

Running Head: National Board Certification Impact on Student Achievement.

A DATA COMPARISON OF THE IMPACT OF NATIONALLY BOARD CERTIFIED
TEACHERS ON STUDENT ACHIEVEMENT

By

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Submitted to

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Submitted in Fulfillment for the Requirements for

61-683 Research Paper

Spring 2012

July 26, 2012

ABSTRACT

The purpose of this study was to analyze the impact National Board Certification has on student achievement. The research includes findings that answer the questions, “Should at risk school districts use National Board Certification as a way to increase student achievement?”, “Should school districts continue to give financial incentives for National Board Certification as a way to encourage professionals?”, and “Should teachers consider the National Board Certification Process as a way to refine their craft?” The research was conducted using the Missouri Department of Elementary and Secondary Education data base as well as the National Board for Professional Teaching Standards list of Nationally Board Certified Teachers. The findings were analyzed by conducting an ANOVA through Microsoft Excel and A Statistical Program (ASP) software. Findings indicate that there is an increase in student achievement in districts that employ a higher percentage of Nationally Board Certified Teachers than districts that do not. Additionally, the district may want to consider the implementation of entire buildings participating in the Take One National Board Certification Process.

INTRODUCTION

Background, Issues and Concerns

An urban school district located in the Midwest, hereafter referred to as ISD, has experienced a change in demographics over the past ten years. In 2002, the district was 33.9% free or reduced lunch and in 2011 62.5% of the district was free or reduced lunch. The demographics has also changed. In 2002 ISD was 5.3% Black and 87.5% White and in 2011 ISD was 11.7% Black, 70.8% White, and 12.3 Hispanic (DESE 2012). As the demographics change there has been a decline in student achievement on standardize testing. The school district is evaluating the best practices for increasing student achievement in preparation for the adaptation of the Common Core Standards. This project will show the data collected from the Missouri Assessment Program (MAP) test from twenty-five different school districts in the state of Missouri as compared to the number of Nationally Certified Teachers in the district. The analysis of results will differentiate between school districts that have varying numbers of National Board Certified Teachers.

Practice under Investigation

The practice under investigation is how National Board Certification impacts student achievement.

School Policy To Be Informed by the Study

Currently students in ISD take a pre and post benchmark multiple response, traditional, test and then anywhere from three to five common assessments of a similar structure. This information is then used to assess student achievement as well as a reflection of the classroom teachers' ability to present the information to students. Over the past several years students'

achievement has reached a plateau according to district testing as well as the MAP test given at the end of the year. National Board Certification can be a vehicle to improve instruction in the classroom and therefore increase student achievement.

Conceptual Underpinnings for the Study

A Nation At Risk was published on April 26th, 1983 by the United States Department of Education through the National Commission of Excellence in Education outlining the concerns for our educational system because of the decline in student achievement as compared to other leading countries in the world and the lasting impact it will have on all facets of our country (The National Commission on Excellence in Education, 1983); specifically looking at the area of concern involving qualified teachers and their impact on student achievement. In response to concerns about the level of educators in our country the National Board for Professional Teaching Standards was created as a way of raising standards for teachers by providing a rigorous certification that has become a tool for improving teaching practices (Aguerreberre, 2007). Competent, highly qualified teachers are necessary for gains in student achievement.

Statement of the problem.

School districts spend time and resources on instructional strategies to ensure students of all types are able to learn but there student achievement is still declining.

Purpose of the study.

The purpose of this study is to determine the impact the National Board process has on student achievement. The information gained will give school districts a new approach to increasing student achievement by bettering their educators.

Research question.

RQ: Is there a difference in student achievement between teachers who have achieved National Board Certification and teachers who have not achieved National Board Certification?

Null hypotheses.

Ho. There is no difference in student achievement between teachers who have achieved National Board Certification and teachers who have not achieved National Board Certification.

Anticipated benefits of the study.

The result of this study will inform teachers, administrators, and school districts of the impact that National Board Certification has on student achievement. It will help both teachers and administrators format classroom practices that are best for students which in turn will increase student achievement.

Definition of terms.

CA: Communication Arts

DESE: Missouri Department of Secondary and Elementary Education

MAP: Missouri Assessment Program

NBCT: National Board Certified Teachers

NBPTS: National Board for Professional Teaching Standards

SPED: Special Education

Summary

ISD is a Midwestern urban school district has experienced a change in demographics over the past ten years and as the demographics change so does the way that we teach and assess student's knowledge. The school district is evaluating the best practices for increasing student

achievement in preparation for the adaptation of the Common Core Standards. This project will show the data collected from the Missouri Assessment Program (MAP) test from twenty-five different school districts in the state of Missouri as compared to the number of Nationally Certified Teachers in the district. The analysis of results will differentiate between school districts that have varying numbers of National Board Certified Teachers.

REVIEW OF LITERATURE

National Board Professional Teaching Standards were established in 1987 in response to concerns about the quality of public education and were developed by a nonprofit, nonpartisan organization (Aguerreberre, 2007). The National Board Process is an advanced certification program used to identify highly qualified teachers and is a voluntary program that many school districts have adopted as a way to increase the quality of teaching in the classroom. There are twenty-four different certification areas based on National Board Standards that are designed to make the assessment process consistent and cohesive throughout the country as opposed to the state certification qualifications that differ depending on each state's education department (Aguerreberre, 2007). National Board Standards are rigorous in design so that only highly qualified teachers obtain certification. This is an outstanding professional accomplishment for teachers but it is also a way to increase student achievement.

The Five Core Propositions as outlined by National Board for Professional Teaching Standards are as follows: Teachers are committed to students and their learning, Teachers know the subjects they teach and how to teach those subjects to students, Teachers are responsible for managing and monitoring student learning, Teachers think systematically about their practice and learn from experience, and Teachers are members of learning communities (Student Learning, Student Achievement Task Force, 2012). Using these Five Core Propositions teachers are assessed on their ability to refine their craft and increase student achievement.

The National Board Process consists of a portfolio with four entries that vary based on the certification area, however all certification areas have the same basic set up (Student Learning, Student Achievement Task Force, 2012). One entry shows student progress over time through the work samples of two or three students. Another entry focuses on accomplishments

of the teacher or areas that the teacher feels are his or her strength, which can be demonstrated through student work, communication logs, district recognition, and other verification forms. The other two entries are primarily video recordings of classroom instruction, either whole group or small group, designed to show the actual learning environment. In addition to the portfolio entries there are six assessments that content based and designed to showcase a working knowledge of content specific information (Student Learning, Student Achievement Task Force, 2012).

National Board Certification has been recognized by several professional associations like the National Education Association (NEA) which supports the standards as a way to ensure quality teachers (National Education Association, 2012). In 2007, NEA started cosponsoring National Board Certified Teacher's Summits as a way to increase student achievement in High-Needs Schools by attracting highly qualified teachers to at risk schools that are normally composed of beginning teachers and less that qualified teachers (National Education Association, 2012). This summit was designed to specifically target Nationally Board Certified teachers to teach in these High-Needs schools as a way to increase student achievement.

National Board Certification is not intended to replace state standards and requirements but as a way to strengthen these standards and encourage continued learning and refining for teachers. According to study done at Johns Hopkins University School of Education "Teacher quality is inextricably linked with the degree of teachers' preparation and experience in subject area matter and pedagogy. In other words, subject knowledge (the information) and pedagogy (the methods of instructional delivery) are both essential for student achievement." (Harris, 2007, p.16). The instructional ability of the teacher is equally important to the content students are

learning and both are instrumental in increasing student achievement not only in their own classrooms but according to this study, campus wide impact and change is noted (Harris, 2007).

Increasing student achievement is the focus in every district across America. We are always looking for ways to improve the learning retention and that is usually measured by student performance on standardized testing. A study was conducted on more than 100,000 students and those that had Nationally Board Certified teachers performed better than students of teachers without National Board Certification on standardized state testing; particularly African American and Hispanic students tested that made larger gains in mathematics equivalent to an extra month of schooling (Aguerreberre, 2007). Students of National Board Certified teachers out scored students of non-Nationally Board Certified teachers anywhere from seven to fifteen percent on year end tests, again particularly in minority students (Aguerreberre, 2007).

Washington state conducted their own study on the impact that Nationally Board Certified Teachers were having on student achievement because to the resources that the state department of education was allocating to help teachers achieve certification. Through this study student achievement was primarily assessed by the state standardized test where students of Nationally Board Certified teachers out performed students of no National Board Certification (Plecki, 2010). The study also noted that the incentives that the state of Washington put in place to compensate teachers for certification did not make a difference state wide and that National Board Certification was not reaching all areas of the state, particularly high need schools and districts (Plecki, 2010). Student achievement was greatest in areas where National Board Certified teachers were teaching in the area in which they were certified. Many teachers were not currently teaching in that certification area and not as effectively increasing student achievement (Plecki, 2010).

“National Board Certification is perhaps the most studied intervention in the education field” (Aguerreberre, 2007, p.2) and that means that not all findings conclusively show the impact the National Board process has on student achievement. The National Academies Committee found when comparing data from both North Carolina and Florida that the seven percent increase in student achievement of non National Board Certified teachers as compared to a nine percent increase in student achievement of National Board Certified teachers was the same increase in student achievement as experienced teachers who were also not National Board Certified (Harris, 2007). Their finding were conclusive in that teachers who are reflective about their practices in the classroom and always re-evaluating and improving instruction were just as impactful on student achievement as those that were Nationally Certified. The study also pointed out that even going through the process increased student achievement and it is not necessarily exclusive of certification (Harris, 2007).

Standardized testing is how student achievement is most often measured because it is easily comparable in a formal setting but that only shows the impact a teacher has over his or her own classroom and the National Board Process extends much further than just one classroom. The National Board Process encourages teachers to use higher order thinking in order to deepen the knowledge obtained by students through effective communication (Aguerreberre, 2007). That communication is linked to improved comprehension specific to classrooms of National Board Certified teachers (Aguerreberre, 2007).

The impact of a Nationally Board Certified Teachers is also seen in curricular improvements and adjustments that teachers make for their classroom and help to implement district wide. National Board Certified teachers also “demonstrate greater confidence in their abilities to foster student achievement than non National Board Certified teachers” (Aguerreberre,

2007, p.2). Teacher efficacy is a large factor in student achievement so this carries a dual impact in the classroom. This also helps to improve mentoring programs district wide by creating more effective mentors. In 2000, 90% of Nationally Board Certified teachers were in some type of mentoring, coaching, or other leadership role within their district as a means of improving school climate and best practices (Aguerreberre, 2007).

Retaining teachers is important to improve the quality of teaching environments and to increase a sense of community within school buildings among staff and students. 52% of Nationally Board Certified teachers are staying in the classroom as long as they are able as opposed to the 38% of non-Nationally Board Certified teachers (Aguerreberre, 2007). This retention is just another indirect affect on student achievement. In preliminary research, National Board Certification is decreasing the burn out rate of teachers because they are better prepared with renewed enthusiasm each school year (Aguerreberre, 2007). The retention of quality teachers also increase the level of professional development because more experienced teachers require more in depth training and with access to the National Board Process teachers who are certified can be used as a facilitator of various professional developments.

According to the National Board of Professional Teaching Standards data base in 2007 the majority of Nationally Board Certified teachers teach in rural and suburban areas creating a need in the urban setting (Aguerreberre, 2007). One-third of teachers in the rural or suburban setting are in low-income school districts but less than twenty percent teach in a high minority setting and less than twelve percent in a high poverty area (Aguerreberre, 2007). As stated above these are two student populations that benefit and make greater gains when taught by Nationally Board Certified teachers. There are several potential reasons for this, but the most common link

is that they pay incentives are not competitive in school districts of high risk and high needs students.

The National Board Process is valuable not only for teachers but also the faculty they work with and most importantly the students they teach.

RESEARCH METHODS

Research Design

A post-test only randomized control group design will serve as the research design. The alpha level was set at 0.25 for all tests with this research. The independent variable is Nationally Board Certified teachers and the dependent variable is student achievement as shown through a districts graduation rate, dropout rate, Composite ACT Scores, percent proficient on the Communication Arts MAP, and percent proficient on the Math MAP. Tests run will include ANOVA. School districts were categorized into the highest percentage of National Board Certified Teachers, the middle percentage of National Board Certified Teachers, and the lowest percentage of National Board Certified Teachers.

Study Group

The study group for this research consisted of twenty-five different Missouri school districts selected at random. Students range from talented and gifted to Special Education (SPED) students. School districts range from rural, suburban, and urban and come from a variety of socioeconomic backgrounds of varying populations.

Data Collection and Instrumentation

Data will be collected from the Department of Elementary and Secondary Education (DESE) for the state of Missouri using the percent proficient and advanced on the MAP test given at the end of the each school year with an undetermined number of selected response questions and an undetermined number of constructed response questions and then compared to the number of National Board Certified teachers in the school district.

Data Analysis Methods

A Statistical Package (ASP) software was used to complete the statistical calculations in this study. Additionally, Microsoft Excel was used to compile some totals used in the research and then an ANOVA test was performed.

FINDINGS

To determine the impact that National Board Certified Teachers have on student achievement five different areas of data collection were assessed: Graduation Rate, Dropout Rate, Composite ACT Scores, Communication Arts MAP Scores, and Mathematics MAP Scores and then compared to the percentage of Nationally Board Certified teachers in that district.

Table 1

Summary of Data Collected

School Districts	Graduation Rate (2011)	Dropout Rate (2011)	Composite ACT (2011)	NCLB-AYP Comm. Arts	NCLB-AYP Math Prof.	Percentage of NBCT
Blue Springs	93.60%	2.10%	22.6	67.30%	70.80%	2%
Bolivar R-I	93.50%	1.50%	21.9	60%	55%	1%
Clayton	99.50%	0.10%	25.8	76%	77%	1%
Drexel R-IV	92%	0%	20.1	59%	53%	0%
Fulton 58	74%	5.20%	21.4	57%	60%	2%
Independence 30	90.30%	2.90%	21.4	49%	48%	5%
Lakeland R-III	80%	5.50%	24.5	51%	44%	0%
Lee's Summit	93.50%	1.40%	23.5	67%	68%	1%
Lesterville R-IV	88.00%	1.00%	19.2	56.00%	60.60%	0%
Lexington R-V	91.10%	1.80%	20.7	42.80%	43.50%	0%
Liberty 53	91.90%	1.60%	22.4	66.70%	71.90%	1%
Marion Co. R-II	100%	0%	20.9	63%	67%	0%
Maysville R-I	89.10%	1.80%	21.2	59%	57%	2%
North Kansas City 74	84.95%	3.10%	21.4	55.20%	55.70%	1%
Northeast Vernon Co.	100%	0%	21.6	44.90%	62.40%	3%
Platte Co. R-II	96.30%	0.80%	21.9	65%	61%	0%
Park Hill	90.60%	1.90%	23.7	69.10%	70.70%	8%
Raytown	83.30%	5.60%	19.4	43%	44%	0%
Ritenour	83.10%	5.90%	19.5	43.10%	43.20%	1%
South Harrison Co. R-II	75%	5.20%	20	55%	53%	0%
St. Charles	84.60%	2.80%	22.6	56%	58%	1%
Union R-XI	86.70%	3.30%	22.1	58.80%	52.70%	0%
Walnut Grove R-V	96.20%	0%	19.8	48%	57%	0%
Wentzville R-IV	90.20%	2.00%	22.4	63.20%	67.30%	1%
West Plains R-VII	85.60%	2.10%	21	58%	61%	1%

Figure 1

Student Achievement by District

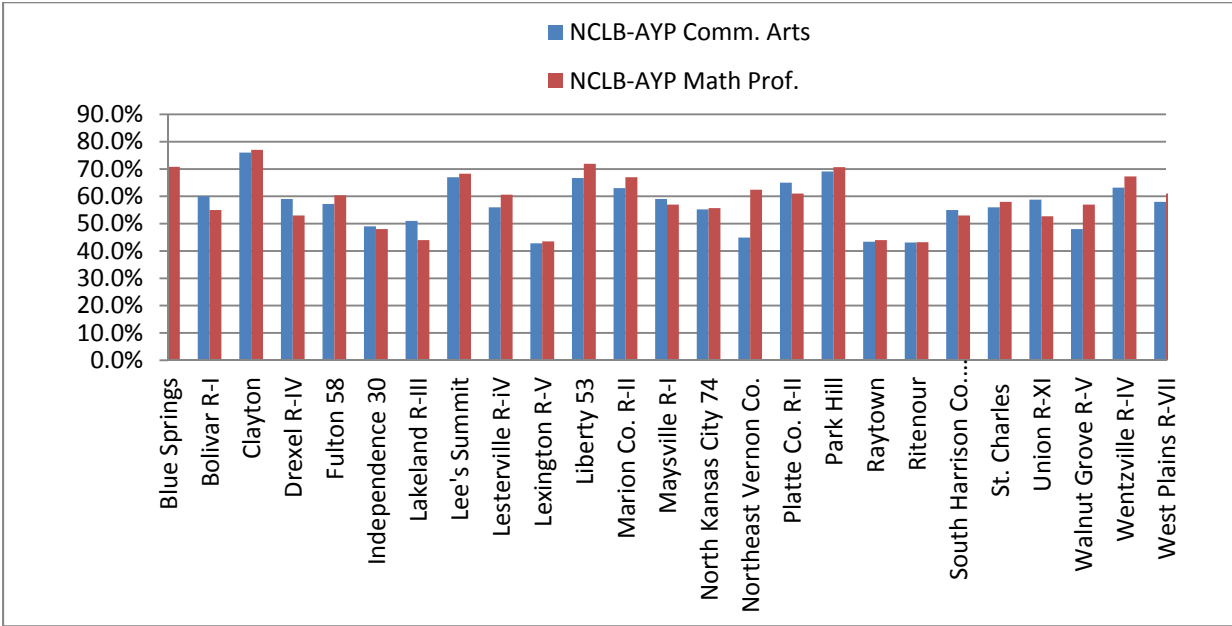


Figure 2

Percent of Nationally Board Certified Teachers per District

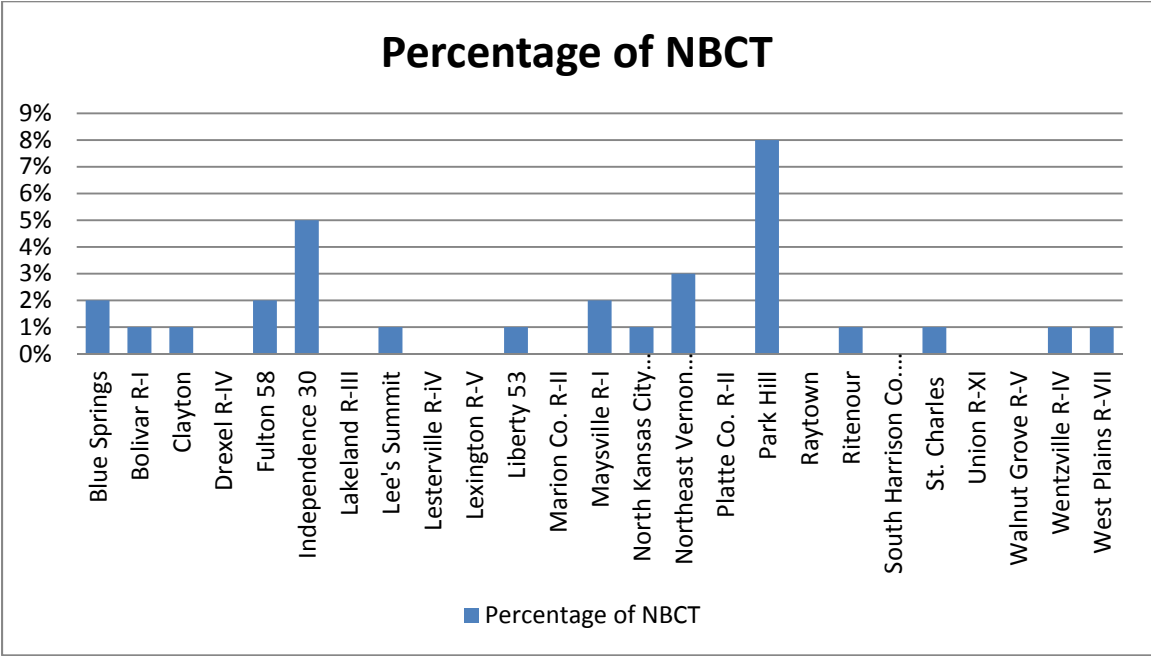


Table 2

Frequency Plot

VARIABLE: Percentage of NBCT				
	FRQ.	CUM. %	CUM.	FREQUENCY PLOT
x < 0	0	0	0	0
x = 0	10	10	40	40 *****
x = 1	9	19	36	76 *****
x = 2	3	22	12	88 *****
x = 3	1	23	4	92 **
x = 5	1	24	4	96 **
x = 8	1	25	4	100 **
x > 8	0	25	0	100
TOTAL	25		100	

Table 2 shows the frequency of the percentage of Nationally Board Certified teachers from the twenty-five Missouri School Districts that were randomly selected. Ten schools or 40% of the school districts selected do not have any National Board Certified staff. 36% of the selected school districts have one percent of their staff with National Board Certification. 4% of school districts have three percent, five percent, and eight percent of their staff with National Board Certification.

Table 3

Summary of Descriptive Statistics for Graduation Rate

Percentage of NBCT	<i>N</i>	Mean	<i>SD</i>
1	10	88.86	-0.512
2	9	89.66	0.284
3	6	89.60	0.228

The purpose of this study is to see if there is a correlation between the percent of National Board Certified Teachers and the percent of graduates in the twenty-five schools surveyed. These schools were selected randomly and then divided into three groups based on the percent of National Board Certified Teachers (NBCT). Group 1 shows the districts with the lowest NBCT of 0. Group 2 is the middle sample with a range of 1% NBCT. Group 3 has the highest percent NBCT with a range of 2% to 8%. The average or mean percent of graduates at the school districts with the most NBCT is 89.60% of students, the average of the middle group is 89.66%, and the average of the lowest percent of NBCT in a school district is 88.86%. The standard deviation, or *SD*, is -0.512 for Group 1; 0.284 for Group 2; and 0.228 for Group 3. The null hypothesis states that there is not a significant difference among school districts with higher percentages of teachers with National Board Certification and districts with lower NBCT percentages in relation to graduation rates. These three groups were broken down into a One-Way ANOVA test to analyze if there is a significant difference in the correlation between NBCT and graduation rates.

Table 4

Summary of ANOVA Test of Significance Results for Graduation Rate

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p-value</i>
Graduation Rate	1162.850	22	52.857		
Percentage of NBCT	3.599	2	1.799	0.034	0.966

Note: Significance = < 0.25

In order to challenge the null hypothesis the twenty-five school districts were divided into three categories based on percentage of NBCT and the ANOVA test was completed as seen in Table 4.

The null hypothesis states that there is not a significant difference in graduation rates and a school district's NBCT percentages. The data collected for graduation rates demonstrates the SS, sum of squares, is 1162.850; the df, degrees of freedom, is 22; the MS, mean squared, is 52.857. The data collected for National Board Certified Teachers demonstrates the SS, sum of squares, is 3.599; the df, degrees of freedom, is 2; the MS, mean squared is 1.799. The F, Fisher Ratio, is 0.034. The ANOVA test reports a p-value of 0.966 which is significantly higher than the alpha level of 0.25 and therefore the null hypothesis is not rejected. The percentage of Nationally Board Certified Teachers in a school district does not impact the graduation rate.

Table 5

Summary of Descriptive Statistics for Dropout Rate

Percentage of NBCT	<i>N</i>	Mean	<i>SD</i>
1	10	2.32	0.015
2	9	2.28	-0.027
3	6	2.32	0.012

The purpose of Table 5 is to see if there is a correlation between the percent of National Board Certified Teachers and the percent of dropouts in the twenty-five schools surveyed. These schools were selected randomly and then divided into three groups based on the percent of National Board Certified Teachers (NBCT). Group 1 shows the districts with the lowest NBCT of 0. Group 2 is the middle sample with a range of 1% NBCT. Group 3 has the highest percent NBCT with a range of 2% to 8%. The average or mean percent of dropouts at the school districts with the most NBCT is 2.32% of students, the average of the middle group is 2.28%, and the average of the lowest percent of NBCT in a school district is 2.32%. The standard deviation, or SD, is 0.015 for Group 1; -0.027 for Group 2; and 0.012 for Group 3. The null hypothesis states that there is not a significant difference among school districts with higher percentages of teachers with National Board Certification and districts with lower NBCT percentages in relation to dropout rates. These three groups were broken down into a One-Way ANOVA test to analyze if there is a significant difference in the correlation between NBCT and dropout rates.

Table 6

Summary of ANOVA Test of Significance Results for Dropout Rate

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p-value</i>
Dropout Rate	85.859	22	3.903		
Percentage of NBCT	0.010	2	0.005	0.001	0.999

Note: Significance = < 0.25

In order to challenge the null hypothesis the twenty-five school districts were divided into three categories based on percentage of NBCT and the ANOVA test was completed as seen in Table 6.

The null hypothesis states that there is not a significant difference in dropout rates and a school district's NBCT percentages. The data collected for dropout rates demonstrates the SS, sum of squares, is 85.859; the df, degrees of freedom, is 22; the MS, mean squared, is 3.903. The data collected for National Board Certified Teachers demonstrates the SS, sum of squares, is 0.010; the df, degrees of freedom, is 2; the MS, mean squared is 0.005. The F, Fisher Ratio, is 0.001. The ANOVA test reports a p-value of 0.999 which is significantly higher than the alpha level of 0.25 and therefore the null hypothesis is not rejected. The percentage of Nationally Board Certified Teachers in a school district does not impact the dropout rate.

Table 7

Summary of Descriptive Statistics for Communication Arts MAP Scores

Percentage of NBCT	<i>N</i>	Mean	<i>SD</i>
1	10	54.20	-3.309
2	9	60.58	3.069
3	6	57.75	0.241

The purpose of Table 7 is to see if there is a correlation between the percent of National Board Certified Teachers and the percent of students scoring proficient on the Communication Arts MAP Test in the twenty-five schools surveyed. These schools were selected randomly and then divided into three groups based on the percent of National Board Certified Teachers (NBCT). Group 1 shows the districts with the lowest NBCT of 0. Group 2 is the middle sample with a range of 1% NBCT. Group 3 has the highest percent NBCT with a range of 2% to 8%. The average or mean percent of proficient Communication Arts students at the school districts with the most NBCT is 57.75% of students, the average of the middle group is 60.58%, and the

average of the lowest percent of NBCT in a school district is 54.20%. The standard deviation, or SD, is -3.309 for Group 1; 3.069 for Group 2; and 0.241 for Group 3. The null hypothesis states that there is not a significant difference among school districts with higher percentages of teachers with National Board Certification and districts with lower NBCT percentages in relation to proficient Communication Arts MAP Test Scores. These three groups were broken down into a One-Way ANOVA test to analyze if there is a significant difference in the correlation between NBCT and proficient Communication Arts MAP Test Scores.

Table 8

Summary of ANOVA Test of Significance Results for Communication Arts

MAP Scores

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p-value</i>
CA MAP Scores	1686.790	22	76.672		
Percentage of NBCT	193.952	2	96.976	1.265	0.302

Note: Significance = < 0.25

In order to challenge the null hypothesis the twenty-five school districts were divided into three categories based on percentage of NBCT and the ANOVA test was completed. The null hypothesis states that there is not a significant difference in proficient Communication Arts MAP scores and a school district's NBCT percentages. The data collected for MAP scores demonstrates the SS, sum of squares, is 1686.790; the df, degrees of freedom, is 22; the MS, mean squared, is 76.672. The data collected for National Board Certified Teachers demonstrates the SS, sum of squares, is 193.952; the df, degrees of freedom, is 2; the MS, mean squared is 96.976. The F, Fisher Ratio, is 1.265. The ANOVA test reports a p-value of 0.302 which is

higher than the alpha level of 0.25 and therefore the null hypothesis is not rejected. The percentage of Nationally Board Certified Teachers in a school district does not impact the percentage of students scoring proficient on Communication Arts MAP Test.

Table 9

Summary of Descriptive Statistics for Mathematics MAP Scores

Percentage of NBCT	<i>N</i>	Mean	<i>SD</i>
1	10	53.58	-5.441
2	9	61.49	2.912
3	6	61.55	2.529

The purpose of Table 9 is to see if there is a correlation between the percent of National Board Certified Teachers and the percent of students scoring proficient on the Mathematics MAP Test in the twenty-five schools surveyed. These schools were selected randomly and then divided into three groups based on the percent of National Board Certified Teachers (NBCT). Group 1 shows the districts with the lowest NBCT of 0. Group 2 is the middle sample with a range of 1% NBCT. Group 3 has the highest percent NBCT with a range of 2% to 8%. The average or mean percent of proficient Mathematics students at the school districts with the most NBCT is 61.55% of students, the average of the middle group is 61.49%, and the average of the lowest percent of NBCT in a school district is 53.58%. The standard deviation, or SD, is -5.441 for Group 1; 2.912 for Group 2; and 2.529 for Group 3. The null hypothesis states that there is not a significant difference among school districts with higher percentages of teachers with National Board Certification and districts with lower NBCT percentages in relation to proficient Mathematics MAP Test Scores. These three groups were broken down into a One-Way

ANOVA test to analyze if there is a significant difference in the correlation between NBCT and proficient Mathematics MAP Test Scores.

Table 10

Summary of ANOVA Test of Significance Results for Math MAP Scores

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p-value</i>
Math MAP Scores	1808.250	22	82.193		
Percentage of NBCT	403.969	2	201.985	2.457	0.109

Note: Significance = < 0.25

In order to challenge the null hypothesis the twenty-five school districts were divided into three categories based on percentage of NBCT and the ANOVA test was completed. The null hypothesis states that there is not a significant difference in proficient Mathematics MAP scores and a school district's NBCT percentages. The data collected for MAP scores demonstrates the SS, sum of squares, is 1808.250; the df, degrees of freedom, is 22; the MS, mean squared, is 82.193. The data collected for National Board Certified Teachers demonstrates the SS, sum of squares, is 403.969; the df, degrees of freedom, is 2; the MS, mean squared is 201.985. The F, Fisher Ratio, is 2.457. The ANOVA test reports a p-value of 0.109 which is lower than the alpha level of 0.25 and therefore the null hypothesis is rejected. The percentage of Nationally Board Certified Teachers in a school district does impact the percentage of students scoring proficient on the Mathematics MAP Test. A post-hoc test is needed to show how the Math MAP scores are impacted by a school district's NBCT.

Table 11

Summary Post Hoc Analysis Results for Mathematics MAP Scores

Percentage NBCT	Percentage NBCT	Mean <i>D</i>	Std. Error	<i>p-value</i>
1	2	-8.353	4.166	0.0574
1	3	-7.970	4.682	0.1028
2	3	0.383	4.779	0.9368

Note: Significance = < 0.25

The null hypothesis was rejected after concluding a One-Way ANOVA test and therefore a post hoc analysis is necessary to determine where the significant differences are among the three groups. There is a significant difference in Group 1 and Group 2, the top two tiers with the lowest percentages of NBCT. Since the p-value is 0.0574 and that is less than the alpha level of 0.25, and is the largest difference, the Math MAP scores are significantly impacted by NBCT percentages. The mean difference was -8.353 and the standard of error was 4.166. There is a significant difference in the Math MAP scores of these two groups based on NBCT. When the highest and lowest groups, 1 and 3, were compared a significant difference was shown in the p-value of 0.1028 which is less than the 0.25 alpha level. The mean *D* was -7.970 and the standard of error was 4.682. This suggests that there is a significant difference in Math MAP scores based on the percentage of NBCT in the highest and lowest percentage groups. The specific difference is in groups 2 and 3; there is not a significant difference, with a p-value of 0.9368. The mean difference is 0.383 and the standard of error is 4.779. This post hoc analysis suggests the higher the percentage of NBCT, the higher the Math MAP scores.

Table 12

Summary of Descriptive Statistics for Composite ACT Scores

Percentage of NBCT	<i>N</i>	Mean	<i>SD</i>
1	10	20.86	-0.847
2	9	22.28	0.571
3	6	21.98	0.276

The purpose of Table 12 is to see if there is a correlation between the percent of National Board Certified Teachers and the Composite ACT scores in the twenty-five schools surveyed. These schools were selected randomly and then divided into three groups based on the percent of National Board Certified Teachers (NBCT). Group 1 shows the districts with the lowest NBCT of 0. Group 2 is the middle sample with a range of 1% NBCT. Group 3 has the highest percent NBCT with a range of 2% to 8%. The average or mean percent of ACT scores at the school districts with the most NBCT is 21.98 of students, the average of the middle group is 22.28, and the average of the lowest percent of NBCT in a school district is 20.86. The standard deviation, or SD, is -0.847 for Group 1; 0.571 for Group 2; and 0.276 for Group 3. The null hypothesis states that there is not a significant difference among school districts with higher percentages of teachers with National Board Certification and districts with lower NBCT percentages in relation to Composite ACT scores. These three groups were broken down into a One-Way ANOVA test to analyze if there is a significant difference in the correlation between NBCT and Composite ACT Scores.

Table 13

Summary of ANOVA Test of Significance Results for Composite ACT

Scores

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p-value</i>
ACT Scores	52.288	22	2.377		
Percentage of NBCT	10.452	2	5.226	2.199	0.135

Note: Significance = < 0.25

In order to challenge the null hypothesis the twenty-five school districts were divided into three categories based on percentage of NBCT and the ANOVA test was completed. The null hypothesis states that there is not a significant difference in Composite ACT scores and a school district's NBCT percentages. The data collected for ACT scores demonstrates the *SS*, sum of squares, is 52.288; the *df*, degrees of freedom, is 22; the *MS*, mean squared, is 2.377. The data collected for National Board Certified Teachers demonstrates the *SS*, sum of squares, is 10.452; the *df*, degrees of freedom, is 2; the *MS*, mean squared is 5.226. The *F*, Fisher Ratio, is 2.199. The ANOVA test reports a *p-value* of 0.135 which is lower than the alpha level of 0.25 and therefore the null hypothesis is rejected. The percentage of Nationally Board Certified Teachers in a school district does impact Composite ACT scores. A post-hoc test is needed to show how the ACT scores are impacted by a school district's NBCT.

Table 14

Summary Post Hoc Analysis Results for Composite ACT Scores

Percentage NBCT	Percentage NBCT	Mean <i>D</i>	Std. Error	<i>p-value</i>
1	2	-1.418	0.708	0.0578
1	3	-1.123	0.796	0.1722
2	3	0.294	0.813	0.7205

Note: Significance = < 0.25

The null hypothesis was rejected after concluding a One-Way ANOVA test and therefore a post hoc analysis is necessary to determine where the significant differences are among the three groups. There is a significant difference in Group 1 and Group 2, the top two tiers with the lowest percentages of NBCT. Since the p-value is 0.0578 and that is less than the alpha level of 0.25, and is the largest difference, the ACT scores are significantly impacted by NBCT percentages. The mean difference was -1.418 and the standard of error was 0.708. There is a significant difference in the ACT scores of these two groups based on NBCT. When the highest and lowest groups, 1 and 3, were compared a significant difference was shown in the p-value of 0.1722 which is less than the 0.25 alpha level. The mean *D* was -1.123 and the standard of error was 0.796. This suggests that there is a significant difference in ACT scores based on the percentage of NBCT in the highest and lowest percentage groups. The specific difference is in groups 2 and 3; there is not a significant difference, with a p-value of 0.7205. The mean difference is 0.294 and the standard of error is 0.813. This post hoc analysis suggests the higher the percentage of NBCT, the higher the Composite ACT scores.

CONCLUSIONS AND RECOMMENDATIONS

The null hypothesis stated that there is no difference in student achievement between teachers who have achieved National Board Certification and teachers who have not achieved National Board Certification. The results of this study indicate that there are areas of significant difference in student achievement between teachers who are Nationally Board Certified and non Nationally Board Certified teachers. There is a significant difference in student achievement when measured in Composite ACT Scores and Mathematics MAP Scores when students are taught by National Board Certified Teachers as compared to those students not taught by Nationally Board Certified Teachers.

In contrast, results of the study also indicate that there are areas with no significant difference in student achievement between teachers who are Nationally Board Certified and non Nationally Board Certified teachers. These areas are graduation rates, dropout rates and Communication Arts MAP Scores. This would suggest that students taught by non National Board Certified Teachers and National Board Certified Teachers will achieve at the same rate.

There appears to be inconclusive evidence that student achievement is increased by teachers who are Nationally Board Certified. It is important to note that there are other outstanding facts that contribute to student achievement that were not outlined in this research such as socioeconomic status and length of time spent with the Nationally Board Certified Teacher. Reason would state that elementary students whose classroom teacher is Nationally Board Certified would have greater impact on student achievement than a middle school student who spends less than an hour day with that teacher. Because there was a significant difference in student achievement and NBCT when measured by Composite ACT Scores, the National

standard universities use as entrance requirements, shows the impact that National Board Certification can have on student achievement.

The school district may want to consider the emphases placed on National Board Certification from a monetary stand point because of the inconclusive evidence that money may be better used in another area to increase student achievement. However, student achievement is impacted because of the level of professionalism that comes with National Board Certification and the recognition it can bring to a district.

The school district may also want to look at the placement of their National Board Certified Teachers to ensure that they are getting the most “bang for their buck”. Teachers should be in curricular areas that match their National Board Certification if the greatest impact on student achievement is to be achieved.

Finally, this is a fairly new practice in education since it has only been in effect for just over twenty years and therefore the true impact it can have on student achievement has yet to be seen.

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