more flexibility in hiring. Created by regulation in 1990, the Resident Teacher Certificate was designed to attract academically talented college graduates possessing a 3.0 GPA in their major, allowing them to bypass education coursework requirements. Only 500 teachers have been hired under this certificate since its inception, though nearly 50,000 teachers were hired in the State in this same time period.⁴²

A TROUBLED HISTORY

Despite its capacity for attracting bright, capable teachers, the Resident Teacher Certificate has never flourished. Dependent for years on private support, disparaged in official state documents, and a victim of conflict between the State department of education and the districts that have tried using it, the certificate has had the status of a poor cousin. Its inferior status may be attributable to mixed messages from State officials, compounded by strong adherence to traditional teacher certification by school district officials. The State's analysis of the Resident Teacher Certificate described it as "substandard."⁴³

⁴²Maryland Teacher Staffing Report, 2000-2002 found on www.msde.state.md.us.

⁴³Maryland State Department of Education, July 30, 1998: 18.



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RENEWED EFFORTS

More recently, the State maintains that it is “actively campaigning to scale up” use of the Resident Teacher Certificate.⁴⁴ As the teacher shortage reportedly has grown, the State Superintendent has become more vocal in support of the Resident Teacher Certificate. The Maryland State Department of Education (MSDE) reports that three higher education institutions are working actively with local school districts to create new Resident Teacher programs. For the past couple of years, it has requested that the Governor provide funding to expand the use of this certificate; additionally, it has sought grant money to bring into the teaching profession more career changers using this certificate.

NEW REGULATIONS

The State's change of heart may have been provoked by the rising teacher shortage, but it unfortunately coincides with the addition of more coursework requirements for obtaining the certificate. The

The Resident Certificate is no longer as flexible as it once was; and it certainly can no longer be used to bypass education coursework.

requirements have evolved from an unrestrictive process in 1990, when a candidate had to present strong academic credentials and then participate in a short summer training program to a process in 2001 that is substantially more regulated. Given these new requirements, the Resident Teacher Certificate is no longer as flexible as it once was. It certainly can no longer be used to bypass education coursework.

BALTIMORE CITY'S USE OF THE RESIDENT TEACHER CERTIFICATE

The increased State-wide use of the Resident Teacher Certificate is somewhat ironic, given that Baltimore City decided in 2000-2001 to discontinue targeted staffing of its Resident Teacher recruitment office, apparently reacting to perceived pressure from the State to concentrate on the recruitment of traditionally certified teachers. For the school year 2001-2002, it recruited one of its smallest cohorts since the program's inception ten years ago.

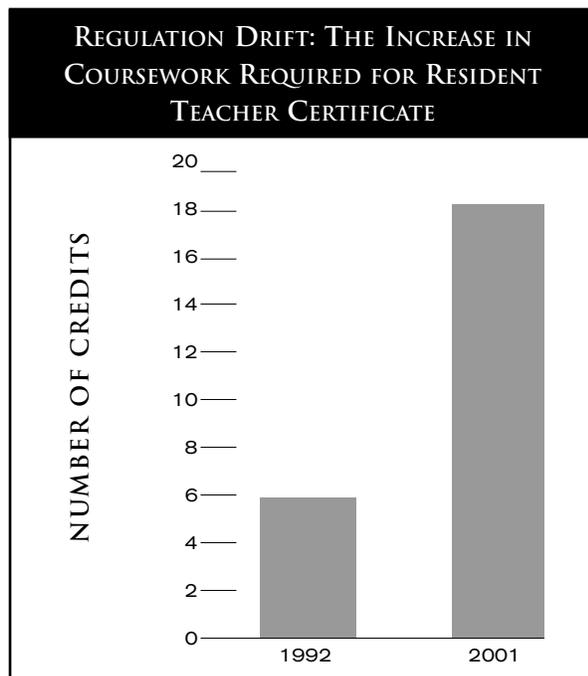
While Baltimore usually hires the most Resident teachers in the state, it has always hired relatively few compared to its total number of new teacher hires each year. Part of the reason for this limited recruitment lies with the State's certification division, which plays an aggressive role in the management of

⁴⁴ Correspondence from Dr. Nancy Grasmick to the Abell Foundation, July 13, 2000.



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the district's Resident Teacher program. Subjected to a level of scrutiny given to no other school district's hiring practice, the transcript of *every* applicant to this program is reviewed by the State, eliminating any candidate who fails to meet its criteria.



In 1990, the Resident Teacher Certificate required completion of 90 clock hours of teacher training in advance of teaching, equivalent to 6 credits. By 2001, that requirement has increased to 135 hours of education coursework, roughly equivalent to 9 credits, before starting to teach. Another 135 hours (9 credits) is required over the course of the first two years of their teaching, Resident Teachers must acquire only 9 credits less than a traditionally certified elementary teacher. Secondary teachers get off a little bit easier, having taken in 45 clock hours or 3 credits after the initial 135 hour pre-teaching requirement, again 9 credits less than required of a traditional certified secondary teacher.

AN APPARENT PREFERENCE FOR PROVISIONAL TEACHERS

The city hires a much larger number of provisional teachers each year than Resident teachers: about 55 percent of new hires are provisional, compared to about 10 percent who are classified as Resident teachers (a figure that includes Teach for America candidates). Each year, the city renews its commitment to the State to hire more certified teachers, bypassing opportunities to recruit qualified Resident teachers. Each year, the city comes up short on certified teachers and, faced with a time crunch, races to hire as many provisional teachers as it can, so that classrooms do not stand empty.

By virtue of the high academic requirements for the certificate, Resident teachers bring strong academic credentials that provisional teachers do not. More than 20 percent of Resident teachers hold advanced degrees in their fields, and all of them possess the Resident Teacher Certificate's requirement of a 3.0 GPA in their undergraduate major. On scores on the National Teacher's Exam (Core Battery and Specialty Areas), teachers in the Resident Teacher Program outscore both provisional and traditionally trained teachers, both in Maryland and nationwide.⁴⁵ These programs attract into the profession candidates who want to teach but are unwilling to complete certification requirements. For

⁴⁵Data supplied by the Resident Teacher office, Baltimore City and Teach for America, Baltimore.



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example, for every slot Teach for America has available, it receives five applications, an enviable application rate in a time of teacher shortage. On the other hand, Baltimore City hires nearly every certified applicant who applies.

WHAT DO ELEMENTARY TEACHERS NEED TO KNOW?

Since 1998, the Maryland State Department of Education has elaborated upon the subject-area coursework requirements needed to qualify for the Resident Teacher Certificate, including coursework in multiple subjects required of elementary teachers. Though much evidence suggests that secondary teachers who have taken more coursework in their subject area are more effective teachers, the subject-area coursework that may be needed by elementary teachers is not so easily discerned, and it has not been identified by any research (*See Chapter 1*).

The State's requirements for elementary teachers (6 credits each in social studies, mathematics, science, and English) seem reasonable, but in practice, these course requirements preclude many talented and able individuals from teaching in Maryland (*see box on Stephanie Nelson*). There are four reasons why this ruling is so problematic:

1. No study has shown a positive relationship between any subject-area college coursework and an elementary teacher's capacity to be successful.

2. Many universities and colleges do not require a broad base of coursework across the disciplines to satisfy the requirements of a liberal arts degree, precluding some of most able candidates.

3. The State will not consider other alternatives for demonstrating that requisite knowledge has been obtained, such as a test.

STEPHANIE NELSON

Stephanie Nelson is a native of Baltimore and a graduate of the prestigious Bryn Mawr School. She recently graduated cum laude from Duke University with a degree in cultural anthropology and was accepted into the highly competitive program, Teach for America. She wanted to return to Baltimore to teach elementary school but was told by the State that she could not teach in Maryland, even under the Resident Teacher Certificate. Despite the fact that Stephanie graduated with honors in her class at Bryn Mawr, and scored a 1460 on her SATs, she was considered inadequately prepared for teaching elementary school because she had not taken science courses in college. Stephanie will be teaching in Washington, D.C. public schools this year.

4. There is no indication that, even if an individual has taken requisite college coursework, these requirements have any relevance to what an elementary teacher will be teaching. For example, in Maryland, most elementary schools teach no history in grades K-3 and in grades 4 and 5 teach



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only the most rudimentary units in Maryland and American history. Why, then, is an elementary teacher who has taken such courses as “Ancient Chinese History” or “The Russian Revolution” more qualified to teach than someone who has not? The State cannot assert that such coursework assures teacher preparedness.

The result of these well-intentioned regulations on coursework is that Resident Teacher programs cannot accept many of the candidates for whom the certificate was designed.

ILEANA IMHOFF

Ileana Imhoff, a Spanish teacher with twelve years of teaching experience was hired to teach last year in a Maryland public elementary school. Ms. Imhoff, a native Spanish speaker, was informed by the State that she could not continue teaching unless she took 54 credits of additional coursework. The time, energy, and expenses required to take 6 college courses a year over three years, especially when her principal already considered her an excellent teacher, was untenable. She left the public school system and was immediately hired by a prestigious private school, which in her own words *“would not place unreasonable hurdles on my professional future.”*

TEACH FOR AMERICA

These restrictions led officials from the national teacher service group, Teach for America, to identify Maryland’s regulations as *“the most stringent”* of its fifteen regions located across the United States.⁴⁶ Though 1,100 applicants were accepted into Teach for America with an average college GPA of 3.4, the organization had a difficult time providing Baltimore City public schools with 75 candidates who met the State’s various criteria for coursework.

THE CREDIT COUNT, A ROUTE WITHOUT MERIT

Recent college graduates with non-education degrees may seek certification via a “credit count” program option. The term credit count describes the process of transcript checking to identify courses that meet certification requirements, a judgment based essentially on the titles of courses. Using this option, teaching candidates enroll as post-baccalaureate students at a college or university, in order to complete the State-required content-area and education courses for which no equivalents can be found in their undergraduate records. The credit count is entirely a matter of completing certain types and quantities of coursework (*see box on Ileana Imhoff*).

⁴⁶Quote from Peter Kannan, Executive Director, Teach for America, Baltimore.



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In 1995, the State significantly lowered the amount of *subject-area* coursework required under the credit count. Still, the credit count option often proves to be elusive, owing to narrow rulings by MSDE staff. It is especially difficult for individuals who were educated outside the United States (*see box on Kanan Mishra*). Even though there is little question that teacher knowledge of subject area is essential, this regulatory approach leaves no room for discretion or alternative ways to assess a teacher's knowledge. For example, a teaching candidate who may have graduated with a high GPA from a selective college and traveled all over the world would not be permitted to teach in Maryland without first taking two geography courses, no matter how much knowledge he could, if permitted, demonstrate about geography.

One teacher educator who works frequently with post-baccalaureate students, negotiating on their behalf with the State, described the credit count option as fraught with difficulty. In most cases these applicants find it easier to pursue certification through enrollment in a costly, year-long Master of Arts in Teaching program.

In sum, even though Maryland advocates flexibility and multiple paths to certification in principle, in practice State teacher certification strongly favors traditional university-based programs. The continued regulatory approach in Maryland and elsewhere retains the focus on input measures and not performance-based measures. Instead, the

KANAN MISHRA

In 1998, a highly competitive math and science program in Baltimore tried to hire a new middle school math teacher, Kanan Mishra. The teachers selected for this selective program are held to rigorous hiring standards, with expectations that they have the teaching ability to prepare their students to be nationally competitive at the most rigorous levels. Ms. Mishra was educated in India, but also received a master's degree in education at Pepperdine University in California, and completed all of the coursework required for a doctorate in math education at Southern Illinois University. She had been certified to teach in another state and had spent the last twelve years teaching in Johns Hopkins' prestigious Center for Talented Youth, as well as teaching college level math at a community college. When this teacher's transcript was routinely submitted to a Maryland official for a "credit count," Ms. Mishra was informed she would not be allowed to teach in a Maryland public school. The official had interpreted her transcript from her Indian undergraduate institution as containing too few courses to be the equivalent of an American bachelor's degree. The official insisted that the presence of a master's and the near-doctorate was irrelevant. All appeals to the State were rejected. It was not until the case was privately taken to the State Superintendent for review that the decision was rescinded. By then, the school year was underway, and Kanan was no longer willing to take the job, returning to teach in community college.

goal of reform should be to attract articulate and capable people to careers in teaching and to free up individual schools to hire the best possible teachers from that pool of applicants.



6. CONCLUSION

Reduced to its essence, teacher certification is incapable of providing any insight into an individual's ability, intellectual curiosity, creativity, affinity for children, and instructional skills. So long as the deficiencies in the research on teacher quality are ignored, misrepresented, or debated, there are clear losers. They are the disadvantaged students who are most dependent upon the quality of their teachers and the opportunity provided by a high quality public school education.

A CAUTION TO POLICYMAKERS

One of the more prolific and respected scholars focusing on teacher quality is Harvard professor Richard Murnane. In a 1983 paper, he identifies three basic sources of teacher competence:

- Intellectual ability
- Formal preservice education
- On-the-job experience

Murnane observes what we, too, have noted: that the most compelling *measurable* evidence on teacher quality is found in a teacher's cognitive ability. This ability is measured by a teacher's score on a test of verbal ability, some other written, standardized measure, or by the selectivity of the undergraduate college attended by a teacher.

Advocates of formal teacher preparation may not acknowledge the preeminence of a teacher's verbal ability, but few familiar with the research would deny that it is a variable worthy of attention. Yet, its importance is unknown to policymakers and the public. This lack of awareness can be attributed, perhaps, to the lack of an advocacy organization championing verbal ability. It is not in the interest of certification advocates to promote the strong findings on the correlation of a teacher's verbal ability with teacher effectiveness.

To concede this relationship would mean acknowledging that formal teacher preparation is not as critical to student achievement as some would advocate.



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The weakest evidence on the effectiveness of any one of the sources of teacher competency is in the area of *preservice education*, the process necessary for certification. Equally important, there is no evidence that school systems should reward teachers for obtaining master's degrees outside a subject area or that teachers should feel compelled to obtain such degrees. This is a firm conclusion of the research. Given the inability of formal teacher preparation to produce measurable results, policymakers should be skeptical about a strategy for improving teaching that relies on changes in formal preservice education.

Murnane concludes:

Teaching is simply not a process that consists of application of codified techniques and principles that can be developed in the laboratory or learned in the university class. The critical skills are acquired through experience.

In other words, the question is not whether there is a set of skills or knowledge that teachers need to have to be effective, but how teachers best acquire them. There is much to learn and know about teaching well, but the acquisition of this knowledge through classroom experience cannot be preempted or circumvented. *In fact, professional education coursework may have considerable value for enriching the professional*

development of practicing teachers and in new teacher induction programs.

It is important to distinguish a process in which school districts, principals, and teachers decide, without worrying about regulatory compliance, what strategies would advance their professional knowledge. The growth and popularity



of new teacher induction programs, once considered a luxury provided sparingly only to *uncertified* teachers, has come to be seen as essential for *all* new teachers. The popularity of these programs serves as a strong indictment of the ability of schools of education to prepare teachers adequately. These teacher induction programs, best accompanied during the first year by a reduced teaching load, may prove far more effective for training teachers.

Most critically, these strategies do not bar bright, talented, and capable individuals from the teaching profession.



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TEACHER CERTIFICATION

APPENDIX A

Maryland's Case for Certification

We asked the Maryland State Department of Education (MSDE) for evidence to support its teacher certification regulations and practices. Though it did not have any research that examined specifically the value of Maryland's teacher certification process, the department did provide twelve citations of newspaper articles, press briefings, studies, and position papers. These documents, claimed the department, "offered research-based evidence on the positive relationship

between having certified teachers in public school classrooms and K-12 student achievement."¹

Of the 12 citations provided, only three even try to build a research-based case linking teacher certification with greater gains in student achievement (Darling-Hammond, 1999, 1992; Fuller, unpublished). The nine remaining articles and briefs either do not contribute any evidence of the value of certification or only allude to an amorphous body of research.

¹Correspondence from Dr. Nancy Grasmick, Superintendent of Schools, Maryland State Department of Education to Robert C. Embry, President, The Abell Foundation, August 30, 2000.



TEACHER CERTIFICATION

1. Darling-Hammond, L. (1999) "Teacher Quality and Student Achievement: A Review of State Policy Evidence"

The most comprehensive study on the subject and highly persuasive on first reading, this paper appears to contain extensive support for its many assertions about the need for formal teacher preparation. Unfortunately, the research cited by Darling-Hammond concerning the relationship between student achievement and a teacher's certification is thin. Many of the studies cited must be discounted for never having been subjected to peer review and for being so old that their validity and their relevance are in question. In addition, her interpretations of the research overreach, often employing misleading tactics to exaggerate the case for certification's effect on student achievement (see Chapter 3).

2. Darling-Hammond, L. (2000) "State Teaching Policies and Student Achievement" Teaching Quality Policy Briefs

This is a later, abbreviated form of the above study, restated for a more general readership.

3. Darling-Hammond, L. (1992) Teaching and Knowledge: Policy Issues Posed by Alternative Certification for Teachers

Darling-Hammond presents an elaborate case to support formal teacher preparation and discourage states from adopting alternative certification routes. She congratulates Maryland for developing fairly good alternative routes as, in her view, such programs go; but she is not referring to Maryland's Resident Teacher Certificate, only to a university-based program offering a master's degree in teaching.

Despite all of the carefully crafted statements allegedly supported by nearly 50 studies that she cites, there is not a single piece of credible research presented in this paper that shows that alternatively certified teachers produce lower student gains than traditionally certified teachers. On page 130, she contends "the weight of research indicates that fully prepared teachers are in fact more successful with students than are teachers without full preparation and certification." However, the "weight of research" to which she is referring is three studies. These three studies misinterpret credible findings, cite flawed research often found in unpublished dissertations, or fail to use student achievement as the measure (Ashton and Crocker, 1986; Evertson, Hawley and Zlotnik, 1985; Greenberg, 1983).

Many of her references to research lose all of their authority when scrutinized; for example, her statement "Denton and Lacina (1984) found a positive relationship between the amount of professional coursework taken by teachers and their teaching performance, including their students'



TEACHER CERTIFICATION

achievement” (page 134). Denton and Lacina (1984) did not examine student achievement.

On the most important question of the effectiveness of teachers from alternative programs, Darling-Hammond cites the findings from many studies that looked at alternative programs; but she does not include findings that show alternatively trained teachers are at least as effective at raising academic achievement as those who graduate from traditional programs. For example, she cites a study by Lutz and Hutton (1989) offering evidence that alternatively trained teachers experience less job satisfaction (page 132), but did not report Lutz and Hutton’s more important response to their own question: whether or not alternative certification teachers are good teachers. Their response was “an unqualified yes! On virtually every indicator examined in this study, [alternatively certified] interns did as well as first-year teachers were doing” (page 252).

4. Educational Testing Service (1999), “The Academic Quality of Prospective Teachers: The Impact of Admissions and Licensure Testing,” Princeton, NJ.

This report contains no data or research on any correlation between a certified teacher and student achievement. Rather, its intent is to compare the scores of college graduates who are prospective teachers with the scores of college graduates who

do not enter teaching on such measures as the SAT, the ACT, and the Praxis I and II. The report is broken out by the teacher’s major and anticipated grade level of teaching. The study does not dispel the findings from previous studies showing that prospective teachers do not perform as well on tests such as the SAT, but it does explain and narrow the gap somewhat through its analysis of the data. The report contrasts the differences in academic standing of elementary and special education majors with teachers who have majored in an academic discipline. It provides more evidence of the relatively poor standing of education majors, a difference of about 50 points on the SAT in this particular study.

The report also compares the Praxis pass rates for students who attend institutions whose colleges of education have been accredited by the national accrediting body known as NCATE, but the comparison is problematic (see #8).

5. National Commission on Teaching & America’s Future (November 20, 1997) “Research Proves Well-Prepared Teachers Produce Higher Achieving Students, But Many Students Do Not Have Qualified Teachers” (Press Release)

This is a press release from the National Commission on Teaching and America’s Future, arguing vociferously for formal teacher preparation but providing no evidence of its value.



6. ERIC Digests (1986), “Misassignment of Teachers in the Public Schools”

This article is a description of the problems arising when teachers do not have a major in the subject they are teaching, not to be confused with the problem of uncertified teachers. Teaching outside of one’s field of expertise, even if certified, has been shown to have a negative effect on student achievement (Hawk, Coble and Swanson, 1985; Monk and King, 1996; Goldhaber and Brewer, 1996, 1998, 2000; Hanushek, Gomes-Neto and Harbison 1992; Rowan, Chiang and Miller, 1997). If certification were linked to student achievement, a certified teacher teaching out of field should produce stronger student gains than should a teacher who is not certified and who is teaching out of field. For example, a history teacher who is certified in English should have higher student scores than the history teacher who is not certified in any subject. No research has produced such a finding. The distinguishing feature of these studies of high school teachers is the positive effect knowledge of subject matter, not certification.

7. Wise, Arthur (Fall 1999), “Effective Teachers...Or Warm Bodies?” Quality Teaching, NCATE Newsletter, Volume 9, Issue 1

Written by Arthur Wise, the president of National Council for the Accreditation of Teacher Education (NCATE), this brief states that there are over 100 studies that show “qualified teachers outperform

those with little or no preparation in helping students learn” (page 2). Though Wise, understandably, does not include the titles for these 100 studies in the newsletter, we presume that we have sufficiently examined the 100 studies to which he refers as we did not omit any study from our analysis that related teacher preparation to student achievement. Further, Darling-Hammond (1997) did provide references for 200 studies that purportedly produced similar findings, all of which we reviewed and again found lacking (see Appendix B).

8. Wise, A., “ETS Study Shows NCATE Makes a Difference,” Volume 8, Issue 2

This brief restates the findings from the ETS study (see #4).

The ETS study compares the pass rates on the Praxis teachers’ exam for teaching candidates who attend a college or university where the college of education is accredited by NCATE. NCATE’s growing influence on how teachers should be prepared is controversial; some administrators from private colleges and universities have expressed frankly their perception of NCATE, viewing the accrediting process as “overly intrusive, using vague criteria that focus more on inputs than results.”² This brief reports higher passing rates on the Praxis for teaching candidates attending these institutions compared to teaching candidates from non-NCATE institutions.



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There are two errors in the researchers' presentation of the data: 1) Praxis II pass scores vary considerably from state to state, as does the share of test-takers who graduate from NCATE-accredited schools. The positive relationship between the number of NCATE schools and the Praxis pass rate may simply reflect the fact that NCATE schools tend to be located in states with low cutoff scores. Secondly, researchers classified test-takers based on the college they attended and not enrollment in or completion of teacher training program. In fact, 14 percent of the sample of test-takers report that they were never enrolled in a teacher training program.

Researchers Dale Ballou and Michael Podgursky examined this same issue using individual-level test data obtained in two states that do not mandate NCATE accreditation and that have large numbers of both NCATE and non-NCATE programs. They found no evidence that graduates of NCATE-accredited programs have higher pass rates or higher mean test scores than non-NCATE graduates. In both states, the teacher training institutions with the lowest pass rates were NCATE-accredited (1999, 2000).

The brief does not mention that individuals from NCATE colleges have lower SAT and ACT

scores than individuals from non-NCATE schools.³ It also fails to mention that college graduates who were never enrolled in teacher education programs have higher SAT scores than college graduates enrolled in teacher education programs, a fact confirmed by the ETS study.

9. Center for the Study of Teaching and Policy (March 1998) "Policy and Excellent Teaching: Focus for a National Research Center," University of Washington

This paper outlines the issues surrounding teacher quality and proposes areas to investigate. It presents no evidence on the value of teacher certification.

10. Center for the Study of Teaching and Policy (December 1999) "State Action to Improve Teaching," University of Washington (1)

This brief provides an overview of what states are doing to improve teaching, but does not evaluate these efforts. It urges states to focus on results rather than inputs, specifically referring to education coursework.

²Blair, J., "New accreditor gaining toehold in teacher ed" *Education Week, Volume LXX, (37), May 23, 2001, pages 1, 12;* and, Ballou, D. and Podgursky, M., "The case against teacher certification," *The Public Interest, Summer 1998, Vol 32, pages 17-29.*

³Ballou, D. and Podgursky, M., July 1999, "Teacher training and licensure: A layman's guide," in *Better Teachers, Better Schools, eds. Marci Kanstroom and C. Finn, Jr., Thomas B. Fordham Foundation.*



TEACHER CERTIFICATION

11. Viadero, Debra (March 22, 2000) “Students in Dire Need of Good Teachers Often Get the Least Qualified or Less Experienced,” *Education Week*.

This news article reports on the work of Education Trust, which has provided evidence of the uneven distribution of teacher quality among schools, a disparity dependent upon the affluence and race of the children served. Education Trust (Spring 2000) reports the findings of several studies, most unpublished, showing that children who are minority and poor are far more likely to be taught by individuals who are 1) teaching outside their area of certification; 2) not certified; 3) lacking a major or minor in the fields; or 4) scoring poorly on tests of literacy. Even though all these facts may be true, the studies cited by Education Trust do not isolate teacher certification as a variable (controlling for critical factors such as a teacher’s major or scores on measures relating to verbal ability.)

It should be noted that some researchers dispute the disparity in teaching credentials between poor and affluent schools (Borman and Rachuba, 2000; Lippman, Burns and McArthur, 1996). Nevertheless, most research indicates that the dis-

tinct problem in schools serving children who are poor is the number of teachers who are teaching subjects in which they have no expertise (Goldhaber and Brewer, 2000; Ingersoll, 1998; Hawk, Coble and Swanson, 1985). These studies do not show that certification status, as an isolated variable, has any significant effect on the achievement level of children who are poor or minority.

12. Fuller, Ed (no date) “Does Teacher Certification Matter?” Unpublished paper, University of Texas at Austin; also reported in “Texas Study Links Teacher Certification, Student Success” *Education Week*, May 12, 1999.

Findings from this never-published paper were reported quite prematurely in *Education Week* and by Darling-Hammond, who discussed it extensively in her 1999 study. More than two years later, the author still has not published the research. When we contacted the author at the Dana Center in Texas to try to obtain a finished version of the paper, he warned us emphatically that all he had was a “preliminary analysis for discussion purposes.” The short paper that we reviewed was full of caveats and disclaimers; not one of its findings can be reported with confidence.



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APPENDIX B

Samples of National Research on Teacher Certification and Effective Teaching

The full review of the literature, containing an analysis of over 200 studies, literature reviews and articles is available in a separate volume to this publication.

To order free of charge, contact:

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EXPLANATION OF CHART

Most of the studies that are included in this table were cited by certification advocates as evidence of certification's value. The table also includes research looking at the relationship of both various teacher attributes and teacher backgrounds with their effect on student achievement. A distinction between the two types of research is noted.



Research which has met the highest standard (a blind, peer review) is marked by a ✓+.
Research which was subjected to an objective, internal review is marked by a ✓.
Research which was unpublished or was not peer reviewed is marked by a ✕.



Research which controlled for necessary variables such as student poverty are marked ✓.
Research which did not control for important variables are marked by an ✕.

A	B	C
Author Year	(Relevant) Principal Finding	Study Description / Why This Study Was Cited by Others
Ashton, P. and Crocker, L. 1987	Education coursework has a positive effect on teaching performance.	<p>Of-quoted meta-analysis that looks at the effects of education coursework and subject matter coursework on student achievement. Darling-Hammond (1999) and others cite this review of the research as primary evidence of a "<i>consistent positive effect of teachers' formal education training on supervisory ratings and student learning</i> ." The authors state that 4 out of 7 studies show that fully certified teachers provide greater student achievement than uncertified or provisionally certified teachers. In contrast, only 5 of 14 studies they reviewed showed a positive relationship between teacher's knowledge of subject matter (as measured by credits in coursework) and student achievement.</p> <p>Darling-Hammond (2000) cites this article as one of 10 studies that support her assertion that "knowledge about teaching and learning shows even stronger relationships to teaching effectiveness than subject matter knowledge" (page 22). Of the ten studies [including Begle, 1979; Begle and Geeslin, 1972; Denton and Lacina, 1984; Druva and Anderson, 1983; Evertson et al., 1985; Ferguson and Womack, 1993; Guyton and Farokhi, 1987; Monk, 1994; Perkes, 1967], only Monk could arguably provide unequivocal support for Darling-Hammond's statement on the student achievement variable.</p>
Davis, C. 1964	Teacher's science coursework and professional development improves student achievement.	<p>The study involving 28 science teachers showed that their students achieved more if the teachers had taken more science coursework and had attended National Science Foundation summer institutes. Ashton and Crocker cite this dissertation, but dismiss the findings, with good cause, because too few teachers were involved.</p> <p>Darling-Hammond (1992) cites this study as one of three (<i>see also</i> Druva and Anderson, 1983; Taylor, 1957) to support a statement that the research finds "<i>consistently, positive relationships between student achievement in science and the teacher's background in both education courses and science courses.</i> "</p>
Denton, J. and Lacina, L. 1984	Supervisors rank teachers higher who have had education coursework.	<p>This study examined 82 student teachers, classified as education majors or noneducation majors. It compared the differences in their morale and ratings by their supervisors. The study is the <i>lone</i> study cited by Darling-Hammond (1992 on page 134; 1999 on page 8; 2001 on page 24) for showing a "<i>positive relationship between the extent of professional education coursework and teaching performance, including student achievement.</i>" She also cites this article as one of 10 studies that support her assertion that "<i>knowledge about teaching and learning shows even stronger relationships to teaching effectiveness than subject matter knowledge</i>" (2000; page 22). [See also Begle, 1979; Begle and Geeslin, 1972; Druva and Anderson, 1983; Evertson et al., 1985; Ferguson and Womack, 1993; Guyton and Farokhi, 1987; Monk, 1994; Perkes, 1967.] Evertson et al. cite this study as one of three studies (out of four), providing evidence that student achievement is tied to teacher certification (<i>see also</i> Hall, 1962; Taylor, 1957).</p>

D	E	F	G
Problems Found with the Study or with Claims about the Study	Cited to Justify Certification	Rigor of Review	Critical Controls Used
<p>Ashton and Crocker identify four studies that they claim prove the value of teacher certification, but none of the four provide much in the way of unequivocal evidence (see McNeil, 1974; Taylor, 1957; Hice, 1970; and Perkes, 1967). Ashton and Crocker's assertion that only 5/14 studies showed a positive correlation between student achievement and credits in subject matter coursework does not withstand scrutiny. All but three of these 14 studies were doctoral dissertations and the three that were published suffer from insufficient sample sizes. No serious researcher would have considered them.</p>	Yes	✓+	Na
<p>The small sample size of 28 teachers is problematic, as is the fact that the dissertation was never published. Though Ashton and Crocker dismiss Davis for sound reasons, they do not dismiss two other studies reaching opposite findings, which had similarly small sample sizes. Darling-Hammond's citation of the three studies (including Druva and Anderson, Taylor) is puzzling. Presumably she equates National Science Foundation workshops, which practicing teachers take during the summer for professional development, as "background in education courses." This approach is a bit of a stretch.</p> <p>Druva and Anderson did not find a statistically significant relationship between education courses and student achievement. Taylor, 1957 did not use student achievement as a variable.</p>	Yes	✗	✗
<p>This article did not examine student achievement at all, as Darling-Hammond and Evertson et al. claimed. It looked only at two measures: the self-reported morale of student teachers and their supervisors' ratings of them. The only reference to student achievement is found in the conclusion, referring to earlier studies by Denton that compared the learning gains in classes taught by student teachers who were education majors to those who were not. Denton's methodology in these studies negates its relevance for making any generalizations: each student teacher designed her or his own assessment, independent of the other student teachers. Denton compared the student results across these unequated tests, a fact that was confirmed to us by Denton in an email dated July 24, 2001.</p>	Yes	✗	✗

A	B	C
Author Year	(Relevant) Principal Finding	Study Description / Why This Study Was Cited by Others
Druva, C., and Anderson, R. 1983	Coursework in subject matter, in education, and overall academic performance are positively associated with pupils' ratings and principals' evaluations.	Meta-analysis of 65 studies looking at multiple measures of teacher characteristics, including analysis of teacher's subject matter, experience and and preparation. Darling-Hammond (2000) cites this article as one of 10 studies that support her assertion: "knowledge about teaching and learning shows even stronger relationships to teaching effectiveness than subject matter knowledge" (page 22). [See also Begle, 1979; Begle and Geeslin, 1972; Denton and Lacina, 1984; Evertson et al., 1985, Ferguson and Womack, 1993; Guyton and Farokhi, 1987; Monk, 1994; Perkes, 1967.] This study is also one of three studies cited by Darling-Hammond in 1992 (see also Davis, 1964; Taylor, 1957) said to support the relationship between student achievement and education coursework in science.
Eisenberg, T. 1977	Teacher's knowledge of subject matter and the number of postcalculus courses correlate with student achievement.	Study of 28 algebra teachers looking at relationship between teacher's knowledge of algebra, experience, college mathematics GPA, and number of postcalculus courses taken with student scores on algebraic concepts and skills. Evertson et al. cite this as one of 4 studies, showing there is no or negative relationship between teacher knowledge and student achievement as measured by GPA and standardized tests (page 6).
Everston, C Hawley, W and Zlotnik, M. 1985	Education coursework has a positive effect on supervisor's ratings of teachers. Preservice training in pedagogy is not effective. Teachers' knowledge of subject matter appears to have an insignificant impact on student achievement.	<p>Mediocre review of the research on teacher preparation. In reviewing the research on teacher preparation, Evertson et al. found 13 studies (7 of which were dissertations) that compare the relationship of certification with teacher effectiveness. Of these 13, 3 found a positive effect on <u>student achievement from teacher certification</u> (see Hall, 1962; Taylor, 1957; Denton and Lacina, 1984).</p> <p>Evertson et al. also review studies on the relationship between teacher's <u>subject matter knowledge</u> and <u>student achievement</u>. Darling-Hammond summarizes his review of these 8 studies, stating that 5 of the 8 studies reported no relationship and the remaining 3 found a small positive relationship (see Druva and Anderson, 1983; Massey and Vineyard, 1958; Begle, 1972; Maguire, 1966; Siegel, 1969; Eisenberg; 1977; Byrne, 1983; Hawk et al., 1985).</p> <p>Darling-Hammond (2000) also cites this article as one of 10 studies that support her assertion that "knowledge about teaching and learning shows even stronger relationships to teaching effectiveness than subject matter knowledge" (p. 22). [see Begle, 1979; Begle and Geeslin, 1972; Denton and Lacina, 1984; Druva and Anderson, 1983; Ferguson and Womack, 1993; Guyton and Farokhi, 1987; Monk, 1994; Perkes, 1967.]</p>

D	E	F	G
Problems Found with the Study or with Claims about the Study	Cited to Justify Certification	Rigor of Review	Critical Controls Used
<p>This study found that science coursework was more significant than education coursework when the variables were looked at separately. In order to achieve a statistically significant result under the category "Education and Performance," the authors bundle <u>education courses</u> with six other variables, including GPA, student teaching grade and experience. The relationship between education courses and student achievement was not statistically significant, but courses in science were.</p> <p>The quality of this meta-analysis should be questioned: 52 of the studies were dissertations; 2 were unpublished articles, and only 11 were studies published in journals, many of which were not refereed journals.</p>	Yes	✓+	Na
<p>Evertson et al.'s interpretation of Eisenberg is indefensible. They cite this study to support their belief that subject matter is not all that important, because of the lack of an effect from GPA found by Eisenberg, without mentioning that teacher's knowledge of subject matter clearly did have a significant effect, as measured by their knowledge of algebraic structures and postgraduate calculus coursework.</p> <p>The other three studies cited by Evertson et al. were never published (Maguire, 1966; Byrne, 1983; and Siegel, 1969). Even discounting this problem, the findings from these studies too are mischaracterized.</p> <p>The number of teachers (28) studied does not permit the results to be generalized with any confidence.</p>	Yes	✓+	✓
<p>When we read the three studies that Evertson et al. claim support the relationship between student achievement and teacher certification, we reached different conclusions. Of the three: Hall (1962) was never published and should have been discounted; Denton and Lucina (1984) did not even look at measures of student achievement; Taylor (1957) went to great lengths to say something positive about teacher certification by combining its effect with measures of teacher experience.</p> <p>Too, Darling-Hammond's interpretation that 5 out of 8 studies showed no effect on student achievement from subject matter coursework is wrong, not even reflecting Evertson et al.'s math. They seem to put the tally at 4 versus 4, (though most were not significant.) Of the five we were able to retrieve (three were unpublished dissertations), all showed at least a positive effect (see Druva and Anderson, Massey, Begle, Byrne, Hawk et al.).</p> <p>Apart from the errors that Evertson et al. make in their review of this research, they are far more hesitant in reaching any strong conclusions than Darling-Hammond is when she refers to this article. They begin by stating "<i>we acknowledge at the outset that although the number of studies related to teacher education is large, the research is often of dubious scientific merit and fails frequently to address the types of issues about which policy makers are most concerned.</i>" They acknowledge the poor retention of material learned in teacher preparation coursework: "<i>overall, there is very good reason to believe that much of what prospective teachers learn in their formal college training is not transferred to their classroom behavior or even that many of the specific skills they acquire do not survive practice teaching.</i>"</p>	Yes	✓+	Na

A	B	C
Author Year	(Relevant) Principal Finding	Study Description / Why This Study Was Cited by Others
Fuller, E. 1999	Teacher credentials affect student achievement	<p>This paper reportedly looked at Texas 3rd, 4th and 5th graders. Its findings were featured prominently in Education Week. ("<i>Teacher study links teacher certification, student success,</i>" May 12, 1999) and cited extensively by Darling-Hammond in 1999 and 2000. Preliminary analysis of students' pass rate on the 1997 Texas Assessment of Academic Skills (TAAS) indicated that student pass rates in districts with greater proportions of licensed teachers were significantly higher when compared to districts with lower proportions of licensed teachers. Darling-Hammond notes that "<i>the findings were significant even after controlling for students' socioeconomic status, school wealth and teacher experience...and were especially influential on the test performance of elementary students</i> " (p13; p9).</p>
Gomez, D(eborie) and Grobe, R. 1990	There is no measurable difference between alternatively trained teachers and fully certified teachers.	<p>In five different papers, Darling-Hammond cites Gomez and Grobe study as a key study, central to her thesis that certification contributes to student achievement. She states that this study found that alternatively trained teachers in Texas are not as knowledgeable about instructional techniques and models and are judged more uneven in their teaching performance. The only finding pertaining to student achievement, according to Darling-Hammond, was higher achievement gains in language arts of students of certified teachers.</p> <p>Miller et al. also cite Gomez and Grobe, and report a somewhat different conclusion: they cite the study's findings as suggesting that alternative certification routes do not necessarily lead to lower student outcomes.</p>

D	E	F	G
Problems Found with the Study or with Claims about the Study	Cited to Justify Certification	Rigor of Review	Critical Controls Used
<p>This study has not been published, as Darling-Hammond's citation implies. In fact, well over two years later the author has yet to release a draft for distribution, but has only made available a draft "for discussion purposes only." Darling-Hammond's statement that the findings were especially strong for elementary students is puzzling as the study only looks at elementary-age students. Her statement that the findings were significant, even after controlling for poverty and teacher experience are, also, largely in error. The author's preliminary analysis confined any significant effect to Hispanics <i>only</i>. No other groups demonstrated any effect from teacher credentials.</p>	Yes	✘	✓
<p>This paper is the single most elusive paper that we tried to retrieve. Given the multiple citations of this paper, we were determined to find it but never could. The paper was written in the very early days of Texas alternative certification and presented at an AERA conference, but the AERA had no record of it. It took us considerable time to find the authors, (partly because the author's name was listed as "David" Gomez in numerous citations though in fact the author is not David but Deborie Gomez). We realized the problem when we found a reference to a "Grobe" writing education research in California who was married to someone named Gomez, who had been employed in the Texas alternative certification office. The authors no longer had a copy of the paper, but they summarized their findings as follows (telephone conversations with Kate Walsh, October 4, 2001):</p> <p>On the positive effects from certified teachers in student achievement in language arts: Gomez and Grobe both separately stated that they had reservations about this finding, that the data was not robust nor was it educationally significant, that other variables came in to play that cast considerable doubt on the finding.</p> <p>On their overall conclusion: Gomez states "We were trying to say that we could see really quality teaching, maturity, diversity, very low attrition [in the alternative certification group]. Our overall theme was that this [alternative certification] was a good and valid way to train teachers.</p> <p>Grobe stated: The significant part of [our findings] was that there was not any difference between the groups; that was the strength of it."</p> <p>Repeated requests to those citing Gomez and Grobe, made by numerous researchers, went unanswered or by responses that they too have no longer have a copy of the paper.</p>	Yes	✘	?

A	B	C
Author Year	(Relevant) Principal Finding	Study Description / Why This Study Was Cited by Others
Guyton, E., and Farokhi, E. 1987	Teacher's college GPA correlates with teacher's performance on a basic skills test and a teacher certification test, but none of these measurements correlate with their supervisors' ratings.	<p>Study looked at performance of 273 new teachers from Georgia State University in order to test the assumption that successful academic performance assures good teaching. The authors used three different measures of academic performance for the graduates of the teacher education program: college GPAs, a test of basic skills taken during college and a teacher subject matter test taken after college. All of these measures were correlated with the teacher's performance on an evaluation instrument that consisted of 14 dimensions of teacher performance, administered in the first year of teaching. The researchers found that neither the basic skills test nor the subject matter test predicted the teacher's performance on this assessment; but that the college GPA did, in fact, correlate.</p> <p>Darling-Hammond (2000 and restated in 2001) cites this article as one of ten studies that support her assertion that "knowledge about teaching and learning shows even stronger relationships to teaching effectiveness than subject matter knowledge" (p.22; see also Begle, 1979; Begle and Geeslin, 1972; Denton and Lacina, 1984; Druva and Anderson, 1983; Evertson et al., 1985; Ferguson and Womack, 1993; Monk, 1994; Perkes, 1967.) Wilson et al. cite this study as 1 of 6 (out of 7 studies they reviewed) that showed a positive effect on student achievement from subject matter training (see also Darling-Hammond, 1999; Goldhaber and Brewer, 2000; Hawk et al., 1983; Monk, 1994; Rowan et al., 1997). They also note that this study is 1 of 3 showing that education coursework is a better predictor of teaching performance than measures related to subject matter knowledge (see also Ferguson and Womack, 1993; Monk, 1994).</p>
Hice, J. 1970	Experienced teachers have higher first grade reading achievement; courses in methodology in reading helped to raise student achievement.	<p>Dissertation explored 40 first grade teachers' coursework in reading methods and compared it to their student achievement in reading. Ashton and Crocker cite this study as one of 4 studies (out of a total of 7 studies) that reported a positive effect from education coursework on student achievement. Darling-Hammond (1999) cites this dissertation as one of three studies that typically show that elementary teachers who have more formal preparation in teaching have higher ratings and greater student learning gains (see also LuPone, 1961; and McNeil, 1974) and again in 2001, cites it as one of six showing that education coursework impacts student achievement and teachers' ratings.</p>

D	E	F	G
Problems Found with the Study or with Claims about the Study	Cited to Justify Certification	Rigor of Review	Critical Controls Used
<p>This is a prime example of a weak study which does not tell us very much. At best, the only thing this study indicates is that students who get good grades in a college school of education also do well on the job, as measured by their supervisors' evaluations. There is no comparison group and no measure of student achievement in this study.</p> <p>The study draws all sorts of conclusions about relationships of teacher's knowledge of basic skills, teacher's subject matter knowledge and their college GPA with their performance as a teacher, but the number of teachers in each one of these subsets varies dramatically, with no real explanation of the variation by the researchers. For example, the researchers point to a strong relationship between teachers' subject matter knowledge and their college GPA using data from 411 teachers, and then find that teachers' subject matter knowledge does not correlate with their teaching performance using data from only 232 teachers. What happened to 179 teachers? How do we know that their loss was random? It is incumbent upon the researchers to explain such phenomena.</p> <p>The teacher evaluation that was used to assess these new teachers classroom performance consisted of an elaborate assessment process involving three trained observers, but not one of its 14 components measured reflected or referred to gains in student achievement. Also, the range of the teachers' GPAs and scores on the basic skills and subject matter tests is not reported but would be well worth knowing. The range may have been quite narrow, or at least skewed toward the lower end of ability, given that only teachers graduating from the college of education from a single institution were studied, an institution that has relatively low entry requirements.</p>	Yes	✓+	✗
<p>Ashton and Crocker and Darling-Hammond's conclusions that reading methodology should improve achievement, though certainly logical, accept <i>prima facie</i> the finding of this dissertation that the the boys were not affected by a teacher's background. why is the lack of effect on boys not troubling? This finding should at least prompt a review of the statistics and indeed the dissertation is full of statistical error. The only measure approaching significance for the boys was something called "affiliation motivation," using an baffling instrument that Hice had adopted from a measure used on secondary school teachers. The questions resemble those found on some self-help tests seen in pop culture magazines. The small sample size of 40 teachers also indicates this study should be looked at with reservation. As a dissertation, we have no assurances that it was properly reviewed. None of the three studies Darling Hammond cites as support have much, if any, value.</p>	Yes	✗	✗

A	B	C
Author Year	(Relevant) Principal Finding	Study Description / Why This Study Was Cited by Others
Monk, D. 1994	Teachers' subject matter coursework and courses in subject methodology both affect student achievement, but there is a ceiling to the effect of subject matter coursework after a certain number of courses. Master's degree outside teacher's subject matter have a negative effect.	<p>Study looking at NAEP science and math achievement for roughly 3,000 students, correlated with over 1,000 teacher surveys. It found that the amount of teacher coursework in the subject area is somewhat, but not hugely, important for student achievement. There is a curvilinear or "threshold" effect, meaning that there are diminishing returns from teacher's coursework on student achievement after the teacher has taken four to six courses in the subject. Darling Hammond (2000) cites this study, and nine others, to support her statement that "knowledge about teaching and learning shows even stronger relationships to teaching effectiveness than subject matter knowledge" (page 22). Of the 10 studies, only this one provide unequivocal support for Darling Hammond's statement as it relates to student achievement. [See also Begle, 1979; Begle and Geeslin, 1972; Denton and Lacina, 1984; Druva and Anderson, 1983; Evertson et al., 1985; Ferguson and Womack, 1993; Guyton and Farokhi, 1987; and Perkes, 1967.]</p> <p>Monk finds that, in some subjects, teacher's methods courses related to the teacher's subject area had "more powerful effects than additional preparation in the content area" (page 142). Wilson et al. cite this study as 1 of 6 studies (out of 7 reviewed) that showed a positive effect on student achievement from subject matter training as well as 1 of 3 they found that showed education coursework can have more value than subject matter training.</p>
Schalock, D. 1979	Research on teacher effectiveness has little to contribute to decisions about who should enter teaching.	Darling-Hammond (1999) cites Schalock and the Soar et al. 1983 review, stating that neither study supports the relationship between "teacher's measured intelligence" and student achievement" (page 6).

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<p>Sound study with Monk making some important and insightful points, that <i>"simple accumulation of credits with no regard to the subject being taught does not have a positive effect on student achievement"</i> (page 142) and <i>"it is risky to generalize about the effects of teacher subject matter knowledge."</i> Monk was critical of his own use of degree levels and undifferentiated credit counts self-reported by teachers to measure teacher knowledge, terming them <i>"gross measures."</i> He views his subsequent analysis of the same data (Monk and King, p38) as producing more reliable findings.</p> <p>After finding that coursework in pedagogy had a more powerful effects (in math and biology, but not in physical sciences) than additional preparation in the content area, Monk concludes, <i>"if we believe this result, it would appear that a good grasp of one's subject area is a necessary but not a sufficient condition for effective teaching"</i> (p142).</p> <p>In one of the more interesting analyses, Monk discusses the reasons why the number of life science courses a teacher took had a negative effect on student performance in contrast to the significant positive effect that teachers' physical science coursework had. Monk theorizes that most teachers take biology coursework to fulfill their science requirements and that it is brighter teachers who elect to take the physical science coursework. The significant effect from physical science coursework, theorizes Monk, is a reflection of the higher intelligence of this teacher pool.</p>	Yes	✓+	✓
<p>When we talked to the author to obtain this study, he wondered why anyone would still be interested in it as it is "OLD, OLD!!" Most of Schalock's (as well as Soar et al. 1983) citations in this paper are from work done in the 1940s lacking critical controls, some of which showed some small, positive correlations between measures of intellectual ability and effectiveness, but results were hardly conclusive. He points out rightly the real problem in the research in this area. Even though intelligence should be a likely predictor of success, higher correlations are not revealed because teachers are relatively homogenous as to intellectual ability. With such a truncated range of ability, high correlations are not likely to be found (page 12). Much of the research that might provide some insight looks at students who are attending the same colleges. This approach does not offer the variance that would be more telling.</p> <p>More recent research such as Summers and Wolfe, 1977; Ferguson, 1991; Ferguson and Womack, 1996; Murnane, 1983; Hanushek, 1971; Strauss and Sawyer, 1986 suggest that intelligence (measured by SAT, verbal ability tests and college selectivity) are indeed substantially important.</p>	Yes	✓+	Na

A	B	C
Author Year	(Relevant) Principal Finding	Study Description / Why This Study Was Cited by Others
Wilson, S., Floden, R., Ferrini- Mundy, J. 2001	The field of education research does not lack exhortations about what teacher preparation <i>should</i> look like, there is much left to learn.	<p>Review of the research surrounding teacher preparation, with a admirable attempt to ignore the old, substandard research that others in the field continue to promulgate. Of 313 studies on teacher preparation that they reviewed, only 57 were deemed worthy of inclusion by the authors, dismissing any that were not published in a scientific journal or that were not published within the past two decades (a criteria which we though excluded some worthy studies, but the attempt at standards is laudable, nevertheless). Excluding the studies they allowed which were "interpretative studies" (i.e. case studies lacking control group, random sample), Wilson et al. accepted only EIGHT studies that examined the issues of teacher preparation that we also examined, and only SIX of these present any evidence to support teacher certification. They are:</p> <p>Darling Hammond, 2000 Ferguson and Womack, 1993 Goldhaber and Brewer, 2000, but no evidence to support teacher certification. Guyton and Farokhi, 1987 Hawk, Coble and Swanson, 1985 Monk, 1994 Rowan, Chiang and Miller, 1987, but no evidence to support teacher certification. Fetler, 1999</p>

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<p>Wilson et al. found at best five studies, compared to the 100 studies claimed by NCATE or the 200 studies claimed by NCATF to support certification.</p> <p>Despite the effort to look only at solid research, it is puzzling that some studies were still included, especially Ferguson and Womack.</p> <p>Wilson et al.'s effort is most seriously flawed because the authors inappropriately employ a technique usually reserved for meta-analyses, where they present the number of studies that supported a particular teacher effect and compare it with the number of studies that did not.</p> <p>Wilson et al. chose to include case studies, termed "interpretive" studies of one, two, or three individuals, lacking random grouping and important controls, which should have precluded their inclusion in any attempt to "tally" the evidence.</p>	Yes	×	Na