




Closing Reading Achievement Gaps for Middle School Students

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Abstract

This research examined how self-efficacy, collective efficacy, and professional development compared between core content and special education middle school teachers working with middle school students in reading comprehension and fluency. Accordingly, no statistically significant difference in teacher self-efficacy between core content and special education teachers was discovered based on the ANOVA analysis results. An analysis of professional development and collective teacher efficacy showed mixed results with a negative relationship predicted between increased professional development hours for core content teachers. A predicted positive relationship existed with the number of professional development hours increasing for special education teachers. There was no statistically significant difference between core content and special education teachers' numbers of professional development hours identified as low, medium, or high. The chi statistic showed that both populations of teachers had insufficient training.

Keywords: *achievement gap, collective teacher efficacy, teacher self-efficacy, reading specialist, response to intervention (RTI), teacher professional development*

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Introduction

This quantitative study aimed to determine what obstacles exist regarding closing the academic achievement gaps of middle school students in grades six through eight within a school district that provides tier-three reading interventions. Specifically, the research examined the teacher perceptions related to teacher efficacy, collective school efficacy, and professional development for closing academic gaps (Cantrell et al., 2013). The concept of self-efficacy was identified in the late 1970s when psychologist Albert Bandura coined this term that describes a person's perceptions of their abilities to accomplish specific tasks (Bandura, 1977). Collective efficacy is a characteristic of the group that can contribute to a faculty's ability to determine the academic level of a school (Bandura, 1993).

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Research has shown that high levels of teacher self-efficacy and collective implementation of intervention programs positively correlate with student achievement in reading (Stokes, 2017). This study examines the implications of teacher self-efficacy, collective faculty efficacy, and professional development related to working with students in middle school, grades six through eight. The study surveyed teachers based on individual and school-wide teacher perceptions of their abilities to close achievement gaps within the general classroom environment.

Closing student achievement gaps became part of the national debate within public education in the early 1980s, with a national report identifying students in the United States for academic failure and potentially dropping out of school (Gardner et al., 1983). Since the publication of this report, public education has continued the debate on how to close the achievement gap of students, correctly identify the barriers, types of services provided, and how best to implement these services to improve student academic performance (Finn et al., 2019).

Review of the Literature

With the current climate in public education characterized by widespread budget cuts, greater accountability, and high-stakes assessments, it has become increasingly important for public school districts to close achievement gaps for all students. This challenge has resulted in educators putting a greater emphasis on reaching all students in ways that can maximize student achievement while maintaining the bottom line. At the center of this work are the relationships between students and teachers. How students feel about these relationships directly impacts their ability to succeed in the classroom. How teachers perceive students and their abilities to provide instruction will determine the success of teaching and learning in conjunction with proper identification for implementation of any needed services. For this study, achievement gaps are based on students performing at or below grade level for reading comprehension and fluency, with a high probability of academic failure in core classes. (Gardner et al., 1983; Glavin, 2014).

Teacher Self-Efficacy

While positive student–teacher relationship perceptions are essential indicators of student achievement, multiple studies have identified high levels of teacher self-efficacy to correlate with student achievement (Thornton et al., 2020). Bandura (1997) defined self-efficacy as the “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p. 3). Further, in the context of teaching and learning, Tschannen-Moran and Hoy (2001) defined teacher self-efficacy as “judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated” (p. 783). Guskey and Passaro (1994) defined teacher efficacy as “teachers’ belief or conviction that they can influence how well students learn, even those who may be considered difficult or unmotivated” (p.628).

There is a greater emphasis on school accountability in today’s academic environment, with high-stakes state and national assessments driving educational decision-making at the local level. Consequently, this has resulted in a lack of consideration for teacher self-efficacy’s impact on student achievement. High levels of teacher self-efficacy, when supported by structures and positive school cultures, can result in improved instructional strategies, student achievement, and ongoing organizational change (Thornton et al., 2020).

Further, Sims (2018) reinforced the complexities around teacher self-efficacy and the importance of further research based on results from a mixed-method study of regular and special education teachers from elementary and middle schools focusing on their perceived level of self-efficacy compared to that of administrators. Findings revealed that, as expected, special education teachers scored higher than regular education teachers for perceived efficacy in working in inclusive settings. In contrast, administrators scored

both groups of teachers higher than the teachers' own perceptions, thus providing another example of the complexities of perceived self-efficacy. Special education teachers have a higher perceived self-efficacy than regular education teachers regarding influencing decision-making within inclusive schools, using school resources, and obtaining parental and community involvement (Lamture & Gathoo, 2016). When both regular and special education teachers have high levels of perceived self-efficacy, there is a positive correlation between a teacher's level of self-efficacy and student achievement (Sun & Leithwood, 2015; Thornton et al., 2020).

Using the Teacher Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Hoy (2001), Callaway (2017) conducted a correlation study examining the relationship between teacher self-efficacy, student engagement, instructional strategies, and classroom management. The study's primary goal was to determine how teacher efficacy impacts Culturally Responsive Teaching Techniques (CRTTs) working with a school district comprising 67% of its student body identified as economically disadvantaged. Results indicated a statistically significant positive relationship between teacher self-efficacy and culturally responsive teaching practices that culminated in a high degree of student engagement. Callaway's (2017) study supports previous research that has identified that teachers with a high level of self-efficacy and culturally responsive teaching techniques increase student achievement (Tschannen-Moran & Hoy, 2001; Tucker et al., 2005).

Collective Efficacy

Bandura (1997) defined collective efficacy as "A group's shared belief in its conjoint capability to organize and execute the courses of action required to produce given levels of attainment" (p. 477).

Thornton et al. (2020) described collective teacher efficacy as the belief that a faculty has the ability to influence student achievement collectively. Goddard et al. (2000) described collective teacher efficacy as "the perceptions of teachers in a school that the efforts of the faculty as a whole will have a positive effect on students" (p. 480) and identified collective efficacy as a critical factor for reading and math achievement. Collective teacher efficacy or group goal attainment, specifically in the educational field working with middle school students, has a more substantial effect on student achievement than socio-economic status, prior academic achievement, race, and gender (Goddard et al., 2004). Bandura (1997) described self-efficacy and collective efficacy as differing in the way both types of efficacies are obtained. Self-efficacy relies on the group's individual and collective efficacy, with responsibilities delegated to various people. However, both forms of efficacy come from similar sources and provide similar functions with parallel processes.

Mosoge et al. (2018) and Sandoval et al. (2011) examined the level of collective teacher efficacy in low-performing schools and the implications efficacy levels have on leadership. Using the Collective Teacher Efficacy (CTE) survey, Mosoge et al. (2018) surveyed 350 teachers from 16 schools identified as low-performing in the research study. The results showed that most teachers reported high levels of general competency in the areas of student motivation and demonstrated the concept that every student can succeed while working in a low-performing school. In the area of task analysis, the results were different. Collective efficacy scores were lower in the categories of home life and the school's ability to keep students safe, presenting a challenge to school leadership with both internal and external sources driving down collective teacher efficacy. Sandoval et al. (2011) compared the CTE survey scores between exemplary school teachers and academically unacceptable school teachers from middle school campuses as determined by the state of Texas. As expected, the results showed that teachers from exemplary schools showed higher collective teacher efficacy scores than teachers from academically unacceptable schools. The preceding research studies provide clear evidence for the relationship between collective teacher efficacy and student achievement and issues surrounding collective efficacy for leadership to address. The following research studies provide evidence to support the importance of collective efficacy and its relationship to student success.

Bandura (1993) brought to the forefront the concept of perceived collective teacher efficacy related to student achievement and postulated that collective efficacy has a more significant impact on student achievement than socio-economic status. Consistent with Bandura (1993), Ramos et al. (2014) collected and analyzed research findings in their literature review between 2000 and 2013 related to collective teacher efficacy and various subcategories. Results from the literature review found that research related to collective teacher efficacy and student achievement accounted for only 39% of the literature, suggesting a gap within the context of research related to this topic. Findings showed that 100% of the studies mentioned above provided a positive correlation, where when the collective teacher efficacy increased, the effects of sociodemographic factors were reduced and student achievement increased. There still exists a need for further research and consideration of the phenomena of collective efficacy and its impact on student success based on the limited amount of research available.

Professional Development Hours and Student Achievement

Dixon et al. (2014) provide insights into professional development limitations related to differentiated instruction for students identified as having mixed abilities. Information provided in the study related to a lack of professional development for core content teachers working with students in the core content classroom. Often, teacher professional development provides an introduction to differentiation during teacher training or district-offered professional development, which does not give enough information or follow-up for a teacher to implement the practice effectively in the classroom. When teachers have a sense of low self-efficacy in their teaching abilities, differentiation in the classroom can be a challenge regardless of the amount of professional development they obtain and the level of their understanding.

Thornton et al. (2020) described the importance of teachers' self and collective efficacy for increased student achievement and promoting positive school-wide change using professional development. Consequently, professional development approaches to improve student achievement are often inadequate due to a lack of depth, implementation, and supported follow-through. It is also essential that school leaders enhance self and collective efficacy within professional development. Prasse et al. (2012) provide evidence to support the need for pre-service teachers with the training and professional development needed to successfully implement and incorporate multi-tiered systems of support to intervention to ensure achievement gap reduction or closure for students. Providing this knowledge and skillset will improve self and collective efficacy of teachers and, as a result, improve student achievement.

Additionally, Xu (2016), using the Kentucky Teaching, Empowering, Leading and Learning (TELL) survey data from 2013, was able to compare results from surveys of 1,120 schools based on the 13 items related to teachers' attitudes toward professional development, with each school's accountability profile data. There was a statistically significant relationship between teachers' attitudes regarding professional development and overall school performance at the elementary and middle school levels, with no relationship at the high school level. Elementary and middle school teachers possessing high efficacy levels were identified with higher-achieving school accountability data, and lower levels of efficacy possession were related to lower-achieving school accountability data. Horan and Merrigan (2021) furthered the research linking self and collective teacher efficacy to student achievement through professional development for students identified with special needs. Using a mixed-methods study, Horan and Merrigan (2021) presented evidence that teachers provided with professional development working with students with special needs are highly trained and have a higher level of efficacy than teachers with little or no training.

Dixon et al. (2014) studied teacher efficacy and its relationship to instructional differentiation by comparing these from two different school districts. The study attempted to answer the following questions: "do teachers who express higher teacher efficacy differentiate instruction more in their classroom than teachers who feel less efficacious?" and "does professional development in differentiation relate to teacher efficacy?" The results found a positive relationship between differentiation between professional development hours and teacher

efficacy. Valiandes and Neophytou (2017) revealed further evidence to support targeted professional development aimed at differentiated instruction to improve student achievement. Both studies reinforce the concepts of teacher self-efficacy, collective efficacy, and differentiated professional development as essential parts of student achievement while providing insight into the complexities of providing teachers with the proper tools to improve student achievement. Additionally, Ross (2013) strengthened the argument for increased teacher participation in professional development. The teacher surveys from this study showed that math teachers ($n = 181$) from pre-kindergarten through grade 12 had a significantly lower sense of efficacy when working with ELL students and a positive correlation between increased professional development focused on differentiation and a heightened sense of efficacy.

Similar to the meta-analysis work described in the previous section focusing on collective teacher efficacy and student achievement, meta-analyses researching the current literature based on professional development and student literacy growth provide insight into the impact of professional development on student achievement (Basma & Savage, 2017). Basma and Savage (2017) reviewed 17 studies to identify similarities between professional development and student reading achievement outcomes. Variables identified within the studies included the type of professional development programs, sample size, type of standardized testing, the use of technology, and the number of hours spent in professional development. Results from the meta-analysis showed that when professional development hours were 30 or less, there was a more significant gain in student reading outcomes ($g = 0.367$ with $p > .05$) compared to professional development hours greater than 30 with an increase in student reading outcomes of ($g = 0.143$ with $p > .05$). The results from Basma and Savage (2017) were similar to the current study, where an increase in professional development hours resulted in a decrease in perceived teacher efficacy for core content teachers working with tier-three reading intervention students.

There is limited research on the significance of teacher self-efficacy, collective efficacy, and professional development hours in closing reading achievement gaps within middle schools. The current literature review suggests that further research needs to determine these variables' impact on closing achievement gaps in reading. How teachers perceive their effectiveness in the core content classroom setting, the school's abilities to close achievement gaps, the amount of professional development provided, and the next steps require consideration.

Purpose of the Study

The purpose of this quantitative, comparative study between regular education and special education teachers was to compare perceived self-efficacy, collective efficacy, and professional development between the two groups as the variables related to closing reading achievement gaps. The study involved conducting two surveys among core content middle school teachers and special education/reading intervention specialists. The first survey, Teachers' Sense of Efficacy Scale (TSES), focused on how individual teachers perceived their abilities to improve academic achievement for students identified as being in Response to Intervention (RtI) for reading. The second survey, Collective Teacher Beliefs (CTB), focused on how teachers perceived their school's abilities and the RtI program, including the number of professional development hours obtained for the improvement of student achievement. (Tschannen-Moran & Hoy, 2001).

With a continually increasing global marketplace, the need for American students to be able to compete at this level requires a citizenry that is well-rounded in both skills and education. In the latest comparisons carried out in 2015, among countries taking the Programme for International Student Assessment (PISA), which measures math, science, and reading ability among 15-year-olds, the United States ranked 39 in math and 24 in reading out of 71 countries. The United States continues to lag behind many other countries, creating a situation where students, upon graduation from secondary and post-secondary education, are at a continuous

disadvantage in the global marketplace, limiting achievements both on the national and individual levels (DeSilver, 2017).

At the community level, companies, schools, parents, and students benefit from what they need to reach their full potential. Companies receive a productive and educated workforce, which would improve bottom lines and provide a more extensive tax base for the community. Schools can maintain autonomy within their districts and provide educational opportunities tailored to the specific needs of the students they serve without fear of intervention from the district and state, where there is the possibility of state educational systems moving into a school that would render site-based decision-making committees authority back to the district or state. At the family level, individuals can reach their full potential and better provide for themselves and their families (García & Weiss, 2017).

Research Questions

1. What is the effect of the teacher's role, core versus non-core (special education/intervention specialist), on individual teacher self-efficacy scores in student engagement, instructional strategies, and classroom management while working with students receiving reading intervention?
2. To what extent do RtI professional development hours predict teacher collective efficacy scores while working with students receiving reading intervention?
3. Is there a significant difference between teacher role, core versus non-core (special education/intervention specialist), and RtI professional development hours identified as low, medium, and high?

Hypotheses

1. H_{1o}: There is no effect of the teacher's role, core versus non-core (special education/intervention specialist), on individual teacher self-efficacy scores in student engagement, instructional strategies, and classroom management while working with students in reading intervention.
2. H_{2o}: Professional development hours do not predict the level of collective efficacy for core and special education teachers.
3. H_{3o}: There is no significant difference between teacher role, core versus non-core (special education/intervention specialist), and RtI professional development hours identified as low, medium, and high.

Methods

Research Design

This study employed a quantitative, causal–comparative research design, using deductive reasoning to analyze and interpret the results from the collected data's statistical analysis (Spatz, 2019). Quantitative research techniques are deductive in nature. Observations are studied, and hypotheses are tested in a reproducible way to show relationships that can be extrapolated to the larger population (Rovai et al., 2014). A benefit to using a quantitative approach for the current research study is that data collection and analysis be conducted using statistical methods where numerical data were collected from surveys and compared between variables (Muijs, 2011).

The first goal was to identify differences in core content teacher self-efficacy and collective efficacy compared to special education teachers. The second goal was to predict the collective efficacy of regular and special education teachers based on the number of professional development hours received. The variables examined

in the study were the type of teacher, core content or special education, the level of self-efficacy, collective efficacy, and the number of professional development hours received by each group of teachers.

Participants

The target population included teachers from six middle schools within a Midwestern school district. Teachers identified themselves as core content (including unified arts) or special education/intervention specialists on the survey instruments. After obtaining written permission to conduct the study within the district, the first attempt to request teacher participation in the survey occurred through email. The link to the two surveys was attached to the email requesting teacher participation. A second email request went to all six middle schools two weeks later.

Two online survey instruments provided data collection. The first instrument, TSES (Tschannen-Moran & Hoy, 2001), and the second instrument, CTB (Tschannen-Moran & Barr, 2004), were administered electronically through Survey Monkey. Attached were the links to the two surveys to the emailed letter that included the participant request and the informed consent page.

Context

Survey data collected in May at the end of the 2020–2021 school year during the COVID-19 pandemic may misrepresent a typical school year. This school year provided a great deal of stress, anxiety, and uncertainty for students, parents, teachers, and administrators. The district started the year during the COVID-19 pandemic with students attending classes from home via Non-Traditional Instruction Days (NTI). Then the district moved to a hybrid model where students would only go to school on certain days of the week and be virtual the other days, with the final few months of school having all students in attendance who chose to be present physically while still allowing some students to remain virtual. Overall, survey results showed high self-efficacy and collective efficacy levels for core content and special education teachers. The data collected has the potential of being skewed by the challenges brought by the pandemic resulting in efficacy numbers that could be lower than in pre-pandemic years. Delice (2010), Henn (2005), Skaalvik and Skaalvik (2007), and Zhou (2019) provided evidence to support the multi-dimensional aspects of teaching and learning where an event such as the COVID-19 pandemic is sure to impact efficacy results.

Instrumentation

Both surveys began with a demographic question to identify the participants as core content (including unified arts) teachers or special education/reading interventionists working with reading students. The TSES long-form survey measuring individual teacher efficacy consisted of 24 items broken down into three subcategories: student engagement, instructional strategies, and classroom management. Each subcategory consisted of eight items with answer choices ranging from “not at all” to “a great deal.” The scoring system used a Likert scale ranging from 1 to 9.

The CTB survey measures how teachers perceive their school’s efficacy in the context of working with reading students, consisting of 12 items broken down into two categories, namely instructional strategies, and student discipline. Each category consisted of six items with answer choices ranging from “not at all” to “a great deal.” The scoring system used a Likert scale ranging from 1 to 9. The final component of the survey consisted of a question asking the number of hours spent on professional development for working with reading students. The choices ranged from zero to three (low), four to six (medium), and seven or more hours (high).

Data Collection

Each research question with the corresponding tested hypotheses determined the type of statistical analysis tools used. For TSES, the unweighted means of each subcategory were calculated based on the directions

provided by the survey creators, Tschannen-Moran and Hoy (2001). The CTB survey scored an overall collective teacher efficacy score by calculating the mean of all 12 items (Tschannen-Moran & Barr, 2004). Analysis of research question one accounted for statistical significance using analysis of variance (ANOVA) Independent Samples. Research question two used regression analysis, and question three used the chi-square test (Spatz, 2019). Analyzation occurred for all three tests using the Microsoft Excel Data Analysis ToolPak.

Methods

The first research question incorporated an analysis for statistical significance using a one-way ANOVA. The one-way ANOVA test is a Null Hypothesis Significance Testing (NHST) technique that identifies differences between two or more population means in experiments with one independent variable (Spatz, 2019, p. 231). The significance level, alpha value, of .05 was determined significant for the test. The independent variable for question one was the type of teacher—whether core content or special education/reading intervention specialist. The dependent variable was the individual teacher’s self-efficacy scores within the subcategories of student engagement, instructional practices, and classroom management.

Regression analysis for question two required the examination of two variables (bivariate distributions). Regression analysis identifies relationships between two variables and predicts scores for one variable when the measurements of a second variable are known (Spatz, 2019). The independent variable for question two is the number of professional development hours categorized from zero to three, four to six, and seven or more. The dependent variable is the overall collective efficacy score.

The third research question tested for statistical significance using the chi-square test of independence. The chi-square test, a nonparametric test, analyzed frequency count data (Spatz, 2019, p. 302). Accordingly, the significance level, alpha value of .05, was determined significant for the test. The chi-square test table used included a two-by-three set of parameters. The strength of association measured between the variables of the role of the teacher category, core or non-core (special education/reading intervention specialist), and the number of professional development hours for RTI reading intervention categorized as low, medium, or high.

Data Analysis

Question One:

What is the effect of the teacher’s role, core versus non-core (special education/intervention specialist), on individual teacher self-efficacy scores in student engagement, instructional strategies, and classroom management when working with reading students? Question one tested for statistical significance using a one-way single factorial ANOVA). The results from question one failed to reject the null hypothesis. There was no statistically significant difference in perceived teacher self-efficacy between core content and special education/reading intervention specialists in the three correlated factors of student engagement, instructional strategies, and classroom management.

A total of 65 surveys (42 core, 23 special education) provided the analysis to test for significant differences among the three factors, student engagement, instructional strategies, and classroom management, of the TSES survey. The survey comprised 24 questions, with each of the three factors containing eight questions. The questions arranged on a Likert scale ranged from 1 to 9, with the mean calculated for each question based on the type of teacher. The one-way ANOVA test and source of variance compared the TSES teacher efficacy scores for each teacher identified as either core or special education within the factor of efficacy in student engagement (see Table 1), efficacy in instructional strategies (see Table 2), and efficacy in classroom management (see Table 3).

The analysis of variance for efficacy in student engagement (see Table 1) showed no significant difference between the two groups [$F(1, 14) = 0.01, p = .92$].

Table 1. Single-Factor One-Way ANOVA—Efficacy in Student Engagement and TSES Scores (N = 65) Items # 1, 2, 4, 6, 9, 12, 14, 22

Groups	Count	Sum TSE	Mean TSES	Variance			
Core Content	8	53.00	6.63	0.53			
Special Education	8	53.40	6.68	1.41			
Source	df	SS	MS	F	Fcrit	p-value	Decision
Between groups	1	0.01	0.01	0.01	4.60	.92*	Accept
Within groups	14	13.57	0.97				
Total	15	13.58					

Note. * $p > .05$. TSES = Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001)

Table 2. Single-Factor One-Way ANOVA—Efficacy in Instructional Strategies and TSES Scores (N = 65) Items # 7, 10, 11, 17, 18, 20, 23, 24

Groups	Count	Sum TSES	Mean TSES	Variance			
Core Content	8	59.50	7.44	0.22			
Special Education	8	57.80	7.23	0.16			
Source	df	SS	MS	F	Fcrit	p-value	Decision
Between groups	1	0.18	0.18	0.97	4.60	.34*	Accept
Within groups	14	2.61	0.19				
Total	15	2.79					

Note. * $p > .05$. TSES = Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001)

The analysis of variance for efficacy in student engagement (see Table 3) showed no significant difference between the two groups [$F(1, 14) = 3.00, p = .10$].

Table 3. Single-Factor One-Way ANOVA—Efficacy in Classroom Management and TSES Scores (N = 65) Items # 3, 5, 8, 13, 15, 16, 19, 21

Groups	Count	Sum TSES	Mean TSES	Variance			
Core Content	8	56.80	7.10	1.19			
Special Education	8	62.30	7.79	0.07			
Source	df	SS	MS	F	Fcrit	p-value	Decision
Between groups	1	1.89	1.89	3.00	4.60	.10*	Accept
Within groups	14	8.80	0.63				
Total	15	10.70					

Note. * $p > .05$. TSES = Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001)

Question Two: To what extent do RTI professional development hours predict teacher collective efficacy scores working with reading students? This question used a linear regression analysis to predict the collective

efficacy scores of core content teachers and special education teachers based on the number of professional development hours focused on working with closing student achievement gaps.

A total of 65 surveys provided the analysis within a linear regression analysis to predict collective efficacy for core content and special education teachers, with 42 core content and 23 special education teachers responding. The collective teacher efficacy scale survey consisted of 12 questions with an overall score computed by taking the mean of each score reported for all 12 questions based on the teacher category. The professional development hours provided the categories identified as low (0–3 hours), medium (4–6 hours), and high (7 or more hours). Subsequently, core content and special education teacher results provided the following analysis (see Tables 4 and 5).

The overall regression was statistically significant [$F(1, 40) = 5.18, p = .03$]. The p-value = .03 constitutes a statistically significant test resulting in the rejection of the null hypothesis that states professional development hours do not predict the level of collective efficacy for core content teachers.

Table 4. Summary Output Regression Analysis Collective Efficacy Core Content Teachers Regression Statistics

Multiple R	0.34
R Square	0.11
Adjusted R Square	0.09
Standard Error	0.92
Observation	42

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	4.36	4.36	5.18	0.03
Residual	40	33.69	0.84		
Total	41	38.05			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	8.11	0.40	20.42	9E-23	7.31	8.91	7.31	8.91
PD hrs.	-0.19	0.08	-2.28	.03	-0.35	-0.02	-0.35	-0.02

The linear regression analysis conducted to predict the collective efficacy scores of core content teachers based on the number of professional development hours identified as low, medium, and high resulted in a negative relationship between collective efficacy and the number of hours spent on professional development. The coefficient, professional development hours, showed a negative relationship between collective efficacy and the reported increased number of professional development hours (see Figure 1).

Figure 1. Core Content Collective Efficacy Compared to PD Hours

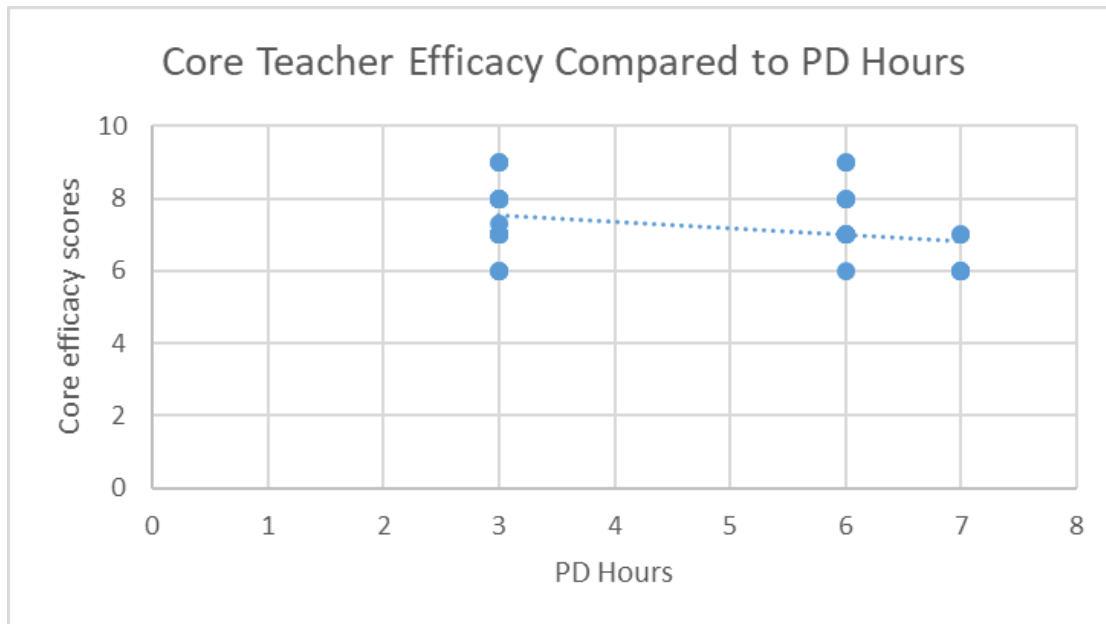


Table 5. Summary Output Regression Analysis Collective Efficacy Sped. Teachers

Multiple R	0.42
R Square	0.18
Adjusted R Square	0.14
Standard Error	0.62
Observations	23

ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	1.79	1.79	4.59	0.04			
Residual	21	8.20	0.39					
Total	22	9.99						

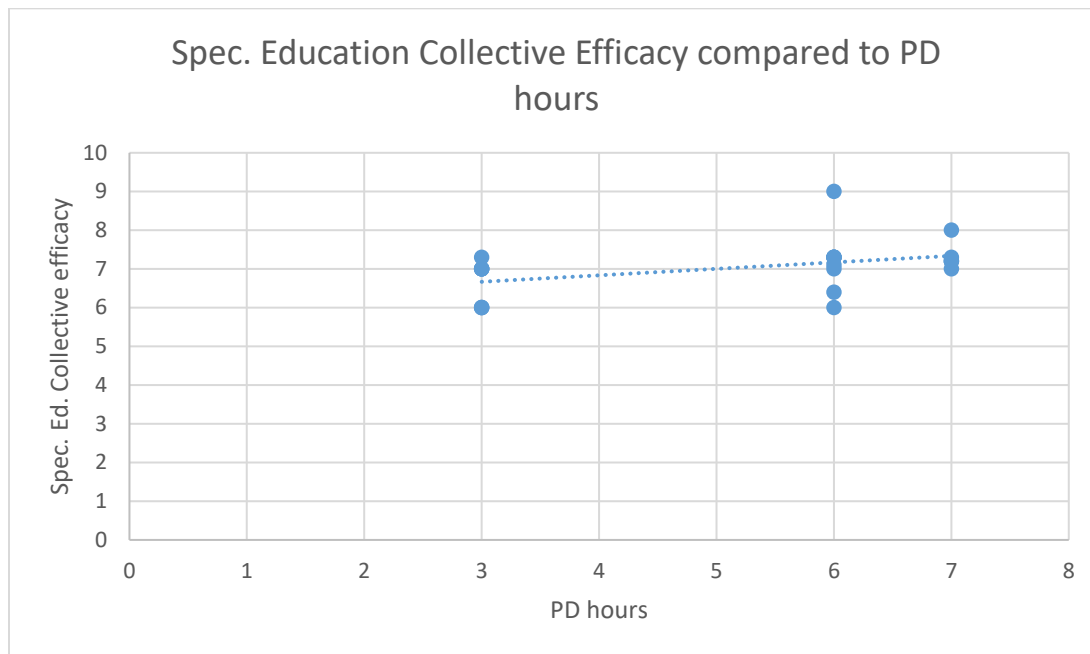
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	6.17	0.43	14.40	2.4E-12	5.27	7.06	5.27	7.06
PD hrs.	0.17	0.08	2.14	.04	0.00	0.33	0.00	0.33

The overall regression was statistically significant [$F(1, 21) = 4.59, p = .04$]. The p -value = .04 constitutes a statistically significant test resulting in the rejection of the null hypothesis that states professional development hours do not predict the level of collective efficacy for special education teachers.

The linear regression analysis for collective efficacy scores compared to professional development hours identified as low, medium, and high for special education teachers shows a positive relationship between collective efficacy and the number of hours spent on professional development. The coefficient, professional

development hours, shows a positive relationship between collective efficacy and the reported increased number of professional development hours (see Figure 2).

Figure 2. *Special Education Collective Efficacy Compared to PD Hours*



Question Three: Is there a significant difference between teacher role, core versus non-core (special education/intervention specialist), and RtI professional development hours identified as low, medium, and high? A chi-square test of independence compared the type of teacher, core or special education, and the number of professional development hours categorized as low, medium, and high. No significant difference existed between the type of teacher and the number of professional development hours ($X^2 [2, N = 65] = 3.26, p = .20$).

A total of 65 surveys provided the analysis within the 3 x 2 chi-square test of independence, with 42 core teachers and 23 special education teachers responding. The teachers identified on the survey categorized the number of professional development hours they received as low (0–3 hours), medium (4–6 hours), and high (7 or more hours). Provided is an analysis of results based on the type of teacher (see Table 6).

Table 6. Chi-Square Frequencies for Number of Professional Development Hours Provided and Type of Teacher (N = 65)

Observed PD Hours and Type of Teacher				
Teacher	PD hrs. Low 0–3	PD hrs. Med. 4–6	PD hrs. High 7+	Total
Core	23	11	8	42
Spec. Ed	8	9	6	23
Total	31	20	14	65
Expected PD Hours Core Content Teachers				
Teacher	PD hrs. Low 0–3	PD hrs. Med. 4–6	PD hrs. High 7+	
Core	20	13	9	
(O-E)	3	-2	-1	
(O-E) ²	9	4	1	
(O-E) ² /E	0.45	0.31	0.11	0.87
Expected PD hours Special Education				
Spec. Ed.	PD hrs. Low 0–3	PD hrs. Med. 4–6	PD hrs. High 7+	
Spec. Ed.	11	7	9	
(O-E)	-3	2	-3	
(O-E) ²	9	4	9	
(O-E) ² /E	0.82	0.57	1	2.39
		X ²	df	p-value
				Decision
		3.26	2	.20
				Accept

Note. * $p > .05$

Results

The first research question tested for statistical significance using a one-way single factorial ANOVA. The independent variable of question one was the type of teacher, whether core content or special education/reading intervention specialists. The dependent variable was the teacher's self-efficacy score. The ANOVA looked for differences among population means from the TSES survey. Question one resulted in accepting the null hypothesis due to a lack of statistically significant differences between the teacher self-efficacy scores and the teacher role.

A linear regression analysis predicted the collective efficacy of core content teachers and special education teachers working with students in receiving reading intervention. Professional development hours used in the linear regression analysis resulted from low (0 to 3 hours), medium (4 to 6 hours), and high (7 or more hours). Regression analysis performed on each of the two teacher categories determined whether there was a positive, negative, or absent relationship between the variables. A relationship resulted between the number of professional development hours received and the level of collective efficacy for core and special education teachers. Results of question two showed core content teachers having a negative relationship between the variables: as professional development hours increased, collective efficacy decreased. On the contrary, special education teachers showed a positive relationship between the two variables: as professional hours increased, collective efficacy increased.

Question three tested for statistical significance using a two-by-three chi-square test to determine the difference between the two variables, the number of professional development hours acquired, identified as low, medium, or high, and the type of teacher, core or special education. Results from question three indicate

no statistically significant difference between the role of the teacher and the number of RtI professional development hours. The majority of core content teachers reported receiving a low amount of professional development, 55%, while special education teachers reported the highest amount in the medium number of professional development hours category at 39%.

Discussion

This quantitative research study examined the elements of closing achievement gaps for struggling readers and any connections between student achievement, teacher efficacy, collective efficacy, and professional development hours. The research study analyzed the following questions:

1. What is the effect of the teacher's role, core versus non-core (special education/intervention specialist), on individual teacher self-efficacy scores in student engagement, instructional strategies, and classroom management while working with students receiving reading intervention?
2. To what extent do RtI professional development hours predict teacher collective efficacy scores while working with students receiving reading intervention?
3. Is there a significant difference between teacher role, core versus non-core (special education/intervention specialist), and RtI professional development hours identified as low, medium, and high?

Question one produced statistically insignificant results, resulting in the inability to reject the null hypothesis. Question two provided statistically significant results, resulting in the coefficient, number of professional development hours, having an impact on collective efficacy. Question three showed no significant difference between the teacher's role and RtI professional development hours.

Integration Into the Current Literature

A large body of research exists to support improving teacher self-efficacy, and collective efficacy can result in improved student academic achievement (Basma & Savage, 2017; Didion et al., 2019; Dixon et al., 2014; Horan & Merrigan, 2021; Prasse et al., 2012; Ross 2013; Valiandes & Neophytou, 2017; Xu, 2016). However, limited research focuses on the specific cost-to-benefit ratio of professional development for districts attempting to close achievement gaps for all students. Sawchuk (2010) described the complexities school districts encounter when measuring how much needs to be invested for professional development compared to the return on student achievement. Further, there is a lack of national data that tracks district spending on professional development. This lack of data is partly due to no clear definition of professional development. Many districts characterize activities as programming, creating one large category that includes multiple aspects of teaching. Gibson and Brooks (2012) presented further evidence to bring attention to school districts' complexities with providing professional development that closes student achievement gaps as targeted training provides challenges with uncertainties regarding what type of training works and what type of training does not.

Additionally, Helf and Cooke (2011) identified areas of concern related to reading specialists working with core content teachers and students receiving reading interventions. Districts have increased the number of reading specialists; however, their roles have yet to be clearly defined. Reading specialists spend more time working with students and less time supporting teachers with results that contradict the expenditures compared to student growth. While evidence supports improved teacher efficacy and collective efficacy can close reading achievement gaps, there are several issues surrounding how best to invest school dollars and allocate resources to maximize teaching and learning for all students.

The National Comprehensive Center for Teacher Quality (2010) identified areas for school districts to provide greater returns on financial investments made to close achievement gaps, focusing on time, the context of targeted training, resources needed, and the continuous measure of student achievement outcomes. Balta and Eryilmaz (2019) provided evidence for a cost-effective way to improve teaching and learning using teacher-led professional development as a means to increase student achievement. Additionally, Glover (2017) provided a coaching model to improve student achievement within the RtI framework of tiered intervention that focuses on the learning environment, instructional modeling for teachers, and a data-driven framework.

This study both agrees with and contradicts results from previous research. Further, it adds to the existing body of research that confirms a relationship regarding how teachers perceive their abilities at closing achievement, how teachers perceive their own school's ability collectively, and how the lack of or type of professional development plays a role in student achievement. Within this study that examined the previously mentioned concepts, the overall results show that while teachers reported high levels of efficacy and low levels of professional development, achievement gaps still exist between students for each of the six middle schools. Future work will require that core content and special education teachers, school administrators, and the district focus on the complexity of the variables that encompass closing achievement gaps.

Limitations

There are certain limitations to the validity of the present study. The study obtained samples of teachers from one large, suburban school district located in the Midwestern portion of the United States versus multiple school districts. The results from the study may not represent the state or the nation at large. The study was limited in focus to core content and special education teachers within the district's six middle schools for grades six through eight. Further, selection bias could be an area of concern as the research study was voluntary and limited to only teachers who met the criteria and accepted participation in the survey. Potential discrepancies related to survey accuracy could result from the survey being anonymous.

Moreover, the study sample size for this research is small compared to the total population of teachers within the district. While using a quantitative approach to this research study, the results must be generalizable and reliable. The goal is to extrapolate the relationship between variables in the study to the larger population (Delice, 2010; Henn, 2005).

The two survey instruments, the TSES and the CTB scale, are used frequently in research, validated, and provide subscale categories. TSES provides three categories: student engagement, instructional strategies, and classroom management. The CTB scale provides two categories: instructional strategies and student discipline (Tschannen-Moran & Hoy, 2001; Tschannen-Moran & Barr, 2004). While the subcategories for both surveys provide insight into teacher and collective efficacy, they do not cover all the aspects of teaching and learning, or the many hurdles teachers must overcome that combine to create a sense of self-efficacy and collective efficacy (Skaalvik & Skaalvik, 2007). This issue with efficacy being a multidimensional aspect of teaching is evident from the research by Zhou (2019), which describes another level of subcategories, respect and confidence from students and parents, preservice training, and field experience that combine to produce teacher efficacy.

Implications for Theory and Practice

Of the six middle schools, five showed significant achievement gaps based on state accountability achievement scores in math and reading, with a three out of five state star rating. Five of the middle schools are under the control of a Site-Based Decision Making (SBDM) Council and receive no Title I funding. One school showed no significant achievement gaps due to a school-wide low star rating of one out of five. Identified as a Title One School, this school has the label of needing comprehensive support and improvement measures provided by the state.

This study showed no statistically significant differences in perceived teacher self-efficacy between core content and special education teachers within the subcategories of student engagement, instructional strategies, and classroom management. Spear et al. (2018) initially found differences in the subcategories of elementary core content and special education teachers' beliefs, knowledge, and practice when using univariate analysis. However, when measured in a complex system of multiple types of beliefs, knowledge, and practice, the results indicated no difference in efficacy between the two populations. Sims (2018) found no statistically significant difference between core content and special education teachers in the subcategories of student engagement, instructional strategies, and classroom management using a mixed-method approach to the study. Future research should involve examining specific instructional strategies that focus specifically on literacy and language instructional practices related to differentiation and self-efficacy.

Results of RtI professional development hours predicting teacher collective efficacy scores showed mixed results. A negative relationship between core content teachers exists with increased professional development hours, resulting in decreased collective efficacy. Special education teachers demonstrated increased collective efficacy with increased professional development hours.

Prewett et al. (2012) studied the impact of RtI program implementation and training in 82 middle schools across the United States. Results showed the importance of professional development and fidelity of implementation of RtI programs. Each middle school identified closing achievement gaps as the school's main priority. While students showed success and improved reading and math scores within their prescribed RtI programs, this did not result in greater student achievement or the closure of achievement gaps.

Garet et al. (2008), focusing on professional development within teacher instructional practices over one school year, grouped teachers into a control group that received standard professional development, another group that received content-focused professional development, and a third group that received content-focused development using an instructional coach. Results showed no statistically significant difference in collective efficacy between the three teacher groups from 90 middle schools within six different school districts. Alternatively, Prewett et al. (2018) studied implementing an RtI program within one middle school with 725 students. Results showed academic growth for students in core content classes when the RtI program fidelity and training focused continuously on student monitoring and reevaluation at regular intervals. Roberts et al. (2013) supported these findings, indicating that students receiving effective RtI programs implemented correctly with appropriate teacher professional development outperformed students receiving no interventions. Further study regarding the extent to which RtI professional development hours predict collective teacher efficacy should examine the RtI programs implemented, the type and duration of professional development provided to core content and special education teachers, and the degree of RtI implementation fidelity.

Goddard et al. (2000) described collective teacher efficacy as "the perceptions of teachers in a school that the efforts of the faculty as a whole will have a positive effect on students" (p. 480). Sandoval et al. (2011) and Mosoge et al. (2018) presented evidence for a direct relationship between collective teacher efficacy and student achievement. Sandoval et al. (2011) described a direct connection between student achievement and collective teacher efficacy in exemplary schools, increasing student achievement related to high collective teacher efficacy. The opposite is true for low-performing schools with low student achievement related to lower collective teacher efficacy. Mosoge et al. (2018) provided similar results between high student achievement and high teacher collective efficacy compared to low student achievement and low teacher collective efficacy. Further research endeavors in collective teacher efficacy should examine student achievement variables related to collective teacher efficacy. Specifically, the relationship between students' closing achievement gaps and the impact on teachers' perceived confidence level that all students can succeed.

There was no statistically significant difference between the type of teacher, whether core content or special education, and the number of RtI professional development hours received for this study. The majority of core

content teachers reported low levels of RtI professional development, while special education teachers reported their highest level as medium hours of RtI professional development. Dixon et al. (2014) related the importance of teacher preparation programs providing more practical instruction for preservice teachers, focusing on differentiated instruction in the regular classroom. Prasse et al. (2012) provided insight into the lack of training for core content teachers, as less than 10 percent of teachers have obtained the necessary skills related to working within a multi-tiered classroom.

Horan and Merrigan (2021) described that teachers receiving more professional development hours working with students with special needs have a higher efficacy level than teachers receiving fewer hours. Ridgeway et al. (2012) provided similar results reaffirming the concept that successful RtI reading programs correlate with a high level of professional development and support. Ross (2013) explained that while there is a positive correlation between the number of professional development hours and improved academic achievement of ELL students, professional development has not kept up with the increase in the ELL population.

Hall and Mahoney (2013) reaffirmed the need to increase targeted, ongoing professional development for all teachers working with students receiving reading intervention as follows:

Professional development opportunities for all teachers, paraprofessionals, and administrators involved in the RtI process should first include facilitating the understanding of the data collection process, the data sources, and the data analysis necessary to meet the needs of struggling students. (p. 480)

Ridgeway et al. (2012) explained that successful RtI programs rely on the amount and quality of professional development for closing achievement gaps. A common theme that connects the previous research has implications for school leadership. It is within their charge to develop a culture and climate conducive to closing achievement gaps for all students. Further research into the number of professional development hours received for core content and special education teachers should focus on school leadership. Emphasis on the abilities of school administrators to provide professional development that improves collective teacher efficacy and targets closing achievement gaps for all students warrants further study.

Conclusion

For the last three decades, closing the achievement gaps for students in reading has been a priority for many school districts in the United States (Gardner et al., 1983). This study examined how teacher self-efficacy, collective efficacy, and professional development impact teaching and learning. Accordingly, no statically significant difference in teacher self-efficacy resulted between core content and special education teachers. The extent to which professional development predicts collective teacher efficacy showed mixed results, with a negative relationship between an increase in the number of professional development hours for core content teachers and a positive relationship with the number of professional development hours for special education teachers. There was no statistically significant difference between core content and special education teachers' numbers of professional development hours identified as low, medium, or high. Both categories of teachers showed an insufficient amount of training.

This study both agrees with and contradicts results from previous research. Further, it adds to the existing body of research that confirms a relationship regarding how teachers perceive their abilities at closing achievement, how teachers perceive their own school's ability collectively, and how the lack of or type of professional development plays a role in student achievement. Within this study that examined the previously mentioned concepts, the overall results show that while teachers reported high levels of efficacy and low levels of professional development, achievement gaps still exist between students for each of the six middle schools. Future work will require that core content and special education teachers, school administrators, and the district focus on the complexity of the variables that encompass closing achievement gaps.

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