



INFORMATION CAPSULE

Research Services

Vol. 1002
August 2010

Dale Romanik, Director

What the Research Tells Us: Teacher Quality and Teacher Preparation

At a Glance

This Information Capsule examines a number of important factors associated with teacher quality. Although a clear consensus has not been reached regarding what actually constitutes teacher quality, it is still believed to be the single most important school-related factor affecting student achievement. In fact, a number of researchers have reported that improving teacher quality is more valuable to improving student achievement and more cost effective than class size reduction. Factors associated with teacher quality and addressed in this Capsule include: personal attributes, college degrees, teaching experience, education coursework, certification, teaching out-of-field, subject area competence, literacy level, academic credentials, and teacher salaries. Subsequent to the discussion of these areas, a section follows concerning teacher preparation programs and the importance of their influence on teacher quality.

Since the 1980s policymakers have made efforts to improve the quality of public school instruction. Impetus to address teacher quality has come more recently from the No Child Left Behind Act which mandated all K-12 teachers be “highly qualified” by 2006. In addition, numerous quantitative analyses have found that teacher quality is among the most important school-related factors affecting student academic achievement (Darling-Hammond, 1999; Congressional Research Service, 2008; Goe, 2009). In fact, a number of researchers have reported that improving teacher quality is more valuable to improving student achievement and more cost effective than class size reduction (Harris, 2004).

Demographic Characteristics of Teachers

There are approximately 3.4 million teachers in the United States (Goe, 2009). Although the racial/ethnic composition of these teachers does not reflect the diversity of the students they teach, recent changes have been heading in that direction. For example, the percentage of Hispanic teachers showed the greatest overall increase from only 4 percent nationally in 1993-94 to 7 percent in 2007-08. Similar data for the Miami-Dade County Public Schools (M-DCPS) during the same period of time showed an increase of approximately 16 percent for Hispanic teachers (from 26.4% in 1993-94 to 42.7% in 2007). An examination of ethnicity for teachers employed on a full-time basis with M-DCPS in 2009 indicated approximately 45.7 percent were Hispanic, 24.9 percent were black, and 27.8 percent were white (Florida Department of Education, 2010).

The average age of teachers nationally has changed from the early 1990s. Approximately 12 percent of public high school teachers were under age 30 in 1993-94 compared to 17 percent in 2007-08 (National Center for Education Statistics, NCES, 2009). Additionally, approximately 34 percent of the same group of teachers were fifty years of age or older. The most dramatic decline has been in the

Research Services

Office of Assessment, Research, and Data Analysis
1500 Biscayne Boulevard, Suite 225, Miami, Florida 33132
(305) 995-7503 Fax (305) 995-7521

number of middle aged teachers (40 to 49). This age group represented only 23 percent of all teachers in grades 9-12 in the nation.

With regard to gender, the majority or 58.0 percent of teachers nationally were female in 2007-08 (NCES, 2009). The subject area most heavily dominated by females was foreign languages (78.7 percent) and for males it was social sciences (64.1 percent). In February 2009, 77.4 percent of M-DCPS teachers were female and 22.6 percent male (M-DCPS, 2010). The percentage of male teachers in M-DCPS (23 percent) in 2009 was considerably lower than that found nationally (42 percent). The majority of male M-DCPS teachers (50.0 percent) were employed in secondary schools, while the highest percentage of female teachers (46.0 percent) taught elementary grades.

Characteristics of Effective Teachers

Although a clear consensus has not been reached regarding what actually constitutes teacher quality, it is still believed to be the single most important school-related factor affecting student achievement. The National Council on Teacher Quality (NCTQ) is a nonpartisan research and advocacy group interested in changing the structure of the teaching profession. The NCTQ has published a number of pertinent reports, several of which will be used in this and in subsequent sections of this report.

What follows is a discussion of a number of important factors that have been associated with teacher quality from the research. These factors include: personal attributes, college degrees, teaching experience, education coursework, certification, teaching out-of-field, subject area competence, literacy level, academic credentials, and teacher salaries. Subsequent to the discussion of these areas, a section follows concerning teacher preparation programs and the importance of their influence on teacher quality.

Personal Attributes. NCTQ (2004) identified seven “critical attributes” of effective teachers as used in the national recruitment process initiated by Teach for America (TFA). These represent “soft” signs which are difficult to measure, but no doubt very important to identifying effective teachers. They include:

- High Achieving - they have succeeded at almost everything they have attempted
- Responsible - they take full responsibility for success or failure and will not blame others
- Critical Thinkers - address cause and effect without merely responding to the effect
- Organized - they are able to multi-task effectively
- Motivating - able to influence and motivate others
- Respectful - look for the best in people particularly those less fortunate than themselves
- Foster the Organization’s Goals - internalize established goals and work to eliminate educational inequities

Advanced College Degrees. NTCQ maintains that school districts have used inappropriate assumptions regarding what constitutes the credentials of high quality teachers. For example, advanced college degrees such as Master’s Degrees do not yield more effective teachers. Approximately 50 percent of the nation’s teachers have Master Degrees. According to NTCQ, the number of teachers with such degrees has doubled in the last 50 years because school districts have provided approximately 11 percent higher salaries to teachers holding advanced degrees. In 1996, school districts spent \$19 billion to help teachers earn advanced degrees. The research consensus indicates that such degrees do not make teachers more effective however, some master’s degrees are more valuable than others. High school math students taught by teachers with master’s degrees in mathematics outperformed students

of teachers without an advanced degree (NCTQ, 2004). The same study did not find a similar performance advantage in other subject areas.

In 2008-09, a total of 50.6 percent of M-DCPS teachers had advanced degrees (i.e., 38.4% Master's, 9.6% Specialist, and 2.6% Doctorate; Florida Department of Education, 2009). This compares to 40.3 percent of teachers statewide.

Teaching Experience. Teacher experience is an important attribute of effective teaching particularly in the first several years of teaching. However, the review of the research presented by NCTQ revealed a minimal relationship between teaching experience and student academic achievement. In fact, experience yielded less of an impact on achievement than other teacher-related factors. After about the fourth year of teaching, there is virtually no evidence to support the notion that teachers become more effective in the classroom (NCTQ, 2004). This lack of relationship between experience and student achievement was accounted for by the idea that the most effective teachers are the first to leave the classroom for administrative jobs or the first to leave the profession all together. Alternatively, continued experience in teaching may produce burnout and yield teachers less effective later in their careers. It was concluded that several years of experience make teachers more effective but after that, the relationship between experience and student achievement is difficult to demonstrate.

Teachers' average years of experience for all M-DCPS teachers in 2008-09 was 11.9 years. This compares favorably to the average for the entire state of Florida which was 12.1 years.

Education Coursework. Recent reviews of the literature have shown that having an education degree has minimal impact on student test scores (NCTQ, 2004). As reported by NCTQ, the lack of impact of a degree in education is due to the fact that many skills needed to be an effective teacher are learned on the job. Additionally, the lack of difficulty required by much of the coursework in education as well as the relatively less capable students enrolled in such courses yields the degree of limited impact on student achievement. More recent findings, however, refute this notion of less qualified students enrolling in education courses. In fact, Gitomer (2007) found that teachers sitting for the Praxis II exams from 2002 to 2005 were academically better prepared in terms of GPA and SAT scores than those taking the exam in 1994 to 1997. Additionally, teacher candidates with a GPA above 3.5 increased from approximately 27 to 40 percent during the eight year period.

Certification. States have passed legislation which has provided several different avenues to teacher certification. These alternative certification programs allow capable individuals with college training in other fields to teach without first graduating from a school of education. Warnings from traditional schools of education and from teachers unions that alternative certificates would lead to a less professional workforce, however, have apparently not materialized. In fact, several research studies have compared traditionally certified teachers with those from an alternative certification program. Results indicated both groups of teachers were equally effective (NCTQ, 2004). In addition, the Mathematica Research Institute found that Teach for America teachers with alternative certifications with no more than two years of experience rendered slightly higher gains in math and about the same gains in reading as experienced teachers employed in the same school (NCTQ, 2004).

The five major national alternative paths to teacher certification include: Teach for America, The New Teacher Project, the Transition to Teaching program, Troops to Teach, and the American Board of Certification of Teacher Excellence. In 1993-94, approximately 6,000 teachers entered the teaching profession with an alternative certification compared to 59,000 in 2005-06 (Goe, 2009).

A telephone survey of 49 alternative certification programs in 11 states indicated that the entrance requirements were not very demanding (Walsh and Jacobs, 2007). Approximately two-thirds of the programs accepted 50 percent of the applicants and only 40 percent required a GPA of 2.75 or above.

In addition, although the original idea of alternative certification was to attract college-trained individuals from fields other than education, one-third of the programs required 30 hours in education courses and nearly 70 percent of the programs sampled were operated by schools of education. Again, the initial notion behind alternative certification was to have the programs operated by entities other than traditional education schools.

Florida's Alternative Certification Program. Florida's program provides an alternative path for a five-year Professional Educator's Certificate. It is a competency-based program that does not require college courses in education. In fact, no college coursework of any kind is required. In this way, career changers can become teachers without formal college courses in education. The program results in the same teacher's certificate that is received by individuals who complete the Bachelor's Degree in Education. Although it is honored in Florida, prospective teachers are cautioned to research the certification laws in the state to which they might move if they plan to teach out of state.

All Florida school districts are required to establish an alternative certification program. Districts can either implement the state's program or a program they develop locally. Although districts do not have the same alternative programs, all approved programs are required to include twelve "Florida Educator Accomplished Practices." These practices provide the framework around which individual districts develop their programs. These include areas such as: Assessment, Communication, Continuous Improvement, Diversity, Human Development and Learning, Technology, etc.

In addition, district programs must also include face-to-face training or on-line instruction in a number of critical components. These components include survival training prior to beginning any teaching assignment; support from peer mentors, coaches, and building administrators; assistance from higher education partners; Florida Professional Education Certification Test, etc. A data-based tracking system is available to districts which choose to implement the state's system. This system is said to provide "paper-free management" that allows for tracking of the participant's progress through the various stages of the process.

Although alternative certification programs allow for recruiting and hiring of teachers during high demand periods such as the present, a number of authors are critical of the end product unless the programs are closely monitored and evaluated (Harris, 2004).

Out-of-Field Teachers. A major challenge for policymakers is to limit the number of teachers that have inadequate content knowledge for the course(s) they teach. The National Center for Education Statistics (NCES, 2008) reported that in 2003-04, the percentage of public high school English and mathematics teachers nationally that had both a major and a certification in the area they were teaching was 71 percent and 65 percent, respectively. Among teachers with a main assignment in science and social science, 72 percent and 71 percent held both credentials, respectively. Although an exact comparison between the NCES results and data reported for Florida cannot be made, during 2008-09, 6.5 percent of Florida teachers were considered out-of-field, with only 2.0 percent in M-DCPS (Florida Department of Education, 2009). However, certified teachers who are in the process of completing certification requirements are not considered certified in the NCES figures.

Subject Area Competence. Some authorities believe subject area training is the most important factor contributing to effective teaching. However, others believe it is important but not the sole criteria in effective teaching. The NCTQ (2004) commented, "highly qualified teachers must now demonstrate that they know the subjects they teach, which for many states, surprisingly, is a new requirement."

Research has shown that high-quality training in mathematics and science contributes to more effective high school math and science teachers (NCTQ, 2004). It appears that from four to six college-level subject area courses are required for effective teaching and that additional training beyond this level of

coursework does not make teachers more effective in the classroom. Teachers with seven subject-area courses were not more effective than teachers with from four to six. This finding with regard to subject-area training is more important for high school teachers than it is for elementary teachers. In contrast, the research indicates that broad liberal arts training and a high level of literacy are best suited for elementary school teachers while subject-area training is less important.

Literacy Level of Teachers. The research indicates that literacy level is an important consideration when hiring teachers. One study showed that students of highly literate teachers were able to improve achievement by .2 and .4 grade levels more than students taught by the least literate teachers (NCTQ, 2004). In fact, NCTQ reported, “a teacher’s level of literacy as measured by vocabulary and other standardized tests affects student achievement *more than any other measurable teacher attribute*, including certification status, experience, and the amount of professional development that a teacher receives.”

Academic Credentials. Research shows that students taught by teachers with strong academic backgrounds and degrees from more selective colleges/universities make greater gains in learning (NCTQ, 2004). In addition, students of teachers with higher scores on licensing exams and higher scores on IQ tests are also more likely to achieve greater learning gains. Therefore, researchers have measured the academic caliber of teachers and have found that on average, teachers with strong academic credentials are more effective in the classroom. Obviously, this cannot be the sole predictor of successful teaching given the myriad of factors involved, but its importance cannot be denied.

Effect of Teacher Salaries

Douglass Harris (2004a), affiliated with Florida State University, concluded, “Although some aspects of Florida’s policies appear to be steps in the right direction, the overall effort in the state has been incoherent and severely under-funded.” He points to under-funding in Florida as a major contributor to the state’s inability to attract the best and brightest teachers. He points out that Florida teachers are paid approximately 11 percent less than the national average which was considered a significant gap.

Harris (2004b) discussed funding options and costs associated with educational adequacy in Florida. He indicated that Florida has the lowest overall tax in the country and the lowest “expenditure effort” in the nation. According to economists, a low effort implies the state receives a relatively small portion of total resources available in the state. This “low effort” also means the state can raise revenues without harming its competitive advantage with other states.

Figures provided by Harris indicated that Florida spends on average \$3,069 for each person in the state compared to the national average of \$4,159. Mississippi even spends more per person than Florida (i.e., \$4,101). Although these figures have no doubt changed since 2004, there is no reason to believe the overall ranking is different with the passage of approximately 6 to 7 years.

The “effort” in Florida was calculated to be 14.2 (i.e., ratio of average expenditure per person to total income per person; $\$3,069/\$21,557$). This “effort” compares unfavorably to the national average of 19.3. In fact, Florida’s “effort” is below that of states such as Mississippi (25.9), South Carolina (23.7), and Alabama (20.6). In addition, Harris estimated that Florida would not lose its’ low-tax state status and would only go from being ranked 50th to 49th nationally in terms of “expenditure effort” if it spent \$3 billion annually on the new policies governing class size and Pre-K enrollment. The assertion that Florida under-funds education seems well documented in the literature.

Low teacher salaries are not only a problem in Florida. The EPE Research Center (2008) found that teachers in only ten states earned at least as much as workers in comparable occupations (e.g., accountants, counselors, insurance underwriters, registered nurses, technical writers, etc.). However,

Florida was near the bottom of the ranking once again given that only 12 states came in lower on the “pay-parity index” used by the EPE Research Center. Teachers in these states on average earned less than workers in comparable occupations.

Low teacher salaries discourage prospective teachers from entering the profession. Harris (2004a) contends that:

“Salaries for college graduates have increased steadily in recent years, particularly for women, who now have access to professions previously open only to men. This greatly affects teaching, because 75 percent of all teachers are women. Women with graduate degrees earn 40 percent more in other fields than they do in teaching; and women with undergraduate degrees earn 10 percent more in other fields than they do in teaching.” (p. 6.19)

A survey concerning teacher’s perceptions of their jobs was conducted by Berry, Luczak, and Norton (2003) and was reported by Harris (2004a). Findings indicated that Florida teachers provided a negative picture compared to other teachers located in other southeastern states and nationally. For instance, only 20.6 percent of Florida teachers compared to 39.4 percent nationally were satisfied with their salaries. Only 28.4 percent of Florida teachers responded they “certainly would become a teacher again” compared to 40.3 percent nationally and 34.7 percent of teachers surveyed in other southeastern states. Six percent of Florida teachers indicated they “plan to leave the profession as soon as they can” compared to 3.3 percent nationally.

Harris (2004a) concluded his report with the following:

“The approach used to attract and retain high-quality teachers in Florida can be summed up in four simple words: all sticks, no carrots. The state places tremendous pressure on teachers to work hard. Florida teachers report receiving little support and are, as a result, unsatisfied with their jobs. At the same time, high performance goes unrewarded and unappreciated. Many of the programs designed to rectify the problem have so little funding that they are little more than symbolic.” (p. 6.22)

Teacher Preparation Programs

As the U.S. Secretary for Education, Arne Duncan, has said: “By almost any standard, many if not most of the nation’s 1,450 schools, colleges and departments of education are doing a mediocre job preparing teachers for the realities of the 21st century classroom” (Taken from Greenberg and Walsh, 2010). NCTQ promotes the notion that it is absolutely critical that the public and institutions with regulatory authority hold the nation’s schools of education accountable for improving teacher quality as much as possible.

In their analysis of 67 undergraduate schools of education in Texas, Greenberg and Walsh (2010) found only four teacher preparation programs that were considered worthy of commendation with regard to design and implementation. An additional 15 programs were singled out as “in need of significant redesign.” The report contends that such findings are not unique to the state of Texas but rather can be extrapolated to the 1,400 education schools nationally. Findings indicated the following flaws in program design and execution:

- Lack of consensus prevailed regarding the “best way to prepare teachers.” This was evidenced by considerable variability in subject areas and topics covered in education courses particularly in math courses aimed at preparing elementary teachers. The report concluded that the content preparation of teachers was inadequate.

- Little commonality was found in the way teachers were prepared within different campuses of the same university system. Again, this was identified as an indication of confusion regarding how to prepare teachers for the classroom.
- Exemplifying the “chaotic nature of teacher preparation,” a large number of different textbooks were used to teach the same course. A total of 256 different textbooks were used in 198 courses to prepare teachers in reading instruction.
- The monitoring and evaluating of schools of education was deficient. Such studies occurred but there was no evidence that the regulations were successful in producing high quality teacher preparation programs.
- The coursework at many schools of education mimicked what would be taught as if the students were themselves the age of public school children. This represented, as the authors indicated, “widespread disregard for the intellectual foundations of teaching.”
- Although the state developed regulations intended to encourage high quality teacher training programs, the colleges and universities tended to comply in the technical sense but not in a way that would lead to any sizeable programmatic enhancements.

The NCTQ has published a State Teacher Policy Yearbook for the past three years. This annual document reviews the state laws and regulations that standardize the field of teaching in each state. The state information is reviewed in terms of 33 goals in five areas which are said to represent “an effective reform framework.” In the 2010 edition of the annual report, Florida received the highest overall grade given to any state, a “C” (2009 State Teacher Policy Yearbook). Seven other states received a grade of “C-” including Alabama, Arkansas, Georgia, Louisiana, South Carolina, Tennessee, and Texas. The average grade for all states combined from the 2009 study was a grade of “D.” Three states received an overall grade of “F” including Maine, Montana, and Vermont.

Below are the national findings relative to all states examined. Afterwards there will be discussion centering around the findings exclusively pertaining to Florida. The following was excerpted directly from the 2009 State Teacher Policy Yearbook (NCTQ, 2009).

- Taken as a whole, state teacher policies are broken, outdated, and inflexible. The broad range of state laws, rules and regulations that govern the teaching profession remains in need of comprehensive reform.
- Evaluation and tenure policies do not consider what should count the most about teacher performance: classroom performance.
- States are complicit in keeping ineffective teachers in the classroom. States fail to articulate that poor classroom performance is grounds for dismissal, create obstacles for districts seeking to dismiss poor performers and provide loopholes that allow ineffective teachers to remain in the classroom.
- States’ requirements for elementary teacher preparation ill equip teachers of the youngest students to teach the basic building blocks of all learning: reading and mathematics.
- States’ requirements for middle school teachers do not prepare these teachers to transition students to more advanced secondary-level content. Sixteen states allow teachers to teach grades seven and eight with a K- 8 generalist license.

- State's requirements for the preparation of special education teachers are one of the most neglected and dysfunctional areas of teacher policy. State's low expectancies for what special education teachers should know stand in stark contradiction to state and federal expectations that special education students should meet the same high standards as other students.
- States fail to exercise appropriate oversight of their teacher preparation programs. States do not hold their teacher preparation programs accountable for their admission standards, efficiency of program delivery or, most importantly, the quality of their graduates.
- States cling to outmoded compensation structures, providing few financial incentives to retain effective teachers. Only 28 states help districts by supporting incentives (differential pay or loan forgiveness) to teach in high-needs schools, and just 25 states provide incentives to teach shortage subject areas such as mathematics and science.
- State pension systems are not flexible or fair, and many are in questionable financial health. The pension systems in 27 states do not meet actuarial benchmarks for funding level and/or amortization period, making their financial sustainability uncertain.

As mentioned previously, Florida received the highest grade achieved by any state ("C"). A grade of "C" being the highest grade awarded indicates the relatively low opinion NCTQ has concerning the present condition of the nation's teacher training policies and practices. Florida received ratings of "nearly met goal" or higher on 13 or 39 percent of the 33 goals examined. The state received the highest rating possible ("Best Practices") in one area (Evaluation of Effectiveness). This goal consisted of evaluating students on objective measures (FCAT) and judging teacher effectiveness based on student performance. Below are the areas judged to be "Major Policy Strengths" for Florida which have been taken directly from the report.

- Makes evidence of student learning the preponderant criterion in teacher evaluations, earning the state a "best practice" designation
- Articulates consequences for teachers with unsatisfactory evaluations
- Supports differential and performance pay initiatives
- Places no restrictions on alternate route usage or providers (Refers to alternative certification)

In contrast to the positive results for the state, Florida received ratings of "Partly Meets Goal" to "Does Not Meet Goal" on 11 or 33 percent of the 33 goals examined. The lowest rating of "Does Not Meet Goal" was awarded on 6 of the 33 goals. These goals are listed below.

- Special Education Teacher Preparation (The state should ensure that special education teachers are prepared to teach content area-subject matter.)
- Balancing Professional Coursework (Teacher preparation programs should provide an efficient and balanced program of study.)
- Tenure (Tenure decisions should be meaningful; tenure should not be automatically awarded after a set period of time.)
- Retention Pay (To retain effective teachers, the state should provide for significant increases in pay after tenure is achieved.)
- Compensation for Prior Work Experience (The state should encourage districts to compensate new teachers with relevant prior experience.)

- Licensure Loopholes (The state should close loopholes that allow teachers who have not met licensure requirements to continue teaching.)

As outlined above, the NCTQ report concludes that Florida is headed in the right direction in a number of policies affecting teachers, but there is still more work to be done.

Conclusion

The area of teacher quality is fraught with disagreement and opposing points of view. The research reviewed in this Capsule has questioned a number of popular beliefs. However, one thing is certain, the teacher is the single most important school-related factor for improving student achievement. Although teachers are the most significant school-related factor, there are many other factors that some contend are as important. These non-school factors will be addressed in an upcoming Information Capsule.

Based on the research reviewed here, it cannot be emphasized strongly enough that the caliber of individuals entering the teaching profession must improve. This of course is not new, the field has been aware of this for a decade or more. Teacher quality will improve when individuals entering the profession are characterized by: a high degree of literacy; superior intelligence; exemplary verbal skills; high standardized test scores; solid academic credentials from credible institutions; substantial content knowledge; and personal traits capitalizing on responsibility, ability to organize and think critically, as well as being motivating, and respectful of diversity. We know what it takes. Many current teachers already have these qualities as do professionals employed in a variety of occupations other than education. However, the common denominators required to attract professionals typified by these characteristics are at the present time lacking in Florida. Professional teachers require above average financial compensation, safe and attractive working conditions, and supportive rather than punitive state education policies.

Unfortunately, until education is adequately funded in Florida it will be difficult to attract top notch professionals to the field in substantial numbers. Offering alternative certifications to people lacking any college credits at all, as specified in state literature, seems counterproductive and certainly short changes and belittles the teaching profession. Everything that can be done to train and support the classroom teacher will go a long way to bring about what all educators seek, well-prepared students. Finally, it is hoped that the issues addressed in this Information Capsule will assist those M-DCPS staff responsible for legislative initiatives discussed at the state level.

All reports distributed by Research Services can be accessed at <http://drs.dadeschools.net>.

References

- Berry, B., Luczak, J., and Norton, J. (2003). "The status of teaching in the southeast: Measuring progress, moving forward," Chapel Hill, North Carolina: Southeast Center for Teaching Quality.
- Congressional Research Service (2008). K-12 Teacher Quality: Issues and Legislative Action, Washington, D.C.
- Darling-Hammond, L. (1999). Teacher Quality and Student Achievement: A Review of State Policy Evidence, Center for the Study of Teaching and Policy, Stanford University, December.

- Editorial Projects in Education Research Center (2008). National Highlights Report: Quality Counts, September.
- Florida Department of Education (2010). Data Report: Teacher Demographics in Florida's Public Schools, Fall 2009, Series 2010-21D, May.
- Florida Department of Education (2009). Percent of Classes Taught by Teachers Teaching In-Field/Out-of-Field, 2008-09, Retrieved from: [Q_In_Field/OutField_Dist_St_0809](#).
- Gitomer, D. (2007). Teacher Quality in a Changing Policy Landscape: Improvements in the Teacher Pool, Retrieved from: http://www.ets.org/Media/Education_Topics/pdf/TQ_full_report.pdf.
- Goe, L. (2009). The Link Between Teacher Quality and Student Outcomes: A Research Synthesis, National Comprehensive Center for Teacher Quality, Retrieved from: www.ncctq.org.
- Greenberg, J. and Walsh, K. (2010). Ed School Fundamentals: Evaluating the Fundamentals of Teacher Training Programs in Texas, National Council on Teacher Quality, April.
- Harris, D.N. (2004a). Putting a High-Quality Teacher in Every Florida Classroom, Education Policy Research Unit, Arizona State University, April.
- Harris, D.N. (2004b). Class Size, Pre-Kindergarten, and Educational Accountability: Costs and Funding Options for Florida, Education Policy Research Unit, Arizona State University, April.
- Miami-Dade County Public Schools (2010). Equal Employment Opportunity Commission Report: All Employees, as of February 12, 2009, Information Technology Services, February.
- National Center for Education Statistics (2009). Digest of Education Statistics, Department of Education, Table 70, 2009 Tables and Figures.
- National Center for Education Statistics (2008). Education Qualifications of Departmentalized Public High School-Level Teachers of Core Subjects: Evidence from the 2003-04 Schools and Staffing Survey, U.S. Department of Education, NCES 2008-338, August.
- National Council on Teacher Quality (2009). 2009 State Teacher Policy Yearbook, Retrieved from: <http://www.nctq.org>.
- National Council on Teacher Quality (2004). Increasing the Odds: How Good Policies Can Yield Better Teachers, October.
- Walsh, K. and Jacobs, S. (2007). Alternative Certification Isn't Alternative, National Council on Teacher Quality, September.