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Self-Efficacy and Its Effect on Student Achievement in Reading and Math

Abstract

This action research study investigated the degree of relationship between elementary teachers' self-efficacy in math and reading and student achievement in math and reading in an elementary school in southeast South Dakota. The participants were 279 students in grades three through five along with 13 third through fifth grade teachers. Using NWEA Growth Map Test data, a comparison in student achievement in math and reading was made between students with highly self-efficacious teachers and students whose teachers reported low self-efficacy. The findings of this research did not show a significant difference between math or reading scores of students with teachers with high or low self-efficacy. Based on the low statistical significance, this study found no correlation between teacher self-efficacy and student math or reading scores.

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Self-Efficacy and Its Effect on Student Achievement in Reading and Math

by

Morgan Van Hulzen

B.A. Dordt College, 2017

Action Research Report
Submitted in Partial Fulfillment
of the Requirements for the
Degree of Master of Education

Department of Education
Dordt University
Sioux Center, Iowa
(May, 2020)

Self-Efficacy and Its Effect on Student Achievement in Reading and Math

by

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Abstract

This action research study investigated the degree of relationship between elementary teachers' self-efficacy in math and reading and student achievement in math and reading in an elementary school in southeast South Dakota. The participants were 279 students in grades three through five along with 13 third through fifth grade teachers. Using NWEA Growth Map Test data, a comparison in student achievement in math and reading was made between students with highly self-efficacious teachers and students whose teachers reported low self-efficacy. The findings of this research did not show a significant difference between math or reading scores of students with teachers with high or low self-efficacy. Based on the low statistical significance, this study found no correlation between teacher self-efficacy and student math or reading scores.

Keywords: Elementary Teachers' Self-Efficacy

According to the 2019 study by the National Assessment of Educational Progress, 59 percent of fourth graders across America are below the proficiency level in mathematics, while 66 percent of eighth graders are below proficient. In the area of reading, 65 percent of both fourth and eighth grade students are below the proficiency level. These results are shocking and beg to have the following question answered: What is the cause behind students scoring below proficiency level in both areas?

There are many predictors and factors of student achievement or lack thereof. Bertolini, Stremmel, and Thorngren (2012) studied Bronfenbrenner's Bio-ecological Model (1979) and found the following:

Student achievement is impacted on numerous levels including students' personal factors, their interactions with others such as parents, teachers, and administrators, and lastly the larger systems that surround the student e.g. school districts, neighborhoods, local economy, political policy, and multicultural relations. (p. 2)

While many factors regarding student achievement are related to the students themselves and the larger systems around them, there are also factors connecting the teachers to student achievement. Brophy (1986) suggested that teachers can impact student achievement through their instructional behaviors, their question asking, and their provided feedback.

Another predictor of student achievement is a teacher's perceived sense of self-efficacy (Coladarci & Breton, 1997). "Teacher self-efficacy is reflected by the teacher's confidence that he or she personally is capable of such instruction and that one possesses personal agency with respect to the task of pedagogy" (p. 230).

It is important to note that the effect of teachers on student achievement can not only impact a student's score positively but can also impact the scores negatively. Moore and

Esselman (1992) found that a high sense of teacher self-efficacy is often connected to students scoring higher on standardized tests of achievement. However, Anderson, Greene, and Loewen (1988) found lower achievement scores from students being taught by teachers with a low sense of self-efficacy.

Based on the numerous studies which showed the correlation between teacher self-efficacy and student achievement, further studies found ways to improve teacher self-efficacy (Alvarez-Nunez, 2012; Anderson, et al 1988; Ashton and Webb, 1986; Corkett, Hatt, & Benevides, 2011; Dembo & Gibson 1985; Gibson & Dembo, 1984; Muijs & Reynolds, 2015; Poggio, 2012). Watson (2006) found that teachers had improved levels of self-efficacy after summer workshops and intense online courses. Watson's research results indicated "teacher training has a long-term effect on teacher self-efficacy" (p. 163). Sehgal, Nambudiri, and Mishra (2017) also suggested that in order to improve teacher effectiveness and self-efficacy, schools "need to focus on enhancing self-efficacy of their teachers and give importance of teacher collaboration and principal leadership."

Purpose of the Study

The purpose of this study is to determine the degree of relationship between elementary teachers' self-efficacy in math and reading and student achievement in math and reading.

Research Questions

This study sought to address the following research questions to determine the relationship between teacher self-efficacy and student achievement in math and reading.

1. How does a teacher's self-efficacy in math affect elementary students' achievement in math?

2. How does a teacher's self-efficacy in reading affect elementary students' achievement in reading?

Definition of Terms

For the purpose of this study, the following definitions will be used. The definitions are the work of the researcher, unless otherwise noted.

NWEA MAP Growth Testing is “a computer adaptive test created by NWEA that kids take two to three times per school year. The results provide teachers with information to help them deliver appropriate content for each student and determine each student's academic growth over time” (NWEA, 2020).

RIT Score, or Rasch Unit scale, is a measurement scale used to measure student instructional growth (User, 2019).

Self-efficacy is “people's judgements of their capabilities to organize and execute courses of action required to attain designated types of performances. It is not concerned with the skills one has but with judgements of what one can do with whatever skills one possesses” (Bandura, 2002, p. 94).

Teacher Self-Efficacy Scales ask a variety of questions. “These questions are designed to elicit responses about the act of monitoring the interpretation and message transfer and explore whether interpreters believe they have an influence toward student outcomes and behavior” (O'Bleness, 2019, p. 4).

Literature Review

Student achievement is based on a wide variety of factors including the personal motivation (Wigfield & Cambria 2010), personal academic aptitude (Hailikari, Nevgi, & Komulainen, 2008), the classroom environment (Gilbert, Musu-Gillette, Woolley, Karabenick,

Strutchens, & Martin, 2014), and teacher effects (Sanders, Wright, & Horn, 1997). The results of the study done by Sanders, et al (1997) showed that “teachers do make a difference in student achievement” (p. 66). Further research completed by Bray-Clark and Bates (2003) found that “teacher efficacy is an important variable in teacher effectiveness that is consistently related to teacher behaviors and student outcomes” (p. 13). These researchers support the idea that teachers who have a high sense of self-efficacy can positively impact their students and their students’ achievement.

According to Bandura (2002), self-efficacy can be defined as “people’s judgements of their capabilities to organize and execute courses of action required to attain designated types of performances. It is not concerned with the skills one has but with judgements of what one can do with whatever skills one possesses” (p. 94). In addition to Bandura, Coladarci and Breton (1997) give a definition specific to teacher self-efficacy. “Teacher self-efficacy is reflected by the teacher’s confidence that he or she personally is capable of such instruction that one possesses personal agency with respect to the task of pedagogy” (p. 230).

Teacher self-efficacy as a factor in student achievement is largely based on Bandura’s social cognitive theory (1986). The study of teacher self-efficacy and its connection to student achievement had its beginnings more than two decades ago. RAND Education and Labor’s researchers evaluated “whether teachers believed they could control the reinforcement of their actions” (Tschannen-Moran, Hoy & Hoy, 1998, p. 202). RAND found evidence to prove that teacher self-efficacy was positively related to student achievement among minority students. In their study, students with teachers who believed they could significantly impact student motivation and achievement tended to have higher reading scores than students who had teachers who were unsure of their level of impact. “The results of the RAND studies sparked interest in

the construct of teachers' self-efficacy beliefs, and in the past three decades, researchers sought to expand and refine the notion of teacher self-efficacy and how it was measured" (Tschannen-Moran, Hoy & Hoy, 1998, p. 205).

Through many studies, (Alvarez-Nunez, 2012; Anderson, et al 1988; Ashton and Webb, 1986; Corkett, Hatt, & Benevides, 2011; Dembo & Gibson 1985; Gibson & Dembo, 1984; Muijs & Reynolds, 2015; Poggio, 2012), teacher efficacy proved itself to be an important factor in teacher effectiveness and student outcomes. Present day studies of teacher-self efficacy use the Teacher Efficacy Scale (TES) which is "historically the most frequently used instrument in the area" because it has "yielded the most variable reliability coefficients of all the instruments" (Henson, Kogan, & Vacha-Haase, 2000, p. 3).

Results of many studies show a relationship between teacher self-efficacy and student achievement. In 1986, Bandura found teacher efficacy to be tied to performance effectiveness in setting and attaining goals (Bandura, 1986). According to Moore and Esselman (1992), when measured using the RAND items, teacher self-efficacy was significantly related to student achievement. Additional evidence was found using the Gibson and Dembo (1984) instrument to assess teachers' personal beliefs. Students in grades two through five who had teachers with a greater sense of self-efficacy outperformed their peers in math on the Iowa Test of Basic Skills (Moore & Esselman, 1992). Many other studies found that a higher level of teacher self-efficacy, and therefore self-confidence, resulted in a higher level of student achievement (Alvarez-Nunez, 2012; Anderson, et al 1988; Ashton and Webb, 1986; Corkett, Hatt, & Benevides, 2011; Dembo & Gibson 1985; Gibson & Dembo, 1984; Muijs & Reynolds, 2015; Poggio, 2012). Statistically, Coladarci and Breton (1997) found that the correlations between teacher self-efficacy and student achievement tend to be modest, with correlations typically ranging between

+0.10 to +0.40. However, they did find it important to note that these findings are consistent across different researchers and their studies (Coladarci, 1986; Gibson & Dembo 1984).

Tschannen-Moran and Barr's study (2004) found many underlying factors for why teacher self-efficacy drives student achievement. Teachers who are high in self-efficacy have high levels of planning and organization, and create lessons using mastery-level instructional strategies which foster students' cognitive development. These teachers also set higher, more challenging goals for their students, dedicate more class time to academics, and make it a priority to assist students who need extra help. In addition, teachers who are highly efficacious set and hold high expectations for their students, have deep and meaningful relationships with their students, and consistently use best practices in instructional strategies. (Tschannen-Moran & Barr, 2004).

The aforementioned studies observed a variety of subjects and grade levels and the relationship between student achievement and teacher self-efficacy. Bandura (1977) provided research which proves that studies of this relationship must be divided into domain-specific studies. Similarly, Tschannen-Moran, Hoy and Hoy (1998) stated the following:

Teacher efficacy has been defined as both context and subject-matter specific. A teacher may feel very competent in one area of study or when working with one kind of student and feel less able in other subjects or with different students. While researchers and theorists agree that teacher efficacy is situation specific, it is less clear what is the appropriate level of specificity (p. 215).

Bandura, in two of his studies (1977 & 2005), researched the self-efficacy theory in domain-specific areas. Bandura originally addressed the concept in 1977, and stated the following in his 2005 study:

Although efficacy beliefs are multifaceted, social cognitive theory identifies several conditions under which they may co-vary even across distinct domains of functioning (Bandura, 1997). When different spheres of activity are governed by similar sub-skills there is some interdomain relation in perceived efficacy. Generic self-management strategies developed in one realm of activity are serviceable in other activity domains with resulting co-variation in perceived efficacy among them. (p. 308)

In this 2005 study, Bandura also highlighted the need to measure efficacy in specific context as “scales of perceived self-efficacy must be tailored to the particular domains of functioning that are the object of interest” (p. 307-308).

A 1986 study performed by Ashton and Webb found a correlation between general efficacy and mathematics achievement, and Moore and Esselman (1992) found that “mathematics achievement was found to differ at grades two and five based on levels of teaching efficacy” (p. 18). Based on their findings, Moore and Esselman stated that students who have self-efficacious teachers “achieve at a rate of approximately three months greater than those whose teachers sense less teaching efficacy” (p. 18).

Maguire (2011) studied students in grades 9-10 who were not meeting state standards in the southeastern United States. With Bandura’s social cognitive theory as the theoretical foundation, results indicated that high teacher efficacy had a significant impact on predicting student achievement in mathematics.

Both Gorena (2015) and Muijs and Reynolds (2015) found evidence of increased student math scores when the teachers had higher levels of self-efficacy. Gorena (2015) found that students taught by teachers with a medium self-efficacy score ($M = 58.6$, $SD = 14.41$) had

significantly lower percentages in math than those teachers with a high self-efficacy score ($M = 68.8$, $SD = 7.05$), $t(19) = -2.19$, $p < .05$, $d = 1.05$.

Muijs and Reynolds (2015) also completed a study of 16 male and female elementary and secondary teachers. This study observed “the possible influence of teachers’ self-concepts on how they perceive the nature of mathematics and their attitudes to teaching and learning mathematics” (p. 30). Results proved their hypothesis that teachers with high levels of efficacy were more motivated, creative, and inventive in their lesson planning and classroom teaching of mathematics. This led to an indirect 0.5 increase student achievement linked to the teachers’ levels of self-efficacy.

As for the correlation between teacher efficacy and student achievement in reading, a variety of researchers found similar results. For Watson (1991) a higher level of efficacy “was significantly related to higher reading scores in majority Black, majority White, and rural schools, while in urban schools there was a link between teacher efficacy and reading achievement. Armor et al. (1976) and Gibson and Dembo (1984) reached similar conclusions, finding that the greater the teacher’s sense of efficacy, the more students advanced in their reading achievement. Gibson and Dembo (1984) found a positive correlation of .42, while Armor et al. (1976) found a coefficient of .31. Corkett, et al (2011) examined students’ reading abilities which “revealed a significant positive correlation between the TSEQ reading score and the students’ Broad Reading Standard Score ($r = .178$, $p < 0.05$, adjusted $R^2 = .023$)” (p. 86).

Two decades later, Poggio (2012) completed a thorough study of the effects of teacher sense of self-efficacy and its connection to reading achievement in grades three through eight. Poggio used Tschannen-Moran and Johnson’s Teacher Sense of Efficacy for Literacy Instruction (TSELI) as measurement for this study. Poggio (2012) stated the following:

Teacher characteristics found to influence efficacy for literacy instruction included the length of a teacher's tenure in the profession and the highest level of education completed. Educators teaching more than ten years and those with graduate degrees had significantly higher levels of efficacy for literacy instruction. (p. 150)

Poggio (2012) found that efficacy was a significant predictor in student achievement in reading, with a one-point higher TSELI score associated to a .04 point increase in reading achievement for students. "The findings of this analysis show that there was a statistically significant relationship between teachers' sense of efficacy for literacy instruction and student achievement gains in reading" (p. 160).

Based on the findings for both reading and math achievement being tied to teacher self-efficacy, studies were done to find reasons for higher teacher self-efficacy. Klassen and Chiu's (2010) study examined the relationship between a teacher's years of experience, a teacher's characteristics, and the three areas of self-efficacy which include classroom management, student engagement, and instructional strategies. Klassen and Chiu (2010) stated that a "teacher's years of experience showed nonlinear relationships with all three self-efficacy factors, increasing from early career to mid-career and then falling afterwards" (p. ii).

According to Sehgal, Nambudiri, and Mishra (2017), "if schools want to improve the effectiveness of their teachers, they need to focus on enhancing self-efficacy of their teachers and give importance to teacher collaboration and principal leadership" (p. 512). Althaus (2015) also found a correlation between teacher self-efficacy and teacher commitment to professional development, while Yoo's (2016) findings showed that online professional development often increased a teacher's sense of self-efficacy. This study found statistically significant growth in all three areas of self-efficacy after completing the online professional development.

Further research completed by Bray-Clark and Bates (2003) showed that “schools with high performance professional development integrate key dimensions that support and reinforce skill development and efficacy beliefs” (p. 13). They stated that “the framework of professional development for teachers should include self-efficacy as a theoretically sound focus of training designs aimed at improving teacher competence and by extension improving student outcomes” (p. 13).

The research suggests that schools wanting to increase their student achievement levels should then hire teachers who are confident in their math and reading knowledge, which leads to a high sense of self-efficacy, and should then give those teachers opportunity for professional development focused on self-efficacy (Bray-Clark & Bates, 2003) and continued education (Yoo, 2016).

Methodology

Participants

The research participants were 279 students in grades three through five who attend a private school in the Midwest. Participants included 153 males, and 126 females, with a mean age of 10. The students come from mostly similar socio-economic backgrounds, and from mostly upper-class families.

The other group of research participants were 13 third through fifth grade teachers. All teachers are female, with a mean age of 38. All teachers come from similar schooling and socio-economic backgrounds.

The third-grade students are divided into five different classrooms with their respective teachers while the fourth and fifth graders are each divided into four classrooms. This allowed

for multiple views of teacher self-efficacy as it is connected to student achievement in each grade level.

Materials

The NWEA Growth Map Testing (NWEA, 2020) was the dependent variable in this study. The assessment is typically given on computers three times each year, in the fall, winter, and spring. For this study, only the fall and winter scores from the 2019-20 school year were used. This study also used a teacher survey in order to quantify teacher self-efficacy (See Appendix A). The survey was generalized in some questions, and specific to math and/or reading in others.

Research Design

This ex post facto study measured the correlation between teacher self-efficacy and student achievement in math and reading. The independent variable was the classroom teacher with which each student was placed in the fall. The dependent variable was the class's mean RIT score on the NWEA Map Growth test. The confounding variable was the students' prior knowledge.

Procedure

Before the study began, students in grade three through five took the NWEA Map Growth Test in the fall and winter of the 2019-20 school year. The assessment was given and monitored by a classroom teacher. In the beginning weeks of this study, the Teacher Self-Efficacy survey was sent out to teachers in grades three through five.

Data was collected from the fall and winter NWEA Map Test assessments. Students' growth and achievement scores were collected from the NWEA Map Growth database. The school principal and curriculum director gave permission for the researcher to use the data. The

Rasch Unit scale, or RIT, was used as the achievement scale in order to measure student achievement and growth over time.

Data was also collected from the third through fifth grade teachers using the Teacher Self-Efficacy Scale. Each teacher's scores for both math and reading were averaged, and the mean self-efficacy score for each subject was then compared to the class's mean RIT score for that subject.

Fall RIT scores were entered as the pretest, and winter RIT scores were entered as the posttest. The growth between the fall and winter testing scores was then used to make a comparison between highly self-efficacious teachers and their students' change in scores and low self-efficacious teachers and their students' change in scores. These comparisons were made for both math and reading mean RIT scores.

Results

Research Question One

The first research question asked the following: How does a teacher's self-efficacy in math affect elementary students' achievement in math? A quantitative analysis was conducted in which the independent variable was a teacher's levels of self-efficacy in math instruction. The dependent variable was a student's achievement scores in math. Fall RIT scores were entered as the pretest, and winter RIT scores were entered as the posttest. These scores are shown in table 1.

Table 1*NWEA Math Pre and Posttest Scores*

| Grade/Section | Pretest (Fall) Mean RIT | Posttest (Winter) Mean RIT |
|---------------|-------------------------|----------------------------|
| 3A | 198 | 203 |
| 3B | 196 | 202 |
| 3C | 202 | 205 |
| 3D | 195 | 201 |
| 3E | 199 | 203 |
| 4A | 205 | 212 |
| 4B | 207 | 213 |
| 4C | 207 | 213 |
| 4D | 206 | 211 |
| 5A | 215 | 221 |
| 5B | 217 | 222 |
| 5C | 219 | 223 |
| 5D | 219 | 223 |

Table 1 shows each classroom, labeled by their grade and section, followed by that classroom's mean RIT scores for the fall pretest and the winter posttest.

After examining the above data, the difference between the RIT scores was found, and the teachers' self-efficacy scores were calculated from the Teacher Self-Efficacy Survey. The data for the teachers' mean score and the difference in mean RIT scores between fall and winter is shown in Table 2.

Table 2*Teacher Self-Efficacy and the Difference in Math Testing Mean RIT*

| Grade/Section | Teacher Self-Efficacy | Difference in Mean RIT Scores from Fall to Winter |
|---------------|-----------------------|---|
| 3A | 3.9 | 5 |
| 3B | 3.7 | 6 |
| 3C | 2.9 | 3 |
| 3D | 4.0 | 6 |
| 3E | 4.0 | 4 |
| 4A | 2.9 | 7 |
| 4B | 3.7 | 6 |
| 4C | 3.7 | 6 |
| 4D | 3.1 | 5 |
| 5A | 3.9 | 6 |
| 5B | 3.4 | 5 |
| 5C | 3.7 | 4 |
| 5D | 3.1 | 4 |

This data was then used to run a correlation and regression test to see if there was any significant correlation between the level of a teacher's math self-efficacy and the growth in their class's mean RIT on the NWEA Math test. The data is shown in Figure 1.

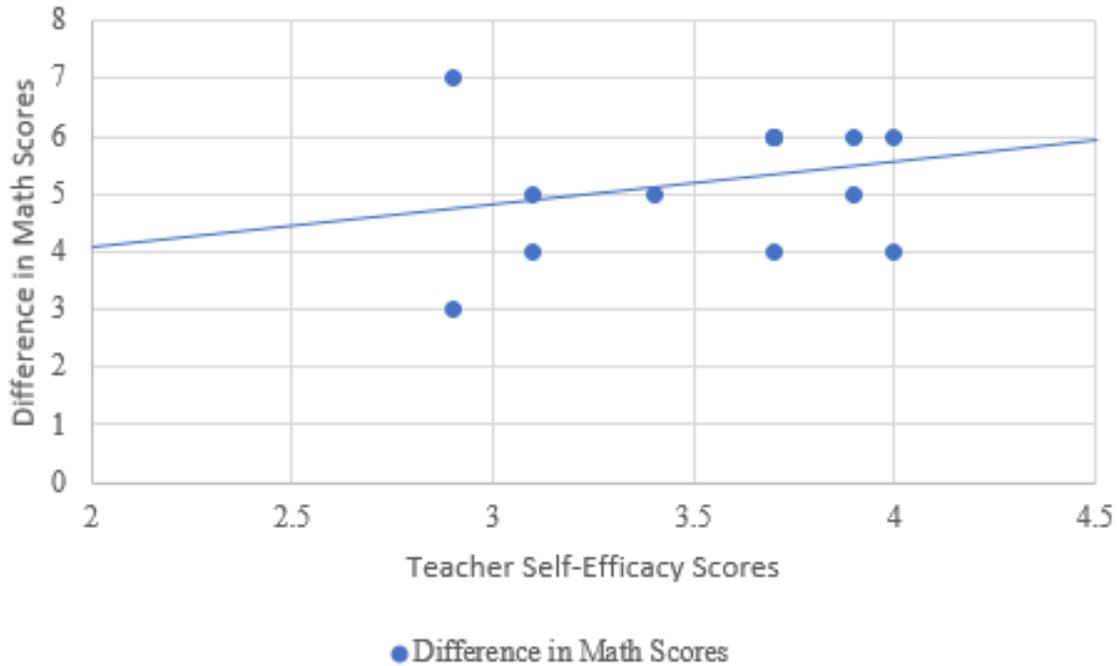
Figure 1*Correlation and Regression**Test Results for Math*

Figure 1 shows seven classes scoring above the regression line and six scoring below. While some scores fall fairly close to the regression line, there are also a few outliers. For example, a teacher with a mean self-efficacy score of 2.9 had a difference in NWEA RIT Math scores of 7, which is higher than any other class.

A correlation and regression test was run and the R^2 was observed because the R^2 measures the amount of variation explained by the explanatory variable which, in this case, was the teacher's level of self-efficacy as defined by the Teacher Self Efficacy Survey. Further results of that test are shown in Table 3.

Table 3*Continued Data from the Math Correlation and Regression Test*

| Subject | Number of classes above the regression line | Number of classes below the regression line | R² Output | Shuffled R² | Mean | Standard Deviation | shuffles greater than R² out of 10,000 |
|----------------|--|--|-----------------------------|-------------------------------|-------------|---------------------------|--|
| Math | 7 | 6 | 4.00% | 0.70% | 8.256 | 10.353 | 4970/10000 |

The R² output of 4.00% indicates a low statistical significance between a teacher's self-efficacy mean score and their class's mean RIT scores on a standardized test. Based on the low statistical significance, this study found no correlation between teacher self-efficacy and student math scores.

Research Question Two

The second research question asked by the researcher was the following: How does a teacher's self-efficacy in reading affect elementary students' achievement in reading? A quantitative analysis was conducted in which the independent variable was a teacher's levels of self-efficacy in reading instruction. The dependent variable was a student's achievement scores in reading. Fall RIT scores were entered as the pretest, and winter RIT scores were entered as the posttest. These scores are shown in Table 4.

Table 4*NWEA Reading Pre and Posttest Scores*

| Grade/Section | Pretest (Fall) Mean RIT | Posttest (Winter) Mean RIT |
|---------------|-------------------------|----------------------------|
| 3A | 199 | 201 |
| 3B | 196 | 203 |
| 3C | 203 | 208 |
| 3D | 197 | 200 |
| 3E | 202 | 206 |
| 4A | 203 | 209 |
| 4B | 204 | 208 |
| 4C | 205 | 207 |
| 4D | 202 | 205 |
| 5A | 214 | 213 |
| 5B | 210 | 215 |
| 5C | 214 | 215 |
| 5D | 215 | 218 |

Table 4 shows each classroom, labeled by their grade and section, followed by that classroom's mean RIT scores for the fall pretest and the winter posttest.

After examining the above data, the difference between the RIT scores was found, and the teachers' self-efficacy scores were calculated from the Teacher Self-Efficacy Survey. The data for the teachers' mean score and the difference in mean RIT scores between fall and winter is shown in Table 5.

Table 5*Teacher Self-Efficacy and the Difference in Reading Testing Mean RIT*

| Grade/Section | Teacher Self-Efficacy | Difference in Mean RIT Scores from Fall to Winter |
|---------------|-----------------------|---|
| 3A | 3.9 | 2 |
| 3B | 3.4 | 7 |
| 3C | 2.7 | 5 |
| 3D | 4.0 | 3 |
| 3E | 4.0 | 4 |
| 4A | 2.9 | 6 |
| 4B | 3.1 | 4 |
| 4C | 2.6 | 2 |
| 4D | 3.0 | 3 |
| 5A | 3.3 | -1 |
| 5B | 3.1 | 5 |
| 5C | 3.7 | 1 |
| 5D | 4.0 | 3 |

This data was then used to run a correlation and regression test to see if there was any significant correlation between the level of a teacher's reading self-efficacy and the growth in their class's mean RIT on the NWEA Reading test. The data is shown in Figure 2.

Figure 2

Correlation and Regression Test Results for Reading



Figure 2 shows eight classes scoring above the regression line and five scoring below. While some scores fall fairly close to the regression line, there are also a few outliers. For example, a teacher with a mean self-efficacy score of 3.4 had a difference in NWEA RIT Reading scores of 7, which is higher than any other class.

A correlation and regression test was run and the R^2 was observed because the R^2 measures the amount of variation explained by the explanatory variable which, in this case, was the teacher's level of self-efficacy as defined by the Teacher Self Efficacy Survey. Further results of that test are shown in Table 6.

Table 6*Continued Data from the Reading Correlation and Regression Test*

| Subject | Number of classes above the regression line | Number of classes below the regression line | R² Output | Shuffled R² | Mean | Standard Deviation | shuffles greater than R² out of 10,000 |
|----------------|--|--|-----------------------------|-------------------------------|-------------|---------------------------|--|
| Reading | 8 | 5 | 4.90% | 3.60% | 8.331 | 10.402 | 4664/10000 |

The R² output of 4.90% indicates a low statistical significance between a teacher's self-efficacy mean score and their class's mean RIT scores on a standardized test. Based on the low statistical significance, this study found no correlation between teacher self-efficacy and student reading scores.

Discussion

Overview of the Study

Students need reading and math instruction that will help them to grow as learners and as citizens in society. This study was designed to answer two questions: How does a teacher's self-efficacy in math affect elementary students' achievement in math? How does a teacher's self-efficacy in reading affect elementary students' achievement in reading? A teacher's level of self-confidence in teaching any given subject, also known as their level of self-efficacy, has often been observed as a possible cause for an increase in student scores in math and reading. Due to the increase in scores found in other studies of teacher self-efficacy and student achievement, such as Moore and Esselman (1992), Gorena (2015), Gibson and Dembo (1984) and Poggio (2012), this study looked at the impact of a teacher's level of self-efficacy in math and reading and the effect those levels had on student academic achievement in the general education setting.

Previous research by Moore and Esselman (1992) and Gorena (2015) had shown high levels of teacher self-efficacy led to increased math scores for students. Other previous research completed by Gibson and Dembo (1984) and Poggio (2012) had shown high levels of teacher self-efficacy led to increased reading scores for students. Because other studies showed a positive correlation, it was worthy of this study's investigation.

Summary of Findings

The growth scores of 13 third, fourth, and fifth grade classes were documented and compared to the average self-efficacy scores of their individual teachers. The findings did not show a significant difference in the reading or math achievement of students taught by teachers with high or low self-efficacy scores. Based on the low statistical significance found in both math and reading, this study found no correlation between teacher self-efficacy and student math or reading scores.

Limitations

This researcher took great care in planning and implementing this action research, however, there are factors which could have affected the findings of the study. The first factor was the limited sample size. A larger sample size including more classrooms, grade levels, and schools may have been beneficial. Another limiting factor was the fact that this study was completed in a school attended by a majority of children from upper-class families. By including a more diverse student population as found in the local public school classrooms in the study, the data may have been different. The experience level of the teachers was another limiting factor of this study. While experience plays a role in a teacher's level of self-efficacy, the level of experience of each teacher involved in the study was not noted or examined. A final limiting factor of this study was the data collection times. Collecting multiple years of data and

comparing fall to spring scores would be more beneficial than observing only one year of fall and winter data as this would allow a longer period of time for growth.

Recommendations

There is a need for more research investigating the implications of increasing teacher self-efficacy and the possible correlation with increased student scores in math and reading. While this specific study did not show a significant difference in student math or reading scores based on their teacher's level of confidence, high levels of teacher self-efficacy have been found to be correlated with significant growth in student scores.

The previous studies completed by Moore and Esselman (1992), Gorena (2015), Gibson and Dembo (1984), and Poggio (2012) had shown high levels of teacher self-efficacy led to increased reading scores for students. All four of these studies had much larger sample populations. Therefore, this researcher recommends having a larger sample size of students in each study. The previous studies also used different standardized tests to collect data. Therefore, this researcher recommends more data be gathered from a uniform standardized test so that results can be pooled together and completed over an extended period of time.

This researcher, along with Yoo (2016), recommends more online or in person professional development opportunities for staff. General and special education teachers would benefit from the trainings. More opportunities for professional development, teacher collaboration, and principal leadership would all be beneficial in increasing a teacher's self-efficacy. Specifically, according to Bray-Clark and Bates (2003), the professional development should focus on increasing a teacher's self-efficacy in math and reading concepts and educational techniques. Teachers could then take their new and refreshed knowledge of the

concepts and educational techniques into their classrooms with a higher level of self-efficacy which, in turn, could lead to an increase in student achievement in many subjects.

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APPENDIX A

Teacher Self-Efficacy Survey

What is your gender?

- Male
 Female

What is your racial identity?

- African American
 Hispanic
 White
 Other

What level do you teach?

- Elementary
 Middle
 High

What grade level(s) do you teach?

- 3rd
 4th
 5th

What subjects do you teach? Check all that apply.

- All (Elementary, self-contained)
 Math
 Science
 Language Arts
 Social Studies

What is the context of your school?

- Urban
 Suburban
 Rural

What is the approximate portion of students who receive free and reduced lunch at your school?

- 0-25%
 26-50%
 51-75%
 76-100%

How many years have you been teaching?

- _____

Directions: For the following questions, please indicate your opinion about each of the questions below by circling any number 1-4 on the continuum. Please respond to each of the questions by considering the combination of your current ability, resources, and opportunity to do each of the following in your present position.

This questionnaire is designed to get a picture of a given teacher's level of self-efficacy. Your answers are both anonymous and confidential.

Response format: (1) not at all true, (2) barely true, (3) moderately true, (4) exactly true

| | | | | |
|---|---|---|---|---|
| 1. I am convinced that I am able to successfully teach all math content to even the most difficult students. | 1 | 2 | 3 | 4 |
| 2. I am convinced that I am able to successfully teach all reading content to even the most difficult students. | 1 | 2 | 3 | 4 |
| 3. I know that I can maintain a positive relationship with parents even when tensions arise. | 1 | 2 | 3 | 4 |
| 4. When I try really hard, I am able to reach even the most difficult math students. | 1 | 2 | 3 | 4 |
| 5. When I try really hard, I am able to reach even the most difficult reading students. | 1 | 2 | 3 | 4 |
| 6. I am convinced that, as time goes by, I will continue to become more and more capable of helping to address my students' math needs. | 1 | 2 | 3 | 4 |
| 7. I am convinced that, as time goes by, I will continue to become more and more capable of helping to address my students' reading needs. | 1 | 2 | 3 | 4 |
| 8. Even if I get disrupted while teaching, I am confident that I can maintain my composure and continue to teach well. | 1 | 2 | 3 | 4 |
| 9. I am confident in my ability to be responsive to my students' needs even if I am having a bad day. | 1 | 2 | 3 | 4 |
| 10. If I try hard enough, I know that I can exert a positive influence on both the personal and academic development of my students. | 1 | 2 | 3 | 4 |
| 11. I know that I can motivate my students to participate in innovative projects. | 1 | 2 | 3 | 4 |
| 12. I know that I can carry out innovative projects even when I am opposed by skeptical colleagues. | 1 | 2 | 3 | 4 |

| | | | | |
|--|---|---|---|---|
| 13. I can motivate students who show low interest in math . | 1 | 2 | 3 | 4 |
| 14. I can motivate students who show low interest in reading . | 1 | 2 | 3 | 4 |
| 15. I play an important role in helping my students value learning. | 1 | 2 | 3 | 4 |
| 16. I can craft good questions for my students. | 1 | 2 | 3 | 4 |
| 17. I play an important role in how much my students value their homework. | 1 | 2 | 3 | 4 |
| 18. I can use a variety of instructional strategies when teaching math . | 1 | 2 | 3 | 4 |
| 19. I can use a variety of instructional strategies when teaching reading . | 1 | 2 | 3 | 4 |
| 20. I can provide an alternative explanation or example when students are confused during a math lesson. | 1 | 2 | 3 | 4 |
| 21. I can provide an alternative explanation or example when students are confused during a reading lesson. | 1 | 2 | 3 | 4 |
| 22. I can assist families in helping their children do well in school. | 1 | 2 | 3 | 4 |
| 23. I can implement alternative teaching strategies in my math instruction. | 1 | 2 | 3 | 4 |
| 24. I can implement alternative teaching strategies in my reading instruction. | 1 | 2 | 3 | 4 |