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A Comparison Between First-Year Alternative Certified Teachers and First-Year Traditional Certified Teachers Based on Students' Academic achievement: The Case of a High-Need Urban Southeast District in Virginia

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A COMPARISON BETWEEN FIRST YEAR ALTERNATIVE CERTIFIED TEACHERS AND FIRST YEAR TRADITIONAL CERTIFIED TEACHERS BASED ON STUDENTS' ACADEMIC ACHIEVEMENT: The case of a high-need urban southeast district in Virginia.

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In the name of God, the beneficent and most merciful; by the blessings of Mohammed (Peace be Upon Him, his family, and companions); by also the blessings of Sheikh Ahmadou Bamba, Khadimu Rassol and his friend and companion Sheikh Ibrahima Fall my spiritual guides (may Allah be pleased with them), and by the blessings of my late parents Elhadji Badara Sene and Maty Mbaye, and my mentor and godfather the late Dr. Abdou Maty Ndiaye who raised me and showed me that there is no substitute for hard work and perseverance, I am very thankful.

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This study is dedicated to my wonderful wife Audrey Cora Fisher-Sene, to my son Mandiaye Mamadou Moustapha Sene, to my lovely daughter Adame Olivia Sene, and to my family and friends.

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Debate about teacher supply and demand has been renewed in recent years by an increased concern about the reduced numbers of students entering teacher education programs and the resulting teacher shortages. Thus, American schools are experiencing teacher shortages, especially in low-income urban areas, because of increased school enrollment, teacher retirement, reduction of class size, teacher attrition, and turnover related to low salaries, job dissatisfaction, lack of administrative support and influence over decision-making. Recently, the increased interest in teacher quality has been the topic of debate for educational policy makers, and many researchers have focused on teacher certification.

The purpose of this study is to determine if the Transition to Teaching (T2T) program in Virginia is a viable way to ease the teacher shortages in a midsize high-need urban school system, and at the same time, to evaluate its impact on students' academic achievement. The results of this study provide evidence that the students taught by first year T2T teachers achieve as well as or better than their peers taught by traditionally licensed first year teachers according to the mathematics Algebra I test scores.

ABBREVIATIONS

AACTE: American Association of Colleges for Teacher Education

AAEE: American Association for Employment in Education

AC: Alternative Certification

AL: Alternative Licensure

CEI: Center for Education Information

ESEA: Elementary Secondary Education Act

IHE: Institutions of Higher Education

ITBS: Iowa Test of Basic Skills

ITQSG: Improving Teacher Quality State Grants

LAUSD: Los Angeles Unified School District

LEA: Local Educational Agency

LSAY: Longitudinal Study of American Youth

NAEP: National Assessment of Educational Progress

NASBE: National Association of State Boards of Education

NCEI: National Center for Education Information

NCES: National Center for Education Statistics

NCLB: No Child Left Behind

NELS: National Educational Longitudinal Study

NTE: National Teacher Examination

ODU: Old Dominion University

SAHE: State Agencies for Higher Education

SEA: State Educational Agencies

TC: Traditional Certification

TFA: Teach For America

TTAS: Texas Teacher Appraisal System

T2T: Transition To Teaching

USDE: United States Department of Education

VASOL: Virginia Standards Of Learning

VDOE: Virginia Department of Education

CHAPTER I

INTRODUCTION

Background

In the United States, many arguments are being developed for alternative certification (AC) programs for teachers. The controversy surrounding the issue of AC programs questions their value and effectiveness. However, it is very important to note that there are a variety of AC programs classified according to content, number of credit hours, and length of the training period.

The AC movement began in the early 1980's as a response to teacher shortages in mostly poor urban school systems in the fields of mathematics, science, special education, and bilingual education (NASBE, 2000). More recently, it has been reported that in the United States, 46 states and the District of Columbia have alternative programs (Blair, 2003; NCEI, 2003). School districts, educational service agencies, universities, or the partnerships of these entities run these programs. Also included are national programs like Troops to Teachers, which focuses on military personnel entry into public sector, and Teach For America (TFA), which focuses on new college graduates who did not major in education. The major goal of all these programs is to solve the school-staffing crisis in poor school systems.

Nationally, the U.S. Department of Education estimated that 2.2 million teachers would be needed by 2010 (USDE, 2000). Of the more than two million teachers needed, approximately 15 percent (345,000) will be hired in central cities, and in schools with large concentrations of low-income students (Dozier, 1997). There are myriad reasons

for this current teacher shortage: (a) retention, (b) retirement, (c) increased student enrollment, and (d) most recently, efforts to reduce class size (USDE, 2002; Darling-Hammond, 2002; Feistritzer & Chester, 2002, 2003). Thus, AC programs were developed as an alternative method for preparing teachers in school systems with a greater need for new teachers.

AC programs are preparing teachers in an innovative and cost effective way by reducing the amount of time alternative teacher candidates must spend out of the job market. Also, AC programs attract a large number of candidates that are older, male, and minorities than do traditional programs (Shen, 1997; Miller, McKenna, & McKenna, 1998; Haberman, 1998, 1999, 2000). At the federal level, the No Child Left Behind Act (NCLB) of 2001 emphasizes the importance of recruiting highly qualified teachers and the improvement of student achievement.

Since 2002, states and local educational agencies (LEAs), along with state agencies for higher education (SAHE), have been working to implement the Improving Teacher Quality State Grants (ITQSG) program. In designing their teacher training, recruitment, and professional development activities, states must use scientifically based strategies that have been shown to increase student academic achievement. States are also required to develop annual measurable objectives to ensure that the state and its districts make progress each year in meeting the highly qualified teacher challenge. The ITQSG can support teacher professional development across all core academic subjects. Mathematics and science remain a high priority, but many other activities are now allowed as well. It gives schools and LEAs expanded flexibility to address their needs for qualified teachers and principals, not only through professional development for

existing staff, but through efforts that include attracting qualified individuals into teaching and offering financial incentives and other structural changes to retain them. In addition, the ITQSG program requires that all teachers of core academic subjects must be of high quality by the end of the 2005-2006 school year. Also, the ITQSG allocates three billion dollars a year to the states to prepare, train, and recruit highly qualified teachers and principals (VDOE, 2003).

Statement of the problem

There is a controversy about the evidence to demonstrate that AC programs produce teachers who are as competent and effective as those from the TC programs. The few studies that have compared the effect of teacher certification on student achievement reported different findings. The proponents of the AC programs have concluded that there is no significant difference in achievement between the students taught by AC teachers and those taught by TC teachers (Miller, McKenna, & McKenna, 1998; Goldhaber & Brewer, 2000) while the opponents have found that the students of teachers from alternate routes achieve less than their peers taught by the traditionally prepared teachers (Laczko-Kerr & Berliner, 2003; Youngs, 2002; Darling-Hammond, 2000). Given the mixed findings of previous studies comparing the achievement of the students that exit AC and TC programs, what is the impact of the T2T program on students' academic performance?

Purpose and Rationale

The purpose and target population for alternative teacher certification programs depend on the context in which they are allowed. Therefore, the purpose of this study is to specify the context of an AC program in a midsize high-need urban school system in southeast Virginia and to evaluate its impact on students' academic achievement.

The evaluation of the school system AC program will focus on the comparison of traditional licensed first year teachers and alternative certified first year teachers based on students' achievement in Algebra I in middle and high schools. This program is new, and a detailed explanation will be found in the context of the study section.

Researchers of AC programs argue that well constructed AC programs are not very different from the TC programs in terms of recruitment, preparation, and mentoring. Indeed, in the programs affiliated with colleges of education and universities, there is no significant difference between AC teachers and TC teachers in their training and supervision (Darling-Hammond, Berry, & Thoreson, 2001; Miller, McKenna, & McKenna, 1998). In other words, well-constructed AC programs, like TC programs, require participants to undergo considerable course preparation in pedagogical techniques and context knowledge, with a rigorous mentoring and supervision period.

Another similar view developed by Barnett Berry (2000), Director of the Southeastern regional office of the National Commission on Teaching and America's Future (NCTAF), shows that structured AC programs, such as the Crystal City Secondary Teacher Education Program at George Washington University and the Project Promise at Colorado State University, tend to be nine to fifteen months in duration. They must include strong academic and pedagogical coursework, intensive field experience under

the direct daily supervision of an expert veteran teacher, and candidates who meet all the state's standards for subject matter and teaching knowledge, followed by performance specified examinations such as the Praxis I and II in Virginia.

Emily Feistritzer (1999, 2003), President of the National Center for Education Information (NCEI), states that good AC programs must include the following components: (a) strong academic coursework, (b) field-based programs, (c) that candidates work with qualified mentor teachers, (d) that candidates go through the program in cohorts, and (e) that programs are collaborative efforts among state departments of education, institutions of higher education (colleges and universities), and school districts.

The selection of the school division was based on its AC program, which fits into Haberman's (1991) five standards of excellence for AC programs. These standards are: (a) a highly selective approach for the participants, (b) recruitment of the best quality faculty to teach the candidates, (c) meaningful content of the curriculum, (d) effective teaching methods that focus on pedagogy, and (e) evaluation of program's effectiveness. For the purpose of this study, Haberman's standards of excellence for AC programs will be adopted.

Educational significance

The school division selected for this study recently received a Transition to Teaching grant (Grant Award S350A020017, Grantee DUNS/SSN: 193075876) in October 2002. A major goal for the grant is to gain a better understanding of the program. There has been little attention paid to the impact of AC programs on students'

academic achievement, since there is a paucity of research in this area. Evaluations of the effectiveness of programs such as T2T are necessary to understand the role of AC in the field of teacher education. This study, putting students' academic achievement at the center, examines if the first year results will support this specific AC program. This program is also an indicator for the response to the teacher shortages in certain subject areas and in particular geographical areas such as urban schools. In addition, this study will serve as a catalyst for the reform of the AC programs.

Relationship to urban setting

According to Feistritzer (1990), urban areas have difficulty attracting TC teachers. Data showed that only four percent of traditionally prepared undergraduate students want to teach in poor urban cities compared to one third of AC teachers (NCEI, 1990). Also, Haberman (1991, 1999) states that, the teacher shortages are greater in urban areas serving poor students of color. Stoddart (1993) stipulates that AC teachers hold higher expectations for the students of color and attempt to improve instruction for these populations. He argues that AC teachers' early education experiences and their life skills and work experiences make them more understanding of students' expectations. With his work done at Los Angeles Unified School District (LAUSD), Stoddart (1995) found that 70 percent of AC interns attended an urban school compared to only 22 percent of traditionally trained teacher education students. In addition, he indicates that the TC novice teachers held a "cultural deficit" on student achievement and that alternative certified teachers were much more aware of the needs of the students of color.

Another study by Natriello and Zumwalt (1993) echoes the same sentiments. In the authors' view, AC teachers are more likely to have experienced their own urban education growing up (22 percent) than their counterparts in the college-based programs (13.6 percent). Natriello and Zumwalt also indicate that AC teachers, compared to TC teachers, are more likely to have a preference to teach the students of color in urban areas and are more likely to speak the language of these students who are not native English speakers. The authors add that because of the background experience of the AC teachers, they are more familiar with urban settings than TC teachers. The authors conclude that AC teachers are much more interested than TC teachers to teach in urban schools, and are also more responsive to the needs of urban students. In addition, Shen (1997) indicates that AC teachers are more likely to be teaching in high-need schools that serve more students of color. For the purpose of consistency, 'students of color' is used to represent poor and minority students, economically disadvantaged students, low-income students, or at risk students.

Context

The purpose of the T2T program in Virginia is to meet the school division's need for highly qualified teachers in high-need core academic subjects such as mathematics and science. The two main goals of this grant are: (a) to draw people into the profession of teaching, and (b) to design and implement alternative paths to teacher licensure in Virginia. The target populations of this T2T program are career switchers, recent college graduates, and substitute teachers. The objectives of the T2T program are to:

1. Recruit, and prepare highly qualified teachers through alternative licensure routes, and ensure that these individuals receive their teaching license by meeting competencies defined in the Virginia Licensure Regulations for School Personnel (1998).
2. Provide to these individuals significant follow-up support with a mentor and cohort experiences in the first three years of teaching to help them become highly effective teachers who make teaching their long-term career choice.
3. Collect, analyze, report, and publicize both quantitative and qualitative data about the effectiveness of the new alternative routes to teacher licensure (T2T, 2003).

It is important to note that the T2T program for new alternative routes to licensure is a partnership between a high-need urban district in southeast Virginia and Old Dominion University (ODU). During year one, secondary mathematics and earth science candidates, referred to as Cohort One, completed an alternative route to licensure in the high-need core academic subjects of either secondary mathematics or earth science. These initial candidates met the highly qualified teacher criteria, as well as the district and VDOE's employment requirements for acceptance into the T2T program.

The T2T program referred to in the study as the alternative teacher preparation program at a southeast district in Virginia was awarded a $1.7 million five-year Transition to Teaching (T2T) grant. During the first year, 118 inquiries from prospective applicants were identified for Cohort One, which is composed of secondary mathematics and earth science teachers. The program received 49 applications and 22 candidates were selected based on the "highly qualified teacher" criteria, as well as VDOE's employment requirements for acceptance into the T2T program. Additional academic transcript

analysis and work experience were used to select the candidates. After the selection process and prior to the intensive four-week Summer Institute, individual candidates in the T2T program satisfied the competencies as defined in the Virginia Licensure Regulations for School Personnel of 1998, and passed the Praxis I and Praxis II tests in the appropriate licensure areas. The candidates did not receive degrees in education and had a 2.5 grade point average or higher in all their college coursework, a Bachelor's degree or higher from an accredited college or university, and work experience. The T2T program included four weeks of intensive training (total 200 hours) in the key areas of curriculum and instruction, pedagogy, classroom management, and technology as it applied to the core academic subjects. The candidates are expected to teach for three years in the urban school district from which they received their training. Through the partnership between ODU and the participating district, the Summer Institute's curriculum has been collaboratively designed, scheduled, implemented, and assessed. It was followed by small group training and an all day training retreat each semester of the first year (T2T, 2004). Out of the 22 candidates, 18 completed the Cohort One, including twelve mathematics teachers and six earth science teachers. However, only six of the twelve mathematics teachers met the requirements to be included in the study (teaching Algebra I, sections ABCD or CD).

For the purpose of the study, a comparison group was selected. These non-T2T teachers were comprised of six out of the eight Algebra I, sections ABCD or CD mathematics teachers hired during the 2003-2004 school year in the same district. The six non-T2T teachers referred to in the study as representing the traditionally licensed teachers are new to the profession of teaching. They obtained full state certification as

teachers, held at least a Bachelor's degree, passed the selection process, and demonstrated competency by passing a rigorous state academic subject test in the area in which they teach. In addition, they successfully completed an academic major, coursework equivalent to an undergraduate academic major, advanced certification, and credentialing in the subject they teach. They also met the requirements of Title I, Part A of the NCLB Act as well as the district and VDOE's employment requirements (T2T, 2004). However, five of the non-T2T teachers had provisional certification and one teacher a standard certification.

Research questions

To determine whether the T2T program has a significant impact on students' academic achievement outcomes, the following questions were considered:

1. Do students taught by teachers prepared in the T2T program achieve in Algebra I as well as the students who are taught by traditionally licensed teachers in the same district?
2. Do the students of AC teachers gain more or less than the students of the TC teachers regarding the evolution of their test scores in Algebra I?

Definition of terms

Alternative Certified (AC) teachers

An AC teacher in this study is defined as an individual who has at least a Bachelor's degree, who completed all the required content and pedagogy courses during the training program, and who passed the Praxis I and II with the State of Virginia defined score.

Core academic subjects

The term "core academic subjects" means one of the following content areas: English or language arts, reading, mathematics, science, social studies, foreign languages, economics, arts, history, and geography (ESEA, section 9101(11)).

"Hard-to-staff" schools

A Virginian school must meet at least four of the eight criteria listed below to be designated as hard-to-staff:

1. Accredited with warning;
2. Average daily attendance is two percentage points below the statewide average;
3. Percentage of special education students exceeds 150 percent of the statewide average;
4. Percentage of limited English proficient students exceeds 150 percent of the statewide average;
5. Percentage of the teachers with provisional licenses exceeds 150 percent of the statewide average;
6. Percentage of the special education teachers with conditional licenses exceeds 150 percent of the statewide average;
7. Percentage of inexperienced teachers hired to total teachers exceeds 150 percent of the statewide average;
8. School has one or more inexperienced teachers in a critical shortage area (VDOE, 2004).

"High-need" LEA

High-need LEA means a local educational agency that:

1. Serves not fewer than 10,000 children from families with incomes below the poverty line or for which not less than 20 percent of the children served by the LEA are from families with incomes below the poverty line, and

2. For which there is:

A high percentage of teachers not teaching in the academic subjects or grade levels the teachers were trained to teach, or a high percentage of teachers with emergency, provisional, or temporary certification or licensing (ESEA, section 2102).

"High-need" school

High-need school means a school that demonstrates any one of the following five requirements:

1. Is located in an area in which the percentage of students from families with incomes below the poverty line is 30 percent or more;

2. Is located in an area with a high percentage of out of field teachers, as defined in section 2102 of ESEA;

3. Is within the top quartile of elementary schools and secondary schools statewide, as ranked by the number of unfilled, available teacher positions at the schools;

4. Is located in an area in which there is a high teacher turnover rate;

5. Is located in an area in which there are a high percentage of teachers who are not certified or licensed (ESEA, section 2103).

Highly qualified teachers

Based on the NCLB legislation and the non-regulatory draft guidance document titled Improving Teacher Quality State Grants, Title II, Part A (June 6, 2002), the term "highly qualified", used in reference to any public elementary, middle, or secondary school teacher in the core academic subjects, means that the teacher:

1. Holds full state licensure as a teacher, including licensure through alternate routes, and teach only in the area of endorsement.
2. In addition, a teacher who is entering the profession through an alternate route program must meet the definition of a highly qualified teacher to participate in the program. This definition requires that the teacher:
    a. Is permitted by the State to assume functions as a regular classroom teacher,
    b. Has a Bachelor's degree,
    c. Has demonstrated subject matter competence by passing the State Professional Teacher Assessments, and
    d. Is making satisfactory progress toward full licensure, as prescribed by the Board of Education in Virginia.

Transition to Teaching (T2T) program

The T2T program is a national level grant. The two main goals of this grant are: (1) to draw people into the profession of teaching; and (2) to design and implement alternative paths to teacher licensure in Virginia. The target populations of this T2T are career switchers, recent college graduates, substitute teachers and paraprofessionals who have classroom experience (T2T, 2003).

CHAPTER II

LITERATURE REVIEW

This chapter provides an overview of the definitions and characteristics of the AC programs. It also focuses on research dealing with the issues related to urban education, teacher shortages, and alternative certification. In addition, the literature reviewed for this study highlights the empirical studies on retention, teacher performance, and student achievement comparing AC and TC teachers. This section provides the reader with a clear and concise summary of the subject matter.

Definitions and characteristics of AC programs

Defining AC has been a difficult issue. Some researchers differentiate AC as teacher education programs that enroll non-certified individuals with at least a Bachelor's degree, offering shortcuts, special assistance, or unique curricula leading to eligibility for a standard teaching credential (Miller, McKenna, & McKenna, 1998; Fetler, 1999; Berry, 2000; Golhaber & Brewer, 2000; Wilson et al., 2001; Laczko-Keer & Berliner, 2002; Mayer et al., 2003). Other programs like TFA focus on emergency licenses for teachers. In a third category are programs that focus on recruitment of teachers without a Bachelor's degree (Adelman, 1996; Mc Kibbin, 2001).

Feistritzer and Chester (1996, 2003, and 2004) describe the different types of AC programs implemented in the United States (see table in Appendix A).

The authors identify 11 classes of AC: (a) Class A- alternative teacher certification programs, specifically designed to attract "talented" individuals with at least a Bachelor's degree in a field other than education, which are not restricted to teacher shortages; (b)

Class B- alternative certification programs that follow the same guidelines as Class A in terms of recruitment, but provide specially designed mentoring and formal instruction, and are restricted to shortages and/or secondary grade levels and/or subject areas; (c) Class C- alternative teacher certification programs that review an individual's professional and academic background in which participants receive individualized in-service training and coursework necessary to reach competencies required for certification and where state and local school districts have the major responsibility for program implementation; (d) Class D- alternative certification programs that follow the same guidelines as Class C, except an institution of higher education (IHE) has the major responsibility for program implementation; (e) Class E- alternative certification programs that require post-baccalaureate degrees and are based in an institution of higher education; (f) Class F- emergency teacher certifications implemented by local school districts; (g) Class G- alternative certification programs that allow individuals who have few requirements left to fulfill before becoming certified through the traditionally approved college teacher education program; (h) Class H- alternative certification programs that allow individuals with "special" qualifications to teach certain subjects; (i) Class I- states that refuse to offer alternative routes to teaching; (j) Class J- programs that are designed to eliminate emergency routes; and (k) Class K- alternative certification programs that accommodate specific populations for teaching (NCEI, 1996, 2000, 2003, 2004). For the purposes of this study, AC will use class B as a defining point.

Theoretical framework

Good teaching matters (Darling-Hammond, 2000; Hirsh, 1998). Increasingly, teachers, policymakers, parents, and the community are realizing that student achievement need not be prescribed by socio-economic status, parent involvement, or race and ethnicity. On the contrary, recent evidence makes clear that regardless of the factors that students bring to school, good teachers measurably increase student learning, and good schools foster high levels of student achievement in large part because of the quality of their teachers (Darling-Hammond & Youngs, 2002; Sanders & Rivers, 1996; Ferguson, 1991). Many researchers insist on the fact that teacher certification does matter for student achievement (Betts, Rueben, & Dannenberg, 2000; Fuller, 2000; Goe, 2002). Thus, teachers are the strongest determinant of student achievement, and they make the most important difference in student learning and academic progress.

In fact, as Hirsh (1998) said, teacher quality may be one of the most significant factors in student achievement. Consequently, knowledge of subject matter and of teaching and learning acquired in teacher education are strongly correlated with teacher performance in the classroom. Teacher education coursework is sometimes more influential than additional subject matter preparation in promoting student's mathematics and science achievement (Darling-Hammond, 2000; Monk & King, 1994).

Nevertheless, based on the National Assessment of Educational Progress (NAEP), Darling-Hammond (1998) found that the strongest predictor of state-level student achievement in mathematics and reading was the state's proportion of well-qualified teachers, after controlling for student characteristics (poverty and language status).

The NCLB Act and ESEA not only require students to make yearly progress toward state standards, but also mandate "highly qualified" teachers for those students in core academic subjects by the end of the 2005-2006 school year. Additionally, states must ensure that all schools are staffed by "high-quality" teachers, especially in those serving more challenging students (NCLB, 2002). The AC programs were implemented to reduce staffing shortages and, at the same time, develop alternative training programs capable of producing teachers who are at least equal to teachers trained in traditional methods.

Urban education

There is evidence that some urban schools have difficulty in filling teaching positions in particular subject fields (Feistritzer, 1990; Haberman, 1999). The shortages are greater in urban schools in specific areas such as mathematics, science, special education, and bilingual education, and mostly at the high school level (NCEI, 2003). Diverse students with great cultural and linguistic variation populate the urban schools in the United States. The majority of the students in most urban schools are children of color. In addition, many of the students who attend urban schools bring with them special needs (Haberman, 1999; Shen, 1997). Despite the fact that teacher performance can reduce the achievement gap, the students of color are more likely to be taught by unqualified teachers (Ferguson, 1991; Sanders & Rivers, 1996; Haberman, 1991, 1999; Shen, 1997).

The challenge facing urban education is that many children come to urban schools not well prepared to learn, and are affected by poverty, drugs, alcohol, and poor health

(Wilson & Corbett, 2001; Wlodkowski & Ginsberg, 1995; Stoddart, 1993; Natriello & Zumwalt, 1993). Proponents of AC argue that the need for a more diverse teaching force is imperative in urban settings. In urban areas, teachers from diverse backgrounds are needed to minimize cultural conflict between professionals and families and serve as role models and mentors (Haberman, 1994, 1996; Feistritzer, 2000). Urban educators must be prepared to address the differences that exist between their cultural and ethnic beliefs and those of urban students.

According to Crosby (1999), urban schools, especially those in poor urban areas, are often staffed largely by newly hired or uncertified teachers. The author indicated that these teachers, who were trained to teach students from middle-class families, and who often come from middle-class families themselves, now are faced with students of color, whose values and experiences are very different from their own. Culturally responsive teaching in urban education supports the need to develop a moral authority which rests on the perception of students and parents that the teacher is knowledgeable about the subject matter, competent in pedagogy, and committed to helping all students succeed in school and in life (Gay, 2000; Weiner, 1999; Delpit, 1995; Sizer, T & Sizer, N., 1999).

At the secondary level, urban middle and high schools are the most challenging learning and teaching environments. Students in hard-to-staff schools live the crucial time of adolescence differently because of their difficult life experiences (Hemmings, 2002; Casella, 2001; Wilson, W. J., 1996; Dryfoos, 1998). The literature regarding secondary urban education indicates that many secondary urban students have low self-esteem, dislike school and teachers, and have poor academic skills (Plank, Mc Dill, Mc

Partland, & Jordan, 2001; Matus, 2001). Therefore, it is imperative for urban educators to be more aware of the specific characteristics and needs of these typical populations.

However, urban schools in the United States are confronted with the problem of attracting and hiring highly qualified teachers, specifically those coming through the traditional routes (Clotfelter, Ladd, & Vigdor, 2002; Darling-Hammond, 2000; Sanders & Rivers, 1996). Indeed, one of the arguments advanced is the lack of professional training dealing with urban settings. Most of the teachers who finished their professional education and training in the institutions of higher education (IHE) select positions in suburban areas or in wealthy small towns (Haberman, 1988; Stoddart, 1992; AACTE, 1989). They generally do not want to teach where the demand for teachers is greater, such as in urban schools with high poverty, high percentage of students of color, and low achievement. Many new teachers are unfamiliar with the urban schools, and therefore are not well prepared to deal with the needs of the students of color in urban and poor areas (Shen, 1997; Ingersoll, 1997; Feistritzer, 1998; Haberman, 1999). Thus, urban educators must have specific skills to work with diverse individuals in terms of race, class, and culture, and they must be well trained to understand the special needs of the diverse student population in urban schools.

According to Haberman (1994, 1995, 1996), these particular and challenging environments in poor and urban schools mean urban educators must possess certain characteristics, such as: deciding not to teach until after graduation from college or university; having several jobs or careers prior to teaching; being a minority between 30 and 50 years old; having attended an urban high school; raising children or having relationships with children; living in a city and planning to continue doing so; being

prepared for an urban environment and seeking a teaching position in an urban school; and having awareness and experience with urban areas.

Urban middle and high schools, particularly those serving the students of color, register the most severe teacher shortages (NCEI, 2001, 2002). Indeed, the reasons why many teachers do not want to work in urban secondary schools are that the schools have the: lowest levels of student achievement (NAEP, 1998), highest rates of teen pregnancy, highest levels of student dropout, and highest incidents of violence (NCES, 1999). Consequently, urban secondary schools remain understaffed in terms of both quality and quantity of teachers. As a result, urban middle and high schools that educate over 40 percent of students with limited English proficiency, three-quarters of the students of color, and more than half of the students from low-income families, are staffed with inexperienced and under-qualified teachers (Ingersoll, 1997, 1998, 1999; Education Week, 1999).

According to a 2002 NCES report on qualifications of public schools teachers, 37 percent of high school mathematics teachers and 31 percent of high school science teachers lack a major or certification in their field. In addition, the report indicated that many "out-of-field" individuals, who do not hold a degree in the field in their current teaching assignment, educate many urban children. Education Trust (2002) demonstrated that approximately 24 percent of secondary school teachers of core subjects have neither a college major nor a minor in their primary field of teaching. The report added that this is worse in urban secondary schools, leaving students in the most challenging classrooms with the least qualified teachers. Education Week Quality Counts (2003) reported that nearly one third of students in high poverty secondary schools, and one fourth students of

color in secondary schools take at least one class with a teacher who has not majored or minored in the subject. As pointed out by the NCES report (1997), students in high poverty schools are less likely to have teachers who are fully qualified, and more likely to have teachers who lack a license and a degree in the field in which they teach.

Quality Counts (2003) report also showed that students in high poverty schools are more likely to be taught by inexperienced teachers. The report indicates that, over 50 percent of students in high poverty middle schools take a class with a teacher who has not acquired a minor in the subject he or she teaches, compared to about 44 percent of middle school students nationwide. At the high school level, about 32 percent of students in high poverty secondary schools take a class with a teacher who has not acquired a minor in the subject he or she teaches compared to 22 percent of secondary school students nationwide. The report adds that students in high poverty secondary schools are twice as likely as those in low poverty secondary schools to have a teacher who is not certified in the subject taught, 26 percent versus 13 percent respectively. About 50 percent of all students in high poverty secondary schools have teachers who have both majored in and become licensed in their subjects, compared to about 70 percent of all secondary students in low poverty schools.

Not only do urban schools in the United States report chronic teacher shortages, particularly in the fields of mathematics, science, bilingual education, and special education, but urban students, especially those in high poverty schools, are more likely to be taught mathematics and science by an unqualified teacher in that field (Ingersoll, 1999; Darling-Hammond, 2001; Humphrey, 2001; Howard, 2003). In addition, the majority of students in urban schools are children of color. Teachers are unrepresentative

of the diverse population they serve and are often neither aware nor well trained for these particular urban settings with high-need schools (NCES, 1997).

Teacher shortages

The issue of teacher shortages transformed the teaching profession over the past two decades and affected the schools in general, specifically urban schools in the United States (NCES, 2001; AAEE, 2002). In urban schools where the shortages are more severe, and where the students come from different ethnic and language backgrounds, hiring and retaining qualified teachers is very problematic. Urban schools, typically in low-income areas, experience higher teacher turnover and greater teacher shortages than any other type of school (Haberman, 1990; Darling-Hammond, 2000).

The factors contributing to teacher shortages cited are: (a) student enrollment (K-12) is expected to rise from 47 million in 2000 to 54 million by 2008, (b) teacher retirement as the baby-boomer teaching population reaches its 50's, (c) teacher attrition and turnover related to difficult school settings and poor work environments, and (d) reduction of class size, thus forcing many school districts to hire more new teachers (NCES, 2000; USDE, 2002, 2003). Other factors such as inadequate support from school administrators, student discipline problems, the lack of student motivation and parent involvement, limited input into school decision-making and low salaries are associated with teacher shortages, specifically in poor urban schools (Ingersoll, 2001).

Recruiting and retaining teachers are primary concerns for schools. Data shows that in the next ten years, the nation will need over two million teachers (USDE, 2000; NCES, 2001, 2002). The shortages are expected to continue because of rising students

enrollments, teacher retirement and teachers leaving their jobs for other reasons (job dissatisfaction or pursuing better careers), and recent class-size reduction policy (Darling-Hammond, 2002; Feistritzer & Chester, 2003). The shortages are greater in urban cities serving the students of color, and in curricular areas such as mathematics, science, bilingual education, and special education (USDE, 2002). The literature demonstrates that annually, the United States produces many more new teachers than American schools are able to hire. Only 60 percent of newly prepared teachers enter the teaching profession after they graduate. At the same time, the attrition rate during the first five years of teaching is 30 percent, and up to 50 percent in poor urban schools (USDE, 2000; Feistritzer, 2001). Paradoxically, colleges and universities produce teachers in fields that are not in demand. Furthermore, there is no collaboration between the states and/or districts in the supply and demand of teachers (Berry, Darling-Hammond, & Haselkorn, 1999). However, the literature gives evidence of shortages of well-qualified teachers in some geographic areas, and certain discipline areas. According to Haberman (1986, 1988) and Darling-Hammond (2000), there is a long-term shortage of well-qualified teachers in poor urban schools, a situation associated with the recruitment of under-certified teachers.

Overall, high-need districts facing teacher shortages is a wide spread and serious phenomenon, and data indicates that schools serving larger populations of students of color experienced greater difficulty finding qualified teachers to meet their needs (NCES, 1997). To combat the school staffing problems, the districts are doing a variety of recruitment initiatives, such as financial incentives, merit pay, new teacher induction, scientifically based professional development, signing bonuses, loan forgiveness, housing

assistance, and tuition reimbursement for primarily teaching positions in urban schools. Thus, many school districts are developing new strategies to bring professionals with different backgrounds and experiences into the classrooms (AACTE, 1991; Denton and Morris, 1991; Darling-Hammond, 1999; Berry, 2004). From this situation AC was developed and implemented as a new approach in the Unites States to meet this need. A key factor in responding to the urban teacher shortages is recruiting individuals who are prepared to teach in culturally diverse urban schools.

Contribution of AC programs

A response to teacher shortages has been alternate route certification programs. Indeed, in light of the failure of traditional education to provide teachers in quantity and quality, specifically for poor urban schools, AC appears to reduce the teacher shortages in urban areas (Feistritzer, 1999, 2001, 2003; Shen, 1998; Natriello & Zumwalt, 1993; Stoddart, 1998). Such programs are helping many states and school districts to find the teachers they need (Stoddart, 1992; Haberman, 1988; Corbin, 1991; Darling-Hammond, Hudson, & Kaby, 1989).

Research has shown that AC programs have been successful in providing urban schools with teachers who have diverse educational and ethnic backgrounds (Fox, 1984; Gray, 1987; Haberman, 1986, 1998, 2000; Shen, 1997; Miller, McKenna, & McKenna, 1998). In general, the objectives of alternate routes to teaching are: (a) to increase the pool of teachers competent in high demand educational specialties such as mathematic and science, (b) to increase the participation of under represented racial, ethnic, and cultural groups, (c) to provide staff in urban high-poverty schools, and (d) to decrease the

need for emergency teachers to meet local teacher shortages (Haberman, 1999). The recent movement to address the shortages in urban schools has resulted in the AC programs recruiting more males, minorities, and older people compared to the TC programs (Wilson et al., 2001; Zeichner & Schulte, 2001; Feistritzer, 2000; Bliss, 1990).

Proponents of AC argue that alternate routes are more likely to recruit candidates who are willing to work with urban students because of the participants' life and background experiences (Shen, 1997; Natriello & Zumwalt, 1993). Indeed, it has been found that teachers from AC programs tend to be older than the traditional university licensed candidates and that alternative routes into teaching recruit more minority teachers than the TC programs (AACTE, 1989; NCES, 1990; Shen, 1997; Haberman, 1999; Feistritzer & Chester, 2000, 2003). According to Stoddart (1993), older individuals with accumulated background experience are more likely to cope in difficult teaching environments. Other studies also indicated that teachers from AC routes, compared to those from the TC programs, are more disposed toward teaching in urban schools and that the AC teachers hold a higher expectation for the students of color (Fox, 1984; Gray, 1987; Haberman, 1990, 1998). As a result, alternative routes to teacher certification are more likely than TC programs to recruit individuals who are more prepared to teach in urban schools (Stoddart, 1993).

It is important to remember that colleges of education are the primary source of elementary and secondary teachers and must confront the problem of shortages of teachers. Faced with the concern for diversity in the teaching force and with teacher shortages particularly in urban schools where the demand of teachers is greatest, and in certain disciplines such as mathematics and science especially, alternate routes are the

solution (Feistritzer, 1999, 2000). According to the NCEI (2001), AC programs are new avenues that provide opportunities for people from various life experiences and educational backgrounds to enter the profession of teaching. Another report from the Center for Educational Information (1999) specified that alternate routes to teaching produce teachers who are generally older, more experienced, and are more committed to helping students with the greatest need. More recently, Feistritzer and Chester (2003) indicated that alternative routes bring into the profession of teaching more people of color, more men, and more people with academic degrees other than education and with experience in other occupations.

In summary, the persistence of teacher shortages in specific disciplines, such as mathematics, science, special education, and bilingual education, and in certain geographical areas such as poor urban schools, has stimulated the growth of AC programs. It is also a way to bring candidates with diverse experience and ethnic backgrounds into the profession of teaching.

Empirical studies

Most of the published evaluations comparing AC and TC focus on qualitative studies and do not address the relevant issues. Research on AC programs has predominantly focused on comparisons of characteristics, rather than comparing the performance of the students that exit these programs. However, research that target AC versus TC as well as the students' academic achievement outcomes are presented in this section. The section also includes a review of the literature and the findings are organized into three topics: retention, teacher performance, and student achievement.

Retention

Mixed results appear in the comparison of the retention rates of AC versus TC teachers. Many studies have found higher retention of AC prepared teachers (U.S. Department of Education, 2002). In his study of the Los Angeles Unified School District (LAUSD), McKibbin (1991) found that the annual attrition rate of first year AC teachers was lower, 20 percent compared to 40 percent, for TC first year teachers. The author shows in the LAUSD's study that AC teachers are more likely to stay in teaching and finds that their turnover rate is lower (nine percent), compared to that of their colleagues from the TC programs (21 percent). Likewise, Stoddart (1993), with the same program in Los Angeles, indicates that AC teachers are more likely to stay in the same school district. He adds that minority teachers in the program have a higher retention rate (87 percent) than white interns (74 percent). According to Stoddart, in the same study, 266 minority AC teachers out of 307 total interns at the beginning of the program are still in the teaching profession. He concludes that the minority persons going through AC programs are much more interested in working in urban schools (1993).

In the Milwaukee AC program, Haberman (1999) found a retention rate of 94 percent for the AC participants with 129 out of 137 total interns still teaching in the same district. Another AC program study, done at the University of Tennessee-Knoxville by Boser and Wiley (1988), shows the same tendency: a lower attrition rate for first year AC teachers (19 percent) compared to 40 percent for the first year TC teachers in the same university. The authors indicate that after the first year, 17 out of 19 AC teachers were teaching in the same school systems, compared to 19 out of 30 graduates from TC

programs that stayed in the same districts during the same period (1988). The explanations given for the high retention rate of AC teachers are: (a) teachers coming from AC programs generally are older, more experienced, and have a strong commitment to helping young people learn and develop; (b) AC teachers are more likely to be persons of color and to reside in the same community with the students; (c) they have work experience in occupations other than education; and (d) they are making a definitive decision to teach at this point in their lives and to give back to the community in which they live (Haberman, 1999; Feistritzer & Chester, 2000).

However, some studies show higher turnover rates among AC teachers (Darling-Hammond, 2001; Shen, 1997). A study in the Houston program using the data from the State Board for Educator Certification (SBEC) indicates a high attrition rate for AC teachers. According to the study, between 1995 and 2002, from the first year of teaching to the seventh year, the Houston-based AC program units registered 36.2 percent loss of teachers (annual attrition rate of 5.1 percent) compared to a 16.2 percent attrition rate for the nine universities' TC programs in the Houston area (annual attrition of 2.65 percent) (Consortium of State Organizations for Texas Teacher Education [CSOTTE], 2004). Additionally, Johnson and Birkeland found in their study of 50 new teachers in Massachusetts that during the first three years of teaching, TC teachers were more likely to remain in public school teaching than a mid-career teacher or someone who had entered teaching through an AC program. The authors concluded that working conditions, lack of administrative support, teaching assignments, and lack of student discipline, dictate the career decisions to leave or stay in teaching or to transfer to another school (2003). The reasons for high attrition rate of the AC teachers during their first

years of teaching are the lack of support and professional development as beginning teachers (Feistritzer & Chester, 2000; Darling-Hammond, 2002).

It is very important to consider some aspects about retention and career patterns. Indeed, subject specialties must be taken into consideration because of the different opportunities available outside the teaching profession to college graduates as pointed out by the National Association of State Boards of Education (NASBE). Beginning teachers, those who are academically talented, those teaching in high-poverty schools, and those with a disciplinary specialty in high demand outside of education (such as math or science) tend to leave teaching first (NASBE, 1998).

Teacher performance

Available data comes primarily from program evaluation reports and tends to show few differences between TC and AC licensed teachers in tested ability, teacher efficacy, or effective teaching. Moreover, studies appear to support arguments that AC teachers are attracting candidates at least equal in quality to graduates from colleges of education. There have been several studies concerning the issue of effective teaching with the professional knowledge examination, the perception of problems in teaching, the general ratings of the overall teaching performance of teachers, the ratings of teaching performance based on systematic classroom observations, and the performance of students. The results of the following studies show, for the most part, that AC and TC programs produce equally competent teachers.

In the North Carolina program, no differences in the professional knowledge examination scores of AC and TC prepared teachers were found (Hawk &

Schmidt, 1989). In the authors' view, teachers from the Lateral Entry Alternative Certification Program (LEP) were as competent in the classroom and as successful on the National Teacher Examination (NTE) as TC teachers. In the same program, the observation of 53 TC and 16 AC teachers with the "Teacher Performance Assessment Instrument" (teacher's management of time, management of behavior, instructional presentation, and instructional monitoring and feedback) indicated that the LEP in North Carolina primarily provided teachers who were "at standard" on the competencies assessed by the instrument (White, Stuck, Wyne, & Coop, 1984).

In the study of the University of Tennessee-Knoxville program, the AC interns scored higher than the two comparison groups of TC teachers on the general knowledge test of the NTE professional education examination. A survey of principals, superintendents, and mentors participating in the AC program showed that the preparation received in the AC program was "as good as or better than" that received in traditional teacher education. On the professional knowledge test, Boser and Wiley (1988) found that teachers from the AC program have significantly higher scores than the graduates from the TC programs. Consequently, the authors stated that the participants in the AC program were as well prepared as their colleagues who completed the TC preparation programs (Boser & Wiley, 1988).

A study of the Houston program that involved 69 TC and 162 AC interns indicated that, after eight months, there was only one significant difference among 14 areas addressed in the teachers' perceptions of problems in their teaching. TC teachers showed greater problems in managing the classroom. There were no statistically significant differences in the teachers' levels of confidence and satisfaction of teaching.

However, after the first two months of teaching, the researchers found that AC teachers showed greater difficulty than those of TC teachers in the following six areas: student motivation, managing teacher time, paper work, school administration, personal time, and grading students (Houston et al., 1993).

With the Georgia study, an efficacy scale developed by Guyton was administered to 23 beginning AC teachers and 26 beginning teachers prepared through traditional teacher education. Guyton, Fox, and Sisk (1991) found that after five months of teaching and at the end of the year, there was no significant difference between alternatively and traditionally certified teachers in terms of their sense of efficacy and their performance as teachers (Guyton et al., 1993). Two persons, who may include the principal, assistant principal, department chair, or another peer teacher, evaluated the two groups of teachers. The authors concluded that beginning AC and TC teachers were "comparable" regardless of their teaching attitudes and their teaching efficacy (Guyton, Fox, & Sisk., 1991).

In New Hampshire's program, principals rated 107 TC teachers as superior in instructional and planning skills, when compared to a group of 29 AC teachers. Graduates from the TC program were ranked "higher in performance" than the teachers from the AC program (Jelmberg, 1996). The author also indicated that 26 of the 27 significant differences found in his study favored the teachers from the college-based education program (1996).

In Dallas, 91.8 percent of AC interns were rated by their teacher advisors as performing as well as or superior to "the average first year TC teachers." Additionally, the results of the Texas Teacher Appraisal System (TTAS) show that all but one AC intern were rated "satisfactory" or above, and the majority of the interns (62 percent)

were rated as "exceptional" or "clearly outstanding". The authors concluded that almost all of the AC interns met or exceeded the TTAS standards during observations of their classroom performance (Hutton et al., 1990). Utilizing observations of AC teachers compared to TC teachers as the basis for assessing teacher competence, other studies with the TTAS in five areas of teaching (instructional strategies, classroom management and organization, presentation of subject matter, learning environment and growth, and responsibility), also showed that AC teachers were rated as exceptional or at standard in all of the TTAS competency areas (Houston et al., 1990; Lutz & Hutton, 1989).

In Connecticut, the supervisors of 88 percent of the interns in 1989 felt that the AC teachers were stronger than other beginning teachers in personal qualities (e.g., hard working, committed to teaching, creative). In a more extensive survey of the principals, mentors, and supervisors of 76 first and second year AC teachers, in which the AC teachers were compared to "the least experienced beginning TC teachers," it was concluded that AC teachers were seen as responsive to individual students, creative and innovative in the classroom, and as effective as TC teachers (Bliss, 1990). Bliss concluded that the AC program in Connecticut met its primary goal of attracting highly qualified individuals who contributed excellent subject matter knowledge and a high degree of professionalism. He added that extensive data from school personal who worked with the AC interns show a positive record of performance.

In Milwaukee, principals rated 96 percent of the AC teachers who were prepared through the Milwaukee Metropolitan Teacher Education Program (MMTEP) between 1990 and 1999 as satisfactory or exemplary in their teaching. The principals rated

teacher performance, for those teachers prepared in the MMTEP and in the TC programs, as equally effective (Haberman, 1999).

Finally, in the Virginia Wesleyan program, 14 of 15 principals reported that the performance of the AC teachers in their schools was excellent or good on all the competencies included on the State Beginning Teacher Assessment Instrument (SBTAI). The remaining administrator reported that the AC teachers were excellent or good in eight categories listed on the SBTAI but only fair in classroom management (Shannon, 1990).

Overall, however, there is not enough information to judge the value of these evaluations. Mostly, people who did the ratings had a stake in the program being assessed. The best way to avoid bias will be to have independent raters. Moreover, in some studies, it was difficult to assess what were the elements and aspects of effective teaching. Often, as in the evaluation of the Dallas program, it was unclear what the evaluators meant by "average first year TC teachers." This is also the case for the Connecticut program; it was ambiguous what the authors meant by "least experienced beginning TC teachers." Because of the limitations brought on by raters' bias and inconsistencies of definitions, we need to have better standards to assess these programs.

Student achievement

In a review of the literature, much of the material dealing with the impacts of teacher certification on student academic achievement does not give indications on the type of certification. Also, the large variability in AC programs makes it difficult to compare AC with TC programs based on student performance, because there is not

enough information concerning the characteristics of the programs in question. Standard certification and alternative routes are compared without clear difference between provisional certification, probationary certification, emergency certification, private school certification, or non-certification.

However, studies in peer reviewed journals and scientifically based research show a strong relationship between student academic achievement and teachers' professional preparation and certification status (Wilson, Floden, & Ferrini-Mundy, 2001, 2002; Miller, McKenna, & McKenna, 1998; Goldhaber & Brewer, 1998, 2000). Monk (1994), with the Longitudinal Study of American Youth (LSAY), found that teachers' education coursework, more than additional preparation in mathematics and science, is positively correlated to student academic achievement in these fields. He also stated that education courses in subject matter have a positive effect on student learning at each grade level in both mathematics and science. Indeed, it has been well documented and demonstrated that there is a significant relationship between teacher qualification and student achievement across studies using different units of analysis and different measures of preparation. Some well-constructed studies, holding constant the students' socio-economic status and prior academic performance, show the same findings (Ehrenberg et al., 2001; Rowan, 2002; Darling-Hammond & Youngs, 2002).

According to Hawk, Coble, and Swanson (1985), a major or minor in mathematics or science is beneficial to student achievement in these areas. The authors argue that in mathematics and science, teacher specific training has a significant impact on student test scores in these subjects. The effects of teacher training on student achievement show that, in general mathematics as well as Algebra, students taught by

teachers certified in mathematics had higher scores than their counterparts taught by teachers certified out of field (Monk & King, 1994; Rowan, Chiang, & Miller, 1997).

Laczko-Kerr and Berliner (2003), in comparing certified teachers (from accredited Institution of Higher Education (IHE) programs, and completing 45 semester hours of education coursework) with under-certified teachers (TFA, provisional teachers, emergency teachers, holders of Bachelor's degrees, but with little or no education coursework, or any other type that do not meet the requirements for a standard certification), used 109 matched pairs of the two groups of teachers and the Stanford Nine (SAT-9) to analyze student academic achievement in grades three through eight in Arizona. They found with the data from 1998-99 and 1999-2000 that the students of certified teachers had higher test scores than those of under-certified teachers.

Similarly, with the National Assessment of Educational Progress (NAEP) data from 1990, 1992, 1994, and 1996, and the 1993-94 Schools and Staffing Surveys (SASS), Darling-Hammond (1999) analyzed the effects of certification status on student achievement in mathematics and reading. She examined the students' mathematics scores for fourth and eighth grades and the students reading scores for fourth grade across 44 states and found that students' achievement is positively correlated at the state level with "well-qualified teachers" (full certification and major in field). The author stated that holding constant students' socioeconomic and language backgrounds, the most strongly significant predictor of student achievement in mathematics and reading was the proportion of well-qualified teachers. She indicated that there is a positive and significant relationship between the percentage of well-qualified teachers in a state and

the state student achievement test scores in mathematics and reading, after controlling for student poverty and language status.

Wenglinsky (2000) used the 1998 NAEP data and controlled for student and school characteristics. He demonstrated how eighth graders do better in mathematics and science under certain circumstances. The author specified that the students have better scores in these subjects when they are taught by teachers who are connecting theory in learning and research for the improvement of teaching practices, who are trained to deal with diversity and urban realities, who integrate technology, and who use inquiry that supports student and educator development.

Miller, McKenna, and McKenna (1998), in their study using matching comparison of 18 total classrooms (nine AC teachers at a Southeastern University Program in Georgia, and nine TC teachers with the same three year teaching experience and teaching the same subject), found that there is no significant difference between students taught by AC teachers and their counterparts taught by the TC teachers in total mathematics or total reading scores. The authors used multivariate analysis of variance (MANOVA) with the Iowa Test of Basic Skills (ITBS). In their views, the students of the AC program (n = 188) achieve as well as the students of the TC program (n = 157) in mathematics and reading.

In another study based on regression analysis and using the National Educational Longitudinal Study (NELS) of 1988, Goldhaber and Brewer (2000) examined the relationships between twelfth grade students' performance in mathematics and science and teacher certification (3,786 mathematics students; 2,524 science students; 2,098 mathematics teachers; and 1,371 science teachers). They found that the students of

teachers with mathematics degrees or certification in the subject achieve better than the students of teachers without subject matter preparation. Students' test scores in mathematics were higher when they had a teacher who holds standard certification relative to when the students' teacher is not certified or is certified out of subject. The authors added in their findings that the students taught by teachers with Bachelor's or Master's degrees in mathematics outperform the students taught by teachers who do not have these credentials in the same field. They discovered that in science, the teachers with standard and probationary certification have a positive impact on the student test scores. On the other hand, the authors indicated that the students taught by an uncertified teacher or a teacher who holds a private school certification achieve less or lower scores than those taught by either a teacher with standard, probationary, or emergency certificate. According to the authors, no significant difference was found between mathematics student test scores for teachers with emergency certification and the ones with standard certification.

Studies using value-added assessment in relation to the teacher certification status have found that, students' assigned teacher predicts the student academic achievement gain more than any other factors (Sanders & Rivers, 1996; Stone, 1999; Rivkin, Hanushed, & Kain, 2001; Darling-Hammond, Berry, & Thoreson, 2001). Indeed, with the same NELS of 1988, Goldhaber and Brewer (2000) used a sample of 3,611 mathematics students and 2,299 science students in twelfth grade public schools. The authors focused this time on the students' achievement gains from the tenth to the twelfth grades and discovered that the mathematics students' gains were much higher when their teachers had standard, probationary, or emergency certification in mathematics as

compared to when their assigned teachers were not certified in mathematics (5 points and 2.6 points, respectively).

Summary

Teacher shortages are causing many urban school districts to connect several initiatives with AC programs, mostly in poor urban areas and in some subject specializations. With the shortage of teachers, coupled with the rise of attrition rates in certain geographic locations and in particular fields such as mathematics, science, special education, and bilingual education, the interest in providing AC programs as a remedy has increased. The purpose of these programs is to attract and retain good teachers especially, in schools serving the students of color.

The issue of AC programs is very political, and like many controversial issues, interests and ideologies drive much of the debate and shape the research questions and the ways they are studied (Haberman, 2001; Darling-Hammond, Berry, & Thoreson, 2001). AC programs are offered as a solution to teacher shortages in urban schools and in specific fields. Substantial studies have been compiled to document the AC programs' values with mixed results.

Opponents of the AC initiatives argue that alternative routes programs produce less qualified teachers (Darling-Hammond, 1997, 2000; Youngs, 2002), that the AC teachers have higher turnover rates (Shen, 1997; Darling-Hammond, 2001), and that the AC teachers tend to leave the teaching profession in greater number during their first year, compared to their colleagues from the TC programs (Houston et al., 1993; Darling-Hammond, 1999; Fuller & Alexander, 2003). Researchers who oppose the AC programs

found in their studies that these routes do not attract the "best and brightest" candidates to teaching. Consequently, adversaries of AC programs conclude that students taught by teachers prepared in these programs achieve less than their counterparts taught by traditionally prepared teachers (Laczko-Kerr & Berliner, 2003; Rowan, Chiang, & Miller, 1997; Monk & King, 1994).

On the other side of the debate, proponents of AC programs indicate that alternate routes to teaching were successful in increasing the number of qualified teachers, with high percentages of minorities (Lutz & Hutton, 1989; Natriello & Zumwalt, 1992; Miller, McKenna, & McKenna, 1998; Haberman, 1998, 1999, 2000). The advocates of AC programs state that these new avenues produce teachers who perform better than or as well as their colleagues from TC programs. Additionally, the defendants of the AC routes to teaching found in their studies that there is no significant difference in achievement between the students taught by AC teachers and those taught by TC teachers (Miller, McKenna, & McKenna, 1998; Goldhaber & Brewer, 2000).

To determine whether the T2T program responds to the needs of students and the expectations of parents, educators, and policy makers, and has a significant impact on students' academic achievement outcomes, the following research questions were asked:

1. Do students taught by the teachers prepared in the T2T program learn Algebra I as well as the students who are taught by the non-T2T licensed teachers with one year of teaching experience in the high-need urban district in southeast Virginia?
2. Do students from the T2T program gain more or less in Algebra I than those taught by the non-T2T teachers according to the different tests administered?

CHAPTER III

METHODOLOGY

Chapter III describes the methodology used in the study. Research design and participants of the study are also presented. Moreover, research questions and statistical analysis are discussed.

Restatement of the problem

The purpose of this study was to determine if significant differences existed between the students taught by the first year T2T teachers and their peers taught by first year non-T2T teachers in Algebra I in a high-need urban district in southeast Virginia. The following research questions were used to guide the research and to evaluate if the T2T program has a significant effect on students' achievement outcomes:

1. Do students taught by teachers prepared in the T2T program achieve in Algebra I as well as the students who are taught by the non-T2T teachers in the same urban southeastern district in Virginia?
2. Do T2T students gain more or less than the non-T2T students, regarding the evolution of their test scores in Algebra I?

Research design

A quasi-experimental design was used for this study because two intact groups of subjects were formed on a basis other than random assignment. Specifically, a non-equivalent comparison group design was used in the study. Teachers were matched by

school based on the type of classrooms, year of experience, type of Algebra I teaching sections, grade level, and certification status of the teachers.

Participants

Three middle schools (MS), four high schools (HS), twelve teachers and a total of 335 students in a high-need urban school district in southeast Virginia participated in the study (106 MS students and 229 HS students). The students taught by T2T Algebra I teachers cohort one (2003-2004) represented the experimental group (n = 150) and those taught by first year Algebra I non-T2T teachers in the same school system were the comparison group (n = 185). Thus, the students taught by the six T2T teachers, according to the specification (Algebra I, sections ABCD or CD) and their counterparts taught by the six matched non-T2T teachers from the eight new Algebra I teachers in the district, teaching sections ABCD or CD, hired during the 2003-2004 school year, were the participants (total considered n = 335). For the sections, ABCD is a two-year alternative method of taking Algebra I. CD is the second year of the two-year course. MS Algebra I is a full year course.

Matching procedures

Of the eight non-T2T Algebra I (sections ABCD or CD) teachers hired in the district during the 2003-2004 school year, six were matched to the six T2T Algebra I (sections ABCD or CD) teachers in the same district. The decision for inclusion was based on the type of school (MS or HS), the sections of Algebra I, the grade level of teaching, and the type of certification the teachers held (see Table 2 below).

Table 2

Number of Students by Grade Level and Program

Pair	Level	T2T	Non-T2T	TOTAL
1	MS	22	33	55
2	MS	43	8	51
3	HS	31	36	67
4	HS	32	27	59
5	HS	10	35	45
6	HS	12	46	58
TOTAL		150	185	335

Measures

The first Algebra I quarterly test (Q1), the second Algebra I quarterly test (Q2), the third Algebra I quarterly test (Q3), and the 2002 new version of the Virginia Standards of Learning (VASOL) were used as the instruments for the study.

The Algebra I quarterly tests used in the study were based on the Virginia Standards of Learning (VASOL) test items, blueprint, and objectives. The urban school district in this study administered the quarterly tests to monitor the progress of Algebra students throughout the year. A panel of mathematics instructors, along with the mathematics coordinator for secondary education within the school district, worked collaboratively to design test items that mirrored the format and depth of items found on the state mandated Algebra I end of course assessment. The quarterly tests examine the

students' ability to utilize algebraic symbols; to solve problems using graphs, tables, and equations; to understand patterns, relations, functions, and models; and to solve complex problems using a variety of problem solving strategies (Wallace, 2004; District, 2004). Cronbach's Alpha was used to estimate the internal consistency reliabilities of the three Algebra I quarterly tests which were $\alpha = .98$, $\alpha = .97$, and $\alpha = .98$ for Q1, Q2, and Q3 respectively. Also, correlation coefficients between the SOL scores and the Algebra I quarterly tests were estimated to assess the validity of the quarterly assessments. Pearson correlation coefficients were significant for all the Algebra I quarterly tests, but were not large (see Table 3 below). The coefficients of shared variance are respectively 21.06 percent, 33.98 percent, and 22.46 percent for Q1, Q2, and Q3 respectively.

Table 3

Correlation coefficients

		Q1	Q2	Q3	SOL
Q1	Pearson Correlation	1			
Q2	Pearson Correlation	.553**	1		
Q3	Pearson Correlation	.311**	.552**	1	
SOL	Pearson Correlation	.459**	.583**	.474**	1

$n = 335$

** Correlation is significant at $p < .001$.

For the 2002 new version of the Virginia Standards of Learning (VASOL), a panel of experts designed the end of year assessment. The panel was comprised of

specialists in mathematics education at the Virginia State Department of Education (VDOE), experienced mathematics instructors from various school districts throughout the state of Virginia, university faculties with expertise in mathematics and instruction, and members of the Virginia Council of Teachers of Mathematics, which is an affiliate of the National Council of Teachers of Mathematics. The state of Virginia requires all school districts to administer an end of course assessment for Algebra I courses. The VASOL end of year assessment is aligned with the standards established by the National Council of Teachers of Mathematics (Wallace, 2004; Commonwealth of Virginia Board of Education, 2002; Virginia Department of Education, 1999, 2002). The reliability and validity of the Algebra I end of course assessment involves correlations with other related measures and between other SOL Algebra I tests. The Spearman Rank Order Correlation coefficient "rho" between the Algebra I SOL tests and the Stanford 9 Total Math test was $\rho = .53$ (VDOE, 1999, 2002). The reliability and validity of the end of the year assessment from the state is reviewed each year by the Virginia State Department of Education through an analysis of field tested items and student responses (VDOE, 1999, 2002; Wallace, 2004). The district uses both versions of the SOL (old and new). Only the students who did not pass the VASOL for the first time are given the old version. For this study, all the students took the 2002 new version (Personal communication, 2004).

The data derived from the Algebra I quarterly tests and the VASOL were used to compare the two groups of students (the ones taught by T2T teachers and their homologues taught by the non-T2T teachers), and to determine the academic growth among Algebra I students between both groups.

Methods of data collection

Prior to the data collection process, permission was obtained from the participating district. After the proposal's defense, the application form for Human Subjects research was submitted to the ODU's Darden College of Education Human Subjects Committee and has been approved as exempt under category 1.

To ensure confidentiality, the Chair of the research committee at the participating district, the Coordinator of the T2T program, and the teachers involved in the study provided the coded data. The participants were assigned numbers and pseudonyms and there was no personal identification. Of 508 students initially enrolled, 335 data (66 percent) were available for all the assessments (Q1, Q1, Q3, and SOL) and were the only ones utilized for the analysis. Some students did not take one or more assessments, and some dropped out or moved to another class or school. Therefore, their scores were not considered in the study.

The disaggregated data were obtained with assistance from the Director of Evaluation, Research, and Testing and the T2T program Coordinator in the district. Otherwise, it was not possible to have access to these disaggregated data.

Analysis

First, the Algebra I test scores were converted into Z scores to remove the scaling factor from the original test score distributions. Secondly, descriptive statistics (means and standard deviations) were used to compare the students taught by teachers from the T2T program (experimental group) and those taught by the non-T2T teachers (comparison group). A 2 (T2T versus non-T2T) x 4 (tests administrated) repeated

measures analysis of variance (ANOVA) was used to examine the impact of teachers' T2T status on student achievement in Algebra I. Box's test was performed to determine whether the data satisfied the assumption of equality of covariance matrices required for repeated measures.

Follow-up tests were conducted to determine which of the means for the experimental group (T2T) and the comparison group (non-T2T) differed significantly from each other. Multivariate Analysis of Covariance (MANCOVA) was performed as a follow-up, using Wilk's Lambda as the criterion for multivariate significance, and using the Bonferroni adjustment for multiple comparisons.

CHAPTER IV

RESULTS

Research findings are reported in this chapter. This section is organized around the descriptive statistics, inferential statistics, and follow-up tests. The limitations of the study are also discussed.

Descriptive statistics

The means (M) and standard deviations (SD) of the three Algebra I quarterly tests and the SOL end-of-course mathematics test for the treatment and for the comparison groups are provided in Table 4. Standardized scores for the same tests are provided in Table 5.

Table 4

Mean scores by Grade Level and Program: Quarterly Tests and SOL

LEVEL	Q1			Q2			Q3			SOL		
	M	SD	*n*	*M*	SD	*n*	*M*	SD	*n*	*M*	SD	*n*
Middle												
Comparison	80.58	8.49	41	63.12	11.27	41	74.80	10.72	41	469.97	35.11	41
T2T	75.83	11.80	65	70.27	19.78	65	72.96	24.30	65	458.98	34.24	65
High												
Comparison	72.72	10.80	144	54.25	16.15	144	55.93	17.08	144	432.89	37.96	144
T2T	62.68	15.75	85	58.25	12.92	85	69.83	11.73	85	442.91	41.92	85
T OTAL												
Comparison	74.46	10.82	185	56.21	15.62	185	60.11	17.70	185	441.11	40.33	185
T2T	63.38	15.57	150	63.46	17.26	150	71.19	18.26	150	449.88	39.47	150

Table 5

Mean Z scores by Test, Grade Level, and Group

LEVEL	Z score (Q1)			Z score (Q2)			Z score (Q3)			Z score (SOL)		
	M	SD	*n*	*M*	SD	*n*	*M*	SD	*n*	*M*	SD	*n*
Middle												
Comparison	.65	.62	41	.21	.67	41	.51	.57	41	.62	.87	41
T2T	.30	.87	65	.64	1.18	65	.42	1.29	65	.34	.85	65
High												
Comparison	.07	.80	144	-.31	.96	144	-.48	.91	144	-.30	.94	144
T2T	-.67	1.16	85	-.07	.77	85	.25	.62	85	-.05	1.04	85
TOTAL												
Comparison	.20	.80	185	-.19	.93	185	-.26	.94	185	-.09	1.00	185
T2T	-.24	1.15	150	.23	1.03	150	.32	.97	150	.12	.98	150

Overall, the T2T students scored eleven points less than the comparison group, on average, during the first Algebra I quarterly test period ($M_{T2T} = 63.38$, $M_{non\text{-}T2T} = 74.46$). In the second and third Algebra I quarterly tests, and the SOL periods, the T2T students led the non-T2T students by respectively seven points, eleven points, and eight points (see Table 4).

During the first quarterly test (Q1), half standard deviation separated the two groups, in favor of the comparison group. In the second and third quarterly tests (Q2 and

Q3), and during the SOL test periods, the T2T students reversed the tendency and surpassed the non-T2T students. Substantial difference in the advantage of the non-T2T students during the first test period and in favor of the T2T students during the second and third test periods separated the two groups. During the end-of-course test period, a small difference favoring the experimental group was found (M_{ZQ1}= -.24, M_{ZQ2} = .23, M_{ZQ3} = .32, M_{ZSOL} = .12) for the students taught by the T2T teachers and (M_{ZQ1}= .20, M_{ZQ2} = -.19, M_{ZQ3} = -.26, M_{ZSOL} = -.09) for the students taught by the non-T2T teachers (see Table 5).

Inferential statistics

To evaluate whether the differences in academic achievement between the students taught by the T2T teachers and their peers taught by the non-T2T teachers grew, decreased, or remained similar from the first Algebra I quarterly test (Q1) to the SOL test, the mean Z scores for each group were analyzed and the F test calculated.

Box's test indicated that the observed covariance matrices were significantly different between the two groups ($F_{10, 481187.5} = 14.06, p < .001$). Therefore, the Geisser-Greenhouse conservative F test was used to correct for the possibility of positive bias in the F statistic arising from a violation of the equality of covariance matrices assumption (Kennedy & Bush, 1985). The Geisser-Greenhouse test called for using degrees of freedom equal to 1 in the numerator, and n-1 in the denominator. In this case, the Geisser-Greenhouse adjustment still yielded a significant interaction between time period and groups ($F_{1, 334} = 53.48, p < .001$).

Also, sphericity and the results of assumptions of normality and independence were satisfactory. Additionally, the interaction effects (Algebra I x Treatment) were tested using the multivariate criterion of Wilks' Lambda (Λ), and the effects were significant ($\Lambda = .738$, $F_{4, 330} = 29.315$, $p < .001$).

Follow-up tests

MANCOVA was used to follow-up the significant multivariate result. The interaction between T2T status and longitudinal Algebra I scores was significant ($F_{1, 323} = 32.33$, $p < .001$).

The graph in Figure 1 below (Mean Z scores by test periods and by groups) shows that, the comparison group had higher scores than the experimental group in the first test period (.20 and -.24, respectively), a difference of .44 points, with significant $F_{1, 333} = 17.66$, $p < .001$ for the Q1. In the second test period, the experimental group reversed the trend and led the difference to .42 points (-.19 for the non-T2T, and .23 for the T2T students), with significant $F_{1, 333} = 16.23$, $p < .001$ for Q2. In the third test period, the experimental group kept the lead over the comparison group by .58 points, respectively (.32 and -.26), with significant $F_{1, 333} = 31.48$, $p < .001$ for Q3. Finally, in the SOL test period, a small advantage of .21 points also favored the T2T group (-.09 for the non-T2T students and .12 for the T2T students), with a significant $F_{1, 333} = 3.98$, $p = .047$ for SOL.

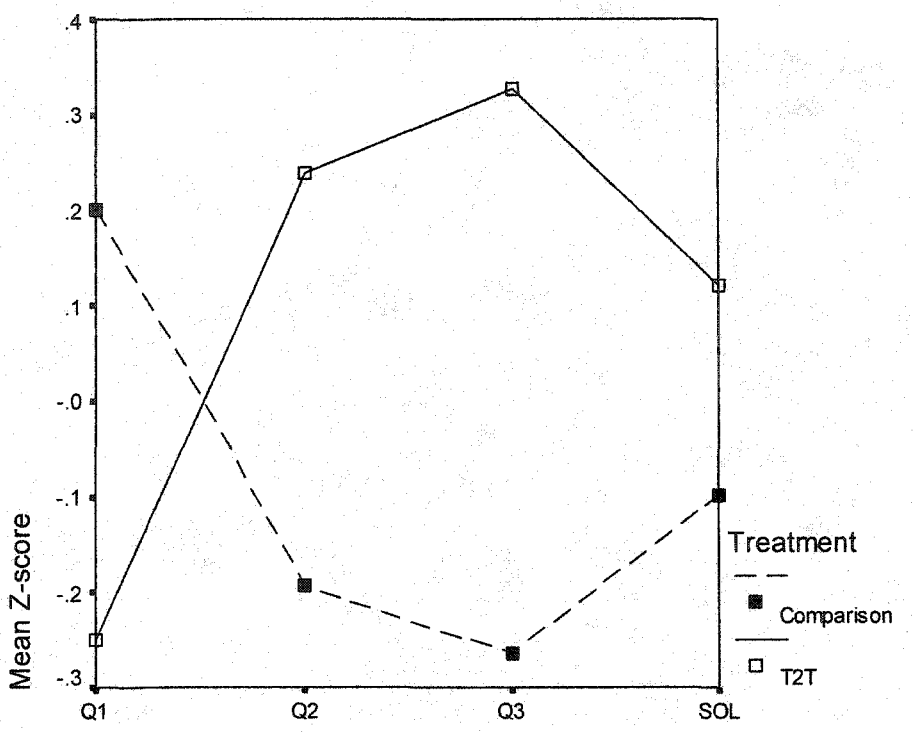

Figure 1

Mean Z scores by test periods and by groups

Note: Q1 = first quarterly test. Q2 = second quarterly test. Q3 = third quarterly test. SOL = end-of-course test (VASOL).

Limitations

1. It is impossible to generalize to a larger population because of the small number of teachers and the specific nature of the T2T program in Virginia. Furthermore, with the absence of random selection and random assignment, the ability to generalize the findings of the study is also limited.

2. The best method to perform this study would be to test the students of both groups before and after exposure to the teachers. Otherwise, telling with precision the effect of teacher certification on student achievement is limited.

3. Longitudinal research is needed to track the students' progress throughout their schooling and to determine the cumulative effects of teacher certification on students' outcomes. Also, research that tracks and matches students who are taught by the T2T teachers and their peers taught by the non-T2T teachers, over a period of at least three years would provide more information on the issue of the debate (Sanders & Rivers, 1996).

4. The subject attrition rate was obvious (34 %).

5. A low validity coefficients correlation (.459, .583, and .474 respectively for Q1, Q2, and Q3) was unregistered for the Algebra I quarterly tests. However, this is understandable because the quarterly tests are formative measurements, while SOL tests are summative measurements.

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

This final chapter is divided into three sections. The first section is a review of the findings reached as a result of this study. The second section offers a discussion of the major findings. Lastly, the conclusions from the study and the suggestions for further research are discussed.

Summary of the study

This study investigated whether the Transition to Teaching (T2T) program responds to the needs of students, the expectations of parents, educators, and policymakers, and most of all, have a positive effect on students' academic achievement outcomes. Across studies using different units of analysis and measures the literature documented that there is a significant relationship between teacher quality and student achievement (Darling-Hammond & Youngs, 2002; Wilson, Floden, & Ferrini-Mundy, 2001, 2002; Miller, McKenna, & McKenna, 1998; Goldhaber & Brewer, 1998, 2000).

Data using descriptive statistics indicates that the students taught by the T2T teachers (experimental group) achieve in mathematics Algebra I as well as or better than the students taught by the non-T2T teachers (comparison group). Means (M) and standard deviations (SD) of the original test scores and of the transformed Z scores show that the experimental group achieved less during the first Algebra I quarterly test (Q1), had higher test scores on average in the second and third Algebra I quarterly tests (Q2

and Q3), and had slightly more success in the SOL, as compared to the non-T2T students (comparison group).

Furthermore, data analysis using a 2 x 4 repeated measures ANOVA shows that the average Algebra I test scores were significantly different between the two groups ($F_{1, 323} = 32.33$, $p < .001$). Follow up tests with MANCOVA indicate that the students from the T2T program, as compared to the non-T2T students, under performed during the first test period and outperformed in the second and third test periods significantly for both, but did also slightly better in the end-of-course assessment. There was a significant difference between the two groups with a small advantage for the experimental group in the last test period (SOL).

Discussion

The results of this study show that middle school (MS) students achieved better than the high school (HS) students in all the Algebra I tests for both groups. According to senior staff person in the district, 90 percent of MS students passed the end of course assessment in Algebra I, while only 70 percent of HS students passed in the 2003-2004 academic year (Personal communication, 2004), which is consistent with the SOL results. Even though the SOL results by themselves are not answering the research questions of this study, it is important to remark that, in general, MS students had a higher rate of success, compared to the HS students during the SOL test period. Indeed, the SOL results of the study show that 97 percent of MS students passed compared to 82 percent of HS students. In addition, the data indicate that 91 percent of the T2T students passed the SOL, while only 84 percent of the non-T2T students succeeded (see table 6 below).

Table 6

SOL results by Grade Level and Group

Level	T2T		Non-T2T		Total	
	P	F	P	F	P	F
MS	62	3	41	0	103	3
HS	75	10	115	29	190	39
Total	137	13	156	29	293	42

Note: P = passed. F = failed.

Overall, the students of the T2T program, compared to the students taught by the non-T2T teachers, did not perform as well during the first Algebra I quarterly test period (Q1). The results also indicate that, in the second and third Algebra I quarterly tests (Q2 and Q3), and during the end-of-course Algebra I test period (SOL), the experimental group outperformed the comparison group. Likewise, in the last test period (SOL), although there was only a small difference, the T2T students achieved better than the non-T2T students.

In summary, the results of the study have important implications for urban education as AC continues to be developed and offered as the solution to teacher shortages in particular fields. The findings contradict the research showing negative effects of AC programs on students' performance and indicate that the T2T students achieved better than the non-T2T students after the first Algebra I quarterly test. The results of the study support the literature suggesting that well constructed AC programs are not very different from TC programs in terms of teacher certification's effect on

student learning, and that AC programs can produce highly qualified teachers that can have a positive effect on students' academic achievement.

Conclusions and Recommendations

The research showed a significant difference between the students taught by the T2T teachers and those taught by the non-T2T teachers. In addition, given the mixed findings in the literature review and what the results of this study show, it seems evident that, more research is needed. Future studies should concentrate on a longitudinal perspective using pre/post achievement tests with a large number of participants. A large-scale study should be undertaken so that the results can be generalized. Indeed, the best method to evaluate the effectiveness of AC programs on students' academic achievement would be to use longitudinal data such as value-added assessment models for at least three years, with a large population, to analyze the annual gains in student achievement (Sanders & Rivers, 1996). Furthermore, it would be helpful if, rather than simply analyzing the students' test scores after exposure to the different teachers, students' previous tests, before exposure to the teachers or the information concerning the students' socioeconomic status, were available for analysis. In addition, a mixed-method longitudinal study using both quantitative and qualitative techniques, such as interviews, observation, and collection of teachers' and students' work, will give a better understanding of the program evaluation, so that the effect of teacher certification on student achievement can be measured with more precision.

The need to discuss the implications of the study such as, hiring new teachers, and working closer with universities to develop AC programs in the school system will be

appropriate to the policy debate. At the university level, a better understanding of the culture of schools, and knowing what the needs are when preparing teachers will help to improve the partnership between school systems and universities. Moreover, disaggregated data must be available to researchers studying student achievement. Although this data is generally not available to outsiders and is the best type of data to use to measure student achievement.

Much research has shown that AC teachers are as effective as TC teachers, and that AC programs can be the solution to teacher shortages in mostly poor urban school systems and in specific fields such as mathematics, science, special education, and bilingual education. However, as suggested in the NCLB Act, the task is to ensure that, both traditional college teacher preparation and AC programs produce competent and highly qualified teachers, which in turn, can positively influence the students' academic progress. Meeting the needs of all students correlates with the concern for teacher quality. Indeed, teacher quality and student achievement are found to be significantly related (Berry et al., 2001; Golhaber & Brewer, 1999, 2000; Darling-Hammond, 2000, 2001; Bandura, 1977; Tracz & Gibson, 1986). As noted by Fuller (1998), schools with high percentages of properly certified teachers have higher student achievement scores than those with low percentages of properly certified teachers. The ability of urban schools, especially in low-income areas, to attract and retain highly qualified teachers is an issue of growing concern. Thus, if the goals of the NCLB Act are going to be achieved, highly qualified teachers must be available in quantity for all the schools, specifically those that serve poor, minority, and lower achieving children in urban and rural areas.

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APPENDIX A: Types of AC Programs

(U.S Department of Education, National Center for Education, Office of Educational Research and Improvement, 1996, 2000, 2003, 2004).

TYPES OF AC	CHARACTERISTICS
CLASS A	Alternative teacher certification programs that attract talented individuals who have at least a Bachelor's degree in a field other than education, and which is not restricted to shortage, secondary levels, or subject areas.
CLASS B	Almost the same as class A, but programs are restricted to shortage and/or secondary grade levels and/or subject areas.
CLASS C	Teacher certification routes that review academic and professional background. The programs involve in-service training and coursework to reach competencies required for certification. Also, the states and local school districts have the major responsibility for program design and implementation.
CLASS D	Same guidelines as class C, but the program implementation is on the responsibility of an institution of higher education.
CLASS E	Post-baccalaureate AC programs based at an institution of higher education.
CLASS F	Emergency routes implemented by local school districts which allow the candidates to teach without on site support while completing traditional teacher education courses requisite for full certification.
CLASS G	Programs where the participants have few requirements left to fulfill before becoming certified through the traditionally approved college teacher education program, e.g. individuals certified in one state, relocating in another state; individuals certified in one content area seeking to become certified in another.
CLASS H	This program allows a person who has some "special" qualifications, such as a well-know author or Nobel Prize winner, to teach certain subjects.
CLASS I	States that do not approve alternative routes to teaching and who offer only college teacher education programs for licensing teachers.
CLASS J	Added in 2003, these programs are designed to eliminate emergency routes. They prepare individuals who do not meet basic requirements to become qualified to enter an alternate route or a traditional route for teacher licensing.
CLASS K	Added recently in 2004, these avenues to certification accommodate specific populations for teaching, e.g., Teach For America, Troops to Teachers, and college professors who want to teach in K-12 schools.