

The Impact of Quality Teachers on Student Achievement

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Abstract: Various research studies reveal that factors, such as teachers' cognitive ability, subject matter knowledge, knowledge of teaching and learning, licensure, and teaching behaviors in the classroom, are related to teacher quality and increased student achievement. Through a literature review these five major themes emerged that support the research that quality teachers do matter.

In our nations' schools today, teacher quality is a priority area in education policy. The Federal No Child Left Behind Act of 2001 requires that every state put a "highly qualified" teacher in every classroom. Title 1 of the Elementary and Secondary Education Act (U.S. Department of Education, Sec. 1119) defines a highly qualified teacher as a person who holds at least a Bachelor's degree, is fully licensed to teach based on state certification, and has demonstrated competence in each academic area in which the teacher teaches (U.S. Department of Education, Sec. 1119). To meet the "highly qualified" teachers challenge, the role of teacher quality and variables that influence student learning come to the forefront in current educational goals.

Theoretical Perspective

Contrary to the 1966 study by James Coleman, as cited in Whitehurst (2002), that suggested that differences in teachers did not matter, recent studies have shown that teacher quality is the single most important school-related factor in student achievement. In 1996, value added assessments were conducted by Sanders and Rivers (Coleman, as cited in Archer, 1999) to answer the question of whether teachers matter. Math teachers in grades 3, 4, and 5 in two urban school districts in Tennessee were examined to determine the average amount of academic growth of students in their classrooms. From this data, teachers were identified and grouped as being the most effective teachers, the top 20%, and the least effective teachers, the bottom 20%. The progress of these students assigned to these effective and least effective teachers were documented over a consecutive three year period. The results revealed that at the end of 5th grade, math students assigned to the high performing teachers scored in the 83rd percentile; students assigned to the low performing teachers scored in the 29th percentile (Whitehurst, 2002).

In 1997, a similar study related to long-term teacher effectiveness was conducted in Dallas, Texas. Researchers extended the study across a wide range of grades, used three different urban school districts and two different methods of determining teacher effectiveness, and yielded similar results, emphasizing the measurable difference that better teachers have on student performance (Bembry, Jordan, Gomez, Anderson, & Mendro, 1998). In effect, these findings differ from the research of James Coleman in the 1960s that was interpreted as such, "the general message taken from Coleman's findings is that socioeconomic status largely determines student achievement . . . and what schools do doesn't matter very much, because in the end poor kids learn very little and rich kids learn a lot" (Archer, 1999, p. 3). The results of these longitudinal studies show that teachers are an influential factor of student achievement, regardless of socioeconomic status and even school location. In other words, a student having an ineffective teacher several years in a row can be at an academic disadvantage, which affects

his/her progress for years; whereas, a student with a highly effective teacher can have positive gains in academic progress for years to come.

Various research studies (Blair 2000b; Darling-Hammond 2000; Hanushek 1971,) reveal that factors such as cognitive ability, subject matter knowledge, knowledge of teaching and learning, licensure, and teaching behaviors in the classroom are related to teacher quality and increased student achievement. The purpose of this paper is to identify the indicators of quality teachers and their impact on student achievement by conducting a literature review.

Method

A review of the literature was used to collect data. The sources of data collection included policy briefs, executive summaries, on-line press releases, professional and academic journals, as well as pertinent web sites. Once these data were collected, they were placed in categories for analysis. The analysis was conducted by reading and re-reading the data, and cross-checking to keep track of five common themes and patterns that emerged during the data collection, which include: (1) cognitive ability, (2) subject matter knowledge, (3) knowledge of teaching and learning, (4) licensure, and (5) teacher behavior and practices.

Results

Cognitive Ability

Research findings show a positive relationship between teacher cognitive ability and student achievement. A study by Hanushek (1971) presents an interesting view of teachers. In his model, the teacher characteristic that appears to contribute to increased student academic performance is a teacher's verbal ability. For both second and third grade teachers, the score on a verbal ability test plays two roles: first it is a measure of communicative ability; second, it can be taken as a quick measure of overall intelligence and ability. Thus, overall intelligence or general ability seems important regardless of formal training. There is more research that shows that teachers who have strong verbal ability or score high on verbal tests impact student achievement more than teachers with lower scores. For example, a study of Alabama schools found that teachers' ACT scores accounted for 15% of the predicted achievement of their students, more than double the effect of class size, two and one half times the effect of a teacher's possession of a master's degree and more than five times the effect of teacher experience (Rotherman & Mead, 2003). Greenwald, Hedges and Laine (1996) conducted a study to determine the effect of school resources on student achievement. They found a total of nine studies that analyzed the effects of teacher ability on student achievement. Findings revealed a positive relationship between the two attributes. These studies suggest that measures of cognitive and/or verbal ability are strong predictors of teacher quality.

Subject Matter Knowledge

Subject matter knowledge is another variable that is related to teacher effectiveness. In a major study conducted by Wenglinsky on the relationship between indicators of teacher quality and the performance of 8th graders, teacher educational backgrounds appear crucial to the student performance on the mathematics and science portions of the 1996 National Assessment of Educational Progress (Blair, 2000b). Upon examining approximately 15,000 scores of 8th grade students' math and science performances, students whose teachers had college majors or minors in either math or science scored 39% higher than those whose teachers lacked such preparation. In addition, Monk, as cited in Darling-Hammond (2000), using data on 2,829 students from the Longitudinal Study of American Youth, found that teachers' content preparation, as measured by coursework in the subject field, is positively related to student achievement in mathematics and science.

While these studies appear to support the relationship between subject matter and teacher effectiveness, other researchers as cited in Darling-Hammond (2000), find that the connection between the two variables have mixed results. Studies of teachers' scores on the subject matter tests of the National Teacher Examinations (NTE) have found no consistent relationship between this measure of subject matter knowledge and teacher performance as measured by student outcomes. Byrne (as cite in Darling Hammond, 2000) did thirty related studies between subject matter knowledge to student achievement. The results were mixed with 17 showing a positive relationship and 14 showing no relationship. Also, studies by Ashton and Crocker (1987) found only 5 out of 14 studies they reviewed to show a positive relationship between subject matter and teacher performance. Despite the mixed findings, it may be safe to conclude that teachers who hold college majors or minors in the subject area that they are teaching, especially in math and science, positively impact student learning in those subject areas.

Knowledge of Teaching and Learning

While the evidence that subject matter makes a difference is mixed, research shows that teacher education coursework has a positive effect on student achievement. A study was conducted on the teacher education program at Arkansas Tech University to determine the extent to which education and subject matter course work predicted the teaching performance of student teachers completing the program (Ferguson & Womack, 1993). Findings indicate that course work in teacher education makes a difference in teaching performance; education coursework is a more powerful predictor of teacher effectiveness than measures of expertise in content area subjects. Furthermore, Ashton and Crocker (1987) compared professional education and academic subject area coursework to determine whether there was a relationship between the two variables and teaching effectiveness. The findings revealed that there was a positive relationship in four out of seven studies when researchers related the number of credits in education coursework. In contrast, a positive relationship was found in only five out of fourteen studies when the number of college credits earned in a subject area compared with student performance in that area. Furthermore, teachers' professional knowledge and skills can be developed through professional development and in-service programs to achieve successful student outcomes (King & Newmann, 2000). For example, at Lewis Elementary School in Texas, professional development focused on teaching strategies to teachers in reading and math, strategies that the students can use themselves. Over a 4-year period, students' reading and math achievement improved dramatically across a range of social backgrounds (King & Newmann, 2000). Studies cited in Darling-Hammond (2000) find that teacher opportunities to participate in professional development in content specific areas linked to the curriculum made an impact on teaching and student achievement. Therefore, teacher preparation education coursework is beneficial and worthwhile in making an educational difference.

Licensure

In addition to a degree in the field to be taught, research finds that teacher licensure is the most consistent predictor of student achievement in reading and math (Darling-Hammond 2000). Current requirements for licensing vary from state to state but generally include measures of many variables, such as basic skills, general academic ability of teaching and learning, and some teaching experience. In the state of Florida, the minimum requirements for admissions to teacher education programs is a 2.5 grade point average on a 4.0 scale, a passing score (40%+) on SAT or ACT, or completion of the baccalaureate requirements at a regionally accredited college/university. In Florida, a passing score on three tests, Florida's Academic Skills Test, Florida Teacher Examination Certification Exam, and a subject area test for each area of

certification, is required for licensure. Over the past decade, states have taken steps to strengthen their licensure requirements which are now substantially stronger than they were 15 years ago (Darling-Hammond & Youngs, 2002). In addition, for the first time ever, the federal government has mandated that fully licensed teachers be in every classroom to teach all children because research has shown that teachers who are fully licensed are more effective than those who are not. According to Darling-Hammond and Youngs (2002), studies using national, state and other data have reported that significant connections exist between teacher education and certification measures and student performance levels. For example, Goldhaber and Brewer (as cited in Darling-Hammonds and Youngs, 2002) found a strong influence of the type of teacher certification a teacher holds as an important factor on student achievement. Certified teachers had more influence on student achievement, especially in mathematics and science, than the teachers holding bachelor's and master's degrees (2002). In addition, a study conducted by the United States National Board for Professional Teaching Standards examined 13 aspects of teaching practice, including teacher effects on student academic achievement, and provided the first research evidence that the day to day performance of nationally certified teachers is superior to that of colleagues without the credential. Teachers' effect on student achievement was measured by randomly selecting the work of 4 students for evaluation as well as randomly selecting 3 students to participate in an interview following a lesson (Darling-Hammond, 2000). The results provide evidence that teachers who are nationally certified are helping students learn more.

Teacher Behaviors and Practices

Research on teacher behaviors in the classroom demonstrated that effective teachers tend to be those who are able to use a variety of teaching strategies and demonstrate a flexible style rather than a single, rigid approach. Studies cited in Darling-Hammond (2000) suggest that it is the expertise of the teachers that make learning occur for students. In general, effective teachers are able to adjust their teaching style to fit the needs and style of different learners because they have a wide repertoire of approaches and strategies, such as direct teaching, modeling interactive teaching strategies, cooperative learning techniques, and experienced-based and skill-based approaches. As cited in Darling-Hammond (2000), other variables that have been found to be important are teacher clarity, enthusiasm, task-oriented behavior, and higher order thinking. In effect, high quality instruction depends on competence and attitudes of each individual teacher. In the report of the National Commission on Teaching and America's Future the standards and assessments that have emerged from the National Commission on Teaching and America's Future identify that an effective teacher should have an understanding of how students learn and develop, skills in using a range of strategies; sensitivity and effectiveness in working with students from diverse backgrounds, the ability to work well with parents and other teachers, and assessment expertise capable of discerning how well children are doing, what they are learning and what needs to be done next to move them along (Darling-Hammond, 1996). Therefore, the fact remains that teaching behaviors and practices facilitate student learning.

Conclusions and Implications for Practitioners and Policy Makers

Given the important findings of this research and the mandate from the federal government's "No Child Left Behind" act, education leaders, policymakers and educators need to invest in critical areas that impact the quality of teacher and the quality of teaching. While it is no secret that better teachers produce better learning, educational reform must work toward restructuring and reinventing teacher preparation and professional development by connecting clinical work in schools with knowledge about what works for teaching and subject-matter

knowledge. If we are going to hold students to standards, we need to be able to ensure that the teachers who work with them will also be able to teach to those standards. Thirdly, teachers do matter, and their cognitive ability and knowledge of the subject matter and of teaching and learning, licensure, and teaching behaviors in the classroom are related to teacher quality. Major changes in the areas of recruitment, preparation, licensing, teacher support and opportunities for professional growth need to occur in order for teaching to improve, thus inevitably and positively affecting the most important variable of all, the student.

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