

## **Impact of an In-Field Teaching Degree on the Quality of Teaching as Measured by Student Performance**

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**ABSTRACT**

*Recently, in both federal and state governments, legislation has been presented that would link teacher compensation to student performance on standardized tests. This change in compensation would abandon the traditional method of compensating teachers based on experience and level of degree earned in favor of a model that rewards high student performance as measured largely by standardized testing. This five-year longitudinal study examined the relationship between student performance and teachers earning advanced degrees as measured by the reading/language arts scores on the Georgia Criterion Referenced Test (CRCT) in grades one through five.*

*Similar studies have been conducted on this topic, using either solely comparative analysis or a value added model, but many of these studies do not differentiate the field of the advanced degree. This study used a pre-test, post-test design to measure growth of teachers who have recently earned an advanced in-field degree and compares that growth to a control group of similar peers who have not recently earned an advanced degree. A statistically significant difference was discovered in both the control and the advanced in-field degree (AID) groups between the pre-test and post-test. However, the difference in the AID group was of a higher significance than the control, indicating that the AID group did outpace the control.*

*The power of continual learning, in this case an AID, seems to become relevant when comparing a group against itself over a span of years. This longitudinal study seems to indicate that an AID can help teachers improve student learning when viewed from that perspective.*

**1. Introduction**

In 2009, the United States Federal Government passed the American Recovery and Reinvestment Act of 2009. Embedded within this document, the federal government included yet another approach to school reform, entitled, "Race to the Top" (United States Department of Education). The competitive funding opportunities offered through "Race to the Top" only add to the long list of legislation, grants, and mandates created by the federal government in an attempt to move all schools forward. In Georgia's application for the "Race to the Top" grant, the current model of teacher compensation, based on degree level and years of experience, will be abandoned for a model that rewards high student performance as measured largely by standardized testing (State of Georgia, 2010).. Using an innovative methodology not typically found in the literature, this study, also investigates the impact of an advanced in-field degree (AID) on student performance as measured by standardized testing.

**2. Context of the Study**

Modern school reform began with the Elementary and Secondary Education Act (ESEA) in 1965 (Hess & Finn, 2007). This act began a very long journey toward school accountability and introduced the first National Assessment of Education Progress in 1960, which used periodic common assessments to demonstrate what American students could and could not do (Hess & Finn, 2007). Many reforms of various magnitudes followed over the years. In 1983, school reform gained national prominence due to the report, "A Nation at Risk, The Imperative for Educational Reform" (Hess & Finn, 2007). This report both publicized and criticized the shortcomings of American schools through reference to the fact that students were failing when compared to students in other industrialized nations (The National Commission on the Excellence of Education, 1983). As a result of reports such as "A Nation at Risk," both state and federal legislation has been passed with increasing demand for school accountability including serious repercussions for failure including, but not limited to, loss of funding, loss of teaching positions, etc.

Under the No Child Left Behind Act of 2001, states are required to measure and confirm that schools are making Adequate Yearly Progress (AYP) (Piche, 2007). AYP is measured in Georgia using student results from the locally administered Criterion Referenced Competency Test (CRCT) in grades one through eight. The CRCT is a summative assessment that measures student achievement against state standards (Georgia Department of Education, 2010a). Beginning in 2011, only students in grades three through eight were included in the administration of the CRCT (Georgia Department of Education, 2010-2011)

The No Child Left Behind Act of 2001 has required teachers to study their craft more diligently and to focus on the needs of all students, not most students. One method Georgia is currently using to encourage continuous professional development is a pay incentive for advanced degrees (Campbell & Lopez, 2008). To support this legislation, Campbell and Lopez stated that research shows the effectiveness of the current practice of compensation based on degree level and experience is mixed at best.

In an attempt to balance the most revenue-short budget seen since the great depression during the budget crisis of fiscal years 2010 and 2011, Georgia legislators looked at multiple measures to lower the cost of education (Essig, 2009). These legislators decided to cancel the increase in compensation for National Board Certified Teachers (Perdue, 2010). According to Clotfelter, Ladd, and Vigdor (2007), this national certification did not appear to have a significantly positive effect on student achievement. Additionally, Georgia legislators heavily weighed a merit pay system, included within Senate Bill 386 (Balfour, Moody, Weber, Heath, & Cowsert, 2010), that would be fueled by financial incentives contained in President Barack Obama's "Race to the Top" (United States Department of Education, 2009). To qualify for the "Race to the Top" grant, Georgia would have to consider merit pay for its teachers in lieu of the current system of step raises based on years of experience and advanced degrees for educators (Balfour, Moody, Weber, Heath, & Cowsert, 2010).

Darling-Hammond, an advocate of school reform and teacher quality has produced numerous reports concerning the positive effects of teacher training and experience. In 2000, Darling-Hammond developed a report in which she discussed the importance of strict teacher certification requirements as well as the importance of continued professional development, including enrollment in advanced degree programs. Although Darling-Hammond had conducted research that documented the importance of continued growth as an educator, other researchers, including Walsh (2001) and Johnson (2000), produced conflicting evidence that advanced degrees have no significant impact on student learning and may even have a slightly negative effect on student achievement. Based on the work of researchers such as Walsh and Johnson, Campbell and Lopez (2008) issued a call for the practice of paying teachers additional salaries for advanced degrees to stop, citing that these raises are a poor use of the taxpayers' money.

In reflecting on the possibility of a merit pay system, educators were growing increasingly concerned that they would lose a major incentive to advance their professional learning. According to Solomon and Podgursky (2000), an additional concern of teachers was that they would become more competitive with one another and fewer teachers would enroll in universities for advanced degrees. Solomon and Podgursky further predicted, from a broader perspective, that schools would not function as well if merit pay was the method in which teachers were reimbursed because of the loss of professional learning communities and interdependence among colleagues.

In previous research studies on the effect of advanced degrees on student achievement, researchers have treated other traits and characteristics of the teacher as confounding variables in the determination of the effect of returning to school to receive an advanced degree (Darling-Hammond, 2000; Clotfelter, et al., 2007; Boyd, Goldhaber, Lankford, & Wyckoff, 2007; Goldhaber & Brewer, 1998; Johnson K., 2000; King & Newmann, 2000; Campbell & Lopez, 2008; Murnane & Steele, 2007). In fact, when a positive correlation is found between advanced degree and student achievement, an antithesis argument is frequently used, as

with Ladd and Sass (2010), when they refuted the positive attributes of teachers who had received National Board Certification by pointing out that these teachers were superior before entering the program and that the program itself did not increase their effectiveness.

### 3. Other Related Literature

Schools are placing a great deal of time and effort, as well as federal and state funds into hiring “highly qualified” teachers who are trained and certified specifically for the subject and grade level they are expected to teach (Georgia School Council Institute, 2007, 2008). However, as demand increases for more highly trained, highly qualified teachers, Georgia is considering no longer paying teachers for advanced training or degrees. Instead, the state is advocating that teachers be paid only for the lowest level degree that will gain them the federally required “Highly Qualified” status (Georgia General Assembly, 2010).

*3.1 Progression of School Accountability.* The Office of Education opened in 1867, although it had limited power or authority to oversee schools (New York State Archives, 2009). Following the passing of ESEA, the National Association of Education Progress (NAEP) was established and began a standardized common assessment program as an initial effort to measure the effectiveness of the ESEA of 1965 (New York State Archives, 2009). Reporting on these findings, “A Nation at Risk” (1983) described schools as falling behind as compared to the progress of students in other industrialized nations (The National Commission on the Excellence of Education, 1983). In response to the identified need for school improvement, the NCLB Act of 2001 placed an unprecedented level of importance on standardized testing and individual student success on those assessments. In 2009, The American Recovery and Reinvestment Act placed even higher demands on the individual teacher, requiring that compensation procedures focus less on education and experience and more on student performance on standardized assessments (United States Department of Education).

*3.2 Professional Learning.* With the requirements of the No Child Left Behind Act of 2001, schools have shifted their focus from teaching to analysis and understanding of student learning (Learning Forward, 2010). Eaker, Dufour, and Dufour (2002) have presented professional learning as a system to explore the connection between teaching and learning by making schools professional learning communities in which information concerning highly effective teaching strategies is shared freely from teacher to teacher and classroom to classroom. Fullan (2001) also supported the use of professional learning communities as a means to help teachers focus on the highly effective methods in their classrooms, while improving, refining, or even discarding practices that were ineffective.

*3.3 Teacher Certification and Compensation Procedures.* In Georgia, teachers are compensated on certification based on the educational level attainment and their experience (Georgia Department of Education, 2010b). Additionally, teachers are required to gain highly qualified status by 2014 (Georgia Professional Standards Commission, 2010b). In 2002-03 Georgia adopted a basic definition of highly qualified as one who holds a bachelor’s degree or higher, has a major in the subject area or has passed the state teacher content assessment, and is assigned to teach his/her major subject(s) (Georgia Professional Standards Commission).

However, under the federal incentive Race to the Top, the current model of teacher compensation has been scrutinized, and may be changed to a model in which teachers are paid for performance on standardized tests instead of experience and education (State of Georgia, 2010). Recent bills such as Senate

Bill 386, introduced in October of 2010 in the Georgia General Assembly, demonstrate this shift in thinking by state lawmakers toward a pay for performance model for educators(Georgia General Assembly, 2010).

3.4 *Advanced Degrees and Student Achievement.* In a meta-study conducted in 2003, Marzano found that the single most important factor in a child's education was the teacher though consensus is still elusive on what makes a teacher successful. Additionally, in multiple articles and through reports written on a range of collaborative studies conducted, Darling-Hammond has consistently found data that support the need for strenuous teacher accreditation procedures and emphasize the important role in teacher education beyond the bachelor's degree e (Darling-Hammond, 2002, 2000, 1981; Goldberg, 2001). Walsh (2001), however, countered these findings stating that strenuous teacher certification and teacher education make no difference in student achievement., Similarly, Goldhaber and Brewer (1998) conducted a study in which they, too, found no statistically significant evidence linking advanced degrees and student performance with the exception of degrees received in the specific content area being taught. By way of a comparative study of teachers, Campbell and Lopez (2008) also found no value in receipt of an advanced degree by teachers with regard to student performance.

#### **4. Theoretical Basis of the Study**

In what Dov Seidman (2007)called the "Paradox of Journey," he explained that in order to move into true understanding and mastery of a subject, a professional must travel through the "Valley of C" (p. 59). In other words, learners must challenge their own thinking as they dig deeper into the content of their study before gaining a truer and deeper understanding. According to the National Council for Accreditation of Teacher Education (2008) a central purpose of education graduate programs is to deepen the understanding of the content area and to strengthen instructional practices incorporated within teaching. Therefore, one would reason that the deeper the understanding of the content, and the stronger the pedagogical methods, the greater the effectiveness of the teacher.

The exploration of professional learning and student performance is not limited to graduate programs. The National Staff Development Council (2010) placed professional learning as a central component to any staff development program. Similarly, researchers such as Eaker, Dufour, and Dufour (2002), placed a great deal of emphasis on the creation and maintenance of Professional Learning Communities in which information about best practices and shared ideas is communicated freely throughout the school building.

Programs, such as reading and writing workshops designed by Calkins (1994), require a great deal of professional learning and training to implement and maintain. Guided Reading, as developed largely by Fountas and Pinnell (1996), also requires a great deal of professional learning and support because much emphasis is placed on teacher knowledge of pedagogy and practice instead of a lock-step program. To further explain by way of these examples, effective implementation of balanced literacy methods requires a responsive approach in which the teacher uses formative and summative feedback to guide instructional decisions thereby meeting the needs of students through individualized and differentiated instruction. In order for teachers to refine their craft, ongoing support and professional development is necessary

#### **5. Purpose of the Study**

Georgia currently bases its certified teacher pay on experience and degree level (Georgia Department of Education, 2010b). This compensation system is based largely on the premise that as teachers become more highly educated, the students will reap the rewards by receiving more effective, higher quality teaching (K. Johnson , 2000). Recently, however, this practice has come under attack as multiple studies (Center for Educator Compensation Reform, n.d.; Boyd et al., 2007; Murnane & Steele, 2007; Campbell & Lopez,

2008b; Goldhaber & Brewer, 2006) have concluded that advanced teaching degrees have a negligible impact on student achievement. In fact, K. Johnson (2000) pointed to certain scenarios in which advanced degrees have a negative impact on student achievement.

The majority of the existing research is based on the idea that one teacher group can be compared to another in a single administration of a summative exam. Additionally, the majority of these studies are driven by the belief that experience, professional learning, leadership, and differences in students, are simply confounding variables that can be negated by either using a value added (ASPIRE, 2007) or other regression model of analysis. Further, these studies did not differentiate the subject area of the advanced degree earned by the teacher. In other words, they did not study the specific effects of an in-field degree earned by a classroom teacher.

The purpose of this research was to study individual teachers over a longitudinal period of five years as they earned their AIDs and to determine if there is any statistically significant growth of student performance during the course of those years as compared to a teacher who did not earn an advanced degree over the same period. An examination of a statistical relationship between the earning of an AID and student achievement was executed. Data were collected in the areas of reading/language arts as measured by the CRCT among a total population of first through fifth grade general education teachers in a representative middle Georgia school system. One research question with four hypotheses was tested.

The study was guided by one research question, with four hypotheses to evaluate the relationship between the classroom teacher earning an AID and student achievement as measured by student performance in the areas of reading/language arts portions on the CRCT in grades one through five: What impact does possessing an AID have on teaching effectiveness as measured by student performance on the reading/language arts portion of the CRCT?

(*Ho1*). There is no statistically significant difference in student achievement as measured by the CRCT scores among students when comparing control pre to control post groups.

(*Ho2*). There is no statistically significant difference in student achievement as measured by the CRCT scores among students when comparing AID pre to AID post groups.

(*Ho3*). There is no statistically significant difference in student achievement as measured by the CRCT scores between the control pre and AID pre groups.

(*Ho4*). There is no statistically significant difference in student achievement as measured by the CRCT scores between the control post and AID post groups.

## 6. Methods

This study employed hypothesis testing in the form of *t* tests and calculated effect sizes reported as Cohen's *d* for non-randomized groups using a pre-test post-test design (Campbell & Stanley, 1963). The study group contained teachers who had earned an AID between August 2006 and May 2010 whereas the control group contained teachers with equivalent credentials and demographics less the AID. The control group was selected to resemble the study group demographically with 63.89% of the teachers in the study group teaching at school-wide Title I schools and 63.04% of the teachers in the control group teaching in schools with that same socio-economic classification. Teachers were also grouped as closely as possible based on the grade levels taught. Finally, by taking all of the data from one system in Georgia, the researcher had some degree of assurance of similar school experiences with reference to collaboration, professional practices, and teacher expectations between all of the schools surveyed due to the fact that all of the schools shared one central leadership.

A survey designed by the researcher to collect degree status and award date was distributed to each of the 23 elementary schools of the ErehwynaCounty School System. Due to the nature of the data to be

collected, principals were instructed to distribute the survey only to classroom teachers who annually administered the CRCT to their students. 480 classroom teachers were included in survey distribution. Of these 480 surveys distributed to teachers, 357 were collected, representing a 74.38% return of completed surveys. Of the 480 surveys collected, 61 participants stated that they had received an AID between August 2006 and May 2010. However, only 36 of 61 respondents had the five years of CRCT data required to participate in the survey. The data received allowed the researcher to establish both a pre-advanced degree mean and a post-advanced degree mean over the course of the five years as well as a common year analysis in which the control and the AID groups were studied in same year administrations of the CRCT. With 36 participants represented in the AID group, the researcher then created an equivalent control group. The equivalent control group included 46 participants who were selected with attention to the economic status of their schools in order to correlate with the economic status of the schools of the participant groups. Of the teachers in the study group, 63.89% taught inschool-wide Title I schools and 63.04% of the teachers in the control group taught in schools with that same socio-economic classification.

Once groups were established, data regarding the year the AID was earned, the grade level taught (when constant), the schools taught in (when constant), and the classroom mean scores on the reading and language arts portions of the CRCT each year from 2006 to 2010 were collected on both the study and control groups. All demographic data provided by the teachers, such as year and type of advanced degree earned, were validated with the Human Resource Department of the ErehwynaCounty School System. From these data, the demographic statistics of group mean scores per year were determined for both the control and the study groups and the standard deviations within each group's per year scores were also calculated. Then, *t* tests and effect size testing were carried out to determine statistical significance both longitudinally within the groups and comparatively between them.

## 7. Limitations

The primary limitations to this study related to size and breadth. Only 23 elementary schools were surveyed and the longitudinal study covered only five years. Additionally, hypothesis testing is sensitive to sample size and is subject to Type II errors. Thus, generalization to the state or national level may be inappropriate without future research using a similar methodology on this topic. The complexity involved in studying student performance must also be considered. Although the participant criterion were stringent, and the sample size relatively small, the tests employed were valid and reliable and the information gained should be insightful. Another limitation is that the research focused only on reading and language arts.

## 8. Findings

Mean scores for the 36 AID participants in all five years of the study ranged from 809.39 to 860.89. Between 2006 and 2010, the overall mean score of the AID group rose from 831.36 to 840.03, denoting an overall scaled score increase of 8.67 points. The standard deviation rose from 9.60 to 10.89. Mean scores and standard deviations from the 2005-2006 school year and the 2009-2010 school year were used to calculate effect size reported as Cohen's *d*. Cohen's effect size value ( $d = .84$ ) suggested a large effect.

During the same five years, mean scores for the 46 participants in the control group ranged from 809.39 to 874.91. Between 2006 and 2010 the overall mean score of the control group rose from 832.89 to 839.18, representing an overall scaled score increase of 6.29 points. The standard deviation rose from 9.31 to 10.92 during the study. Mean scores and standard deviations from the 2005-2006 school year and the 2009-2010 school year were used to calculate effect size reported as Cohen's *d*. Cohen's effect size value ( $d = .62$ ) suggested a moderate effect.

After calculating the within group statistics, the groups were compared. Table 1 lists the demographic and hypothetical statistics calculated in the group comparisons.

Insert Table 1

## 9. Discussion

The topic of effective teaching has been studied numerous times in the last few decades, though little consensus has been reached in how to make a weak teacher effective or how to make a strong teacher more effective. Eaker, Dufour, and Dufour (2002) discussed the important role of professional learning and interdependent learning communities in improving teacher effectiveness. Darling-Hammond (2002) also acknowledged the importance of professional learning pointing to strong certification requirements and teachers earning advanced degrees as critical to the effort of increasing the effectiveness of classroom teachers.

Campbell and Lopez (2008) examined the effect of advanced degrees on student performance in Georgia. They compared a group of teachers who had advanced degrees to teachers who did not have advanced degrees to see if there was a statistical difference between the two. They did not find any statistically significant difference. Ten years earlier, Goldhaber and Brewer (1998) performed a study in which they found that only an in-field advanced degree had any effect. The findings of the current study support findings included in both of the previously referenced studies by confirming that there is no statistically significant difference between the AID and Control Groups. However, the AID group did outperform the Control Group over the course of the five years. This difference in improvement, although small, is present in both the *t* score analysis and the effect size.

When performing group comparison analysis, the researcher discovered that there was no statistically significant difference between the study group that had received AID and the control group that had not received an AID. Like Campbell and Lopez (2008b), comparative hypothesis testing yielded very low results, indicating that an AID did not advance teachers beyond their peers. However, through longitudinal analysis and calculation of effect size, the researcher found that the teachers who had received advanced degrees between August 2006 and May 2010 did outperform their peers in regard to improvement. The effect size, reported as Cohen's *d*, of the control group was 0.62, indicating a moderate significance in their improvement on test scores. The *t* test confirmed this with a statistically significant score of 2.97. The effect size, reported as Cohen's *d*, of the AID group was 0.84, indicating a large significance in the improvement on test scores, again supported by the *t* test score of 3.58. Similar to the findings of Goldhaber and Brewer (1998), the researcher found that in-field degrees can have a statistically significant impact on student performance.

When comparing the two groups, one finding of interest was that both the control group and the AID group had significant improvement over the span of the five years studied. While the AID group improved more, the control group improved as well. However, there was no statistically significant difference between the two groups.

The power of continual learning, in this case in the form of an AID, becomes relevant when comparing a group against itself over a span of years. It is this longitudinal study that shows how an AID can help a teacher improve the craft of teaching and learning. This study supports previous research that found no difference between a teacher with an advanced degree and a teacher without an advanced degree in the span of a school year. Findings from this study also support studies indicating that an advanced degree only makes a difference when it is in field. This study differentiates itself by finding a statistically significant effect over time in student performance when a teacher is engaged in continual professional learning including earning an AID when compared to peers who are not pursuing advanced degrees.



## **10. Implications**

The findings of this research have implications well beyond the individual classroom. This study indicates that there is a significant impact on student performance when the teacher is engaged in advanced professional learning at a college or university. Although this study did not find a significant difference between the control and AID groups, it did find a greater increase in performance of the AID group over the course of the five years than the control group. This information could prove to be important as lawmakers debate compensation. Like Boyd et al. (2007), this researcher concedes that more data are needed to determine the statewide and nationwide effect on student performance of a teacher earning an AID. However, until that research is completed, lawmakers should proceed with caution as they make decisions that will directly influence the field of teaching, learning, and resultant student performance. Without the incentive for advanced compensation, many teachers may shy away from the expense and workload of formal education in graduate school. As findings of this study suggest, a lack in advanced professional learning by teachers could result in a loss for our students. At this point, the data are inconclusive and more research needs to be performed. As for school systems, this data helps to support the practice of encouraging certified employees to earn higher-level degrees. To apply the economic law of diminishing returns, as a teacher moves closer to optimal performance, in this case high student test scores, it would take greater effort to make smaller increments of improvement (P. Johnson, 2005). With each pedagogical gain a teacher makes, the next gain requires more work than the first and is more difficult to achieve. Viewed through this lens, it is logical that the control and the AID group would have very similar growth rates since both have been exposed to similar professional learning, collaboration, and teacher expectations within the same county. Any additional growth would take exceptional effort on the part of the teacher. Therefore, although the difference between the improvements in student test scores of the control group over the five years studied is only slightly less than the improvement of the Advanced In-Field degree group, the difference is very significant when the principle of diminishing returns is applied.

## **11. Future Research**

An important part of this framework is the use of both longitudinal and comparative data in the descriptive statistics and hypothesis testing. Through use of the data available at the state level, many of the limitations found in this research could be overcome. A much larger sample of participants and data would be available, making the findings more generalizable to an entire region or state. Future research could also expand the scope of the research by including the standardized test scores of all students and the subject areas could be expanded to all areas tested.

Additionally, a researcher could use the data to compare school systems within states and look for trends similar to the ones found in Erehwyna County in which all teachers have test scores that are improving, regardless of their pursuit of advanced degrees together. This could lead to other research possibilities regarding the difference in specific school systems in Georgia, especially in systems in which the demographics are similar but the outcomes reveal statistically significant differences. This study could easily become a study on the effects of interdependent learning groups as described by Fullan (2001) and Eaker et al. (2002).

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Table

Table 1

Student Achievement Comparison of AID and Control Group Participants

Group	n	M	SD	Group	n	M	SD	T	d
Control Pre	46	832.89	9.31	Control Post	46	839.18	10.92	2.97	.62
AID Pre	36	831.36	9.60	AID Post	36	840.03	10.89	3.58	.84
Control Pre	46	832.89	9.31	AID Pre	36	831.36	9.60	.72	.16
Control Post	46	839.18	10.92	AID Post	36	840.03	10.89	.35	.07