

2014

THE EXPERIENCE OF RESEARCH, GROWTH, DEVELOPMENT AND LEADERSHIP OF THE MiTEP PROGRAM

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Recommended Citation

Bryant-Kuiphoff, Yonee E., "THE EXPERIENCE OF RESEARCH, GROWTH, DEVELOPMENT AND LEADERSHIP OF THE MiTEP PROGRAM", Master's report, Michigan Technological University, 2014.
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THE EXPERIENCE OF RESEARCH, GROWTH, DEVELOPMENT AND
LEADERSHIP OF THE MiTEP PROGRAM

By

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A REPORT

Submitted in partial fulfillment of the requirements for the Degree of

MASTER OF SCIENCE

In Applied Science Education

MICHIGAN TECHNOLOGICAL UNIVERSITY

2014

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This report has been approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE in Applied Science Education.

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PREFACE

As part of the Collaborative Action Research Project, I contributed in several ways:

Planning and Discussion

During the initial stages of this project, I was involved in the planning and design of how we could possibly use this research to develop a strategy to remove 2 of the 3 schools involved from being a Priority school, and to keep the 3rd from becoming a Priority school based on MEAP data. I also participated in the discussion of the types of articles that would be used in the assessment, as well as the methods of collecting and analyzing the data. It was decided that using a summarization strategy that we all were trained in because of our professional development in Kalamazoo Public Schools. We used a rubric scoring system that was developed and being used already at Milwood Magnet.

Conducting Research

Over a time period of 10 weeks, from October to December, I used the instructional strategies agreed on by my partners to collect data on my students ability to identify the Main Idea and 2 to 3 supporting details in expository articles chosen by the group. I introduced and taught the strategies of DRTA and SQ3R and practiced with my students using the John Collins format of 10% summary, which is identifying the main idea and supporting details in a very concise writing format. The same article was used for pre & post data assessment to account for reading level. Various articles were used during the study to allow for different student ability levels.

Data Analysis & Conclusion

After I accumulated my pre and post test data, I organized my data and entered it into the Excel table set up by one of my partners. We then met as a group to make our final calculations and conclusions and write the final part of the paper. By using my data and that of my partners, I was able to conclude that using DRTA and SQ3R did have an overall impact on students ability to extrapolate the Main Idea and supporting details from selected expository texts.

Acknowledgements

My husband and children – for always having my back, especially when I have deadlines.

My mother – who loved me and pushed me – even from Heaven.

My heavenly Father – without Him – none of this would be possible.

ABSTRACT:

Chapter 1. The Action Research in this report was to focus on improving the reading comprehension of students with expository text in relation to identifying the main idea and supporting details. Students were given an expository text to read and identify main idea and 2 -3 supporting details as a pre assessment. Students were provided instruction and support in DRTA (Directed Reading Thinking Activity) and SQ3R (Survey, Question, Read, Recite, Review) methodology to identify the Main Idea and supporting details of a selected expository text for both pre & post test. Results were compiled and analyzed on the effectiveness of the strategies by overall student growth in accurately identifying the Main Idea and being able to state at least 2 supporting details. Analysis of the data will show that the methods were effective in middle school students ability to read and extrapolate the necessary information from expository text.

Chapter 2 is a reflective essay on the MiTEP)Michigan Teacher Excellence Program and its impact on my teaching practices, lesson delivery and leadership development.

INTRODUCTION

The focus of the study was to raise MEAP (Michigan Educational Assessment Program) scores to be able to remove Milwood Magnet and Decatur Middle Schools from PLA (Persistent Low Achieving) status. Even though I teach at Linden Grove now, I taught at Milwood for 19 years and we have the same student base. If these methods were successful, Milwood and Decatur Middle could emerge from PLA status and Linden Grove could use this strategy to prevent becoming a PLA school.

Because we have the same student base (Kalamazoo and Decatur are high poverty districts) we have similar problems with reading and writing comprehension. I had worked on other writing and comprehension strategies at Linden Grove, while my coauthors worked on SQ3R strategies to improve reading and comprehending nonfiction text at their respective locations.

My coauthors received formal training on SQ3R – Scan, Question, Read, Recite, Review. Their literacy consultant spoke with them about using DRTA (Directed Reading Thinking Activity), first, then using SQ3R to develop literacy and writing strategies to determine if students were comprehending nonfiction, expository text. I'm sure I had been taught SQ3R techniques while working on my teaching certification in Language Arts twenty years ago, because many of the things we talked about were familiar, but it was probably called another name then. DRTA was a new concept to me, so during our many meetings to organize and put everything in place to implement, we all watched an online video and discussed plans, techniques, rubrics and articles to use for the best fidelity scores.

Our research question: “If students were taught to use DRTA in connection with SQ3R, would they demonstrate higher levels of expository text comprehension?” We used 7th and 8th grade students from one of each of our classes to focus on these two techniques. I worked with eighteen 8th grade students that had a reading comprehension range of 2nd to 5th grade level. SQ3R techniques are ranged for about the 4th grade level, but the lexical level of some of

the expository texts used were 5th and 6th grade, so some of the articles used were above the students' range of comprehension. I was able to observe and document the frustration some students experienced and the way they implemented SQ3R and DRTA, and contrast it with the way they would either refuse and shutdown or write something totally off topic before being taught these methods. Overall, my students were able to at least identify the main idea of a given text, but still experienced difficulty with supporting details in the higher lexical texts. Although students with high absenteeism experienced less improvement, they did experience success with no loss as they were taught and modeled SQ3R and DRTA methods of attacking a text.

Using SQ3R and DRTA to Improve Student Comprehension of Expository Text

Bryant-Kuiphoff, Yonee; Ernstes, Joshua; Kahler, Dawn

Motivation for the study

The motivation to do this study on improving reading comprehension came as the result of being labeled a PLA (Persistently Low Achieving) school over the last four years by the State of Michigan. Our school, Milwood Magnet School, had written a grant to the state government to acquire money to help bring us out of this status and to fund the mandates set upon us by the state. One of the grant proposals stated that our students would be working on improving their thinking skills by successfully writing summaries. The school focus had been to practice teaching varying summarization strategies for approximately the last two years. Then, each marking period, we would give a school-wide formal summarization assessment to demonstrate student growth. Within KPS (Kalamazoo Public Schools) there were several strategies for summarization of expository text being utilized. As a group we decided to focus our research on these strategies.

The Milwood Science department then decided to take on the reading strategy of SQ3R to help improve students' performance on reading nonfiction text for the fall 2013 MEAP assessment. Dawn had been observed teaching this strategy to students in a lesson by a consultant. The consultant came and spoke to her about the idea of including DRTA and then going into SQ3R. Both agreed that the DRTA offers students a way of tackling text that would open up pathways

into the brain to help improve the comprehension of expository text. The consultant was looking to do action research on the idea for a professor at Wayne State University.

The consultant then led a meeting with the Milwood School Improvement team on the writing process that the school would be working on. The group discussion came to the idea that we as a staff were really trying to ascertain if our students are comprehending nonfiction text by teaching summarization strategies. This is where the light bulb went on for us and what to do our action research on along with some of our teacher evaluations for the year. This is where we came together to work on the action research project.

The school consultant was highly interested in our results. The research we were going to conduct would help him to decide if his action research was worth pursuing. Each of our schools and our departments then would be motivated to know more and teach reading in this fashion if we achieved good results. This would also trickle to our administrators and possibly district-wide.

Research question

Our research question was, “If students were taught to use DRTA in connection with SQ3R, would they demonstrate higher levels of expository text comprehension?”

Readings about the study

First we spoke with the consultant about teaching DRTA, Directed Reading Thinking Activity. Likewise one of us had been to a summer workshop

on how to use DRTA. We then found an online source that more fully explained how to use DRTA in teaching.

Often, we used each other for information also. The different strategies to teach summarization was taught to the Milwood staff by two consultants for the school and our literacy coach. They taught us how to successfully and identically grade student summarizations. Our coach also provided us with one of her rubrics to score the summarization.

Our group then met and discussed how to use SQ3R to help students think about the text before, during and after reading. Then we would find age appropriate reading articles from Science News for Kids in order to have students reading at a middle school grade level and consistently across the practice summarizations along with the pre and post summarizations.

Reading our class text, Improving Teaching with Collaborative Action Research (Cunningham, 2011), also helped us to be sure how to use the process of action research to get accurate and honest results.

Research plan for the study

As a group we met and decided to use the same basic process we had been using for the summarization strategies assessments at Milwood Magnet. Students from all three middle schools (Milwood Magnet School and Linden Grove Middle School in Kalamazoo Public Schools and Decatur Middle School) participated in the project. The students included in the research were seventh and eighth grade students. We felt that by using all three schools we could get a larger data pool as well as a more diverse population that could lead to greater discussion and

possible further ideas to research. The ability to compare the results of a more urban, larger district to that of a smaller district was one we felt could lead to some very interesting data as we will discuss later in our analysis.

The plan is to have students read a piece of expository text and write a summary focusing on the main idea and supporting details. A copy of the rubric that is used to assess students is included in the appendix. At all three schools John Collins writing (Collins, 2007) is also a part of our school improvement plans so we simply incorporated this summary as a type III writing. A copy of this sheet that students used is also included in the appendix as well.

For the upcoming weeks we introduced and implicitly taught and modeled reading expository text using DRTA and SQ3R. As we worked through our curriculum we found places to have students use their expository text to complete different activities coupled with the DRTA and SQ3R such as Cornell notes, 10% summary activities, sum it up writings, text rendering activities, etc. Through the use of these strategies we monitored our student's progress as to comprehend and write a summary on expository text that correctly identified the main idea and at least two supporting details.

We continued to work weekly with our students for approximately ten weeks. At the end of the ten weeks we used the first article again and asked students to read and write a summary of the article. We then constructed a Microsoft Excel spreadsheet to compare the student's pre and post assessment summarizations in both areas; main idea and supporting details. We can then analyze the overall

growth of our students in these areas using the spreadsheet. We may then complete a t-test and find the effective size of our efforts.

Analysis and interpretation

Bryant-Kuiphoff Data Analysis

In looking at my data, using SQ3R and DRTA did have an impact on my students ability to identify the Main Idea (M.I.) and Supporting Details (S.D.). Of the 18 students tested, 14 students showed growth in identifying the Main Idea, while 4 stayed the same and 0 students lost. Supporting details, 7 students showed growth, while 6 maintained, and 5 lost growth.

The p score was calculated and found a value of .0001 for Main Idea. & .253 for Supporting Details, which rejects the null hypothesis and indicates that there was a teaching impact upon the students ability to identify these two areas.

Cohens score (1.53 M.I. & .394 S.D.) Indicates that teaching SQ3R did have an effect on the students' ability to identify the Main Idea as well as Supporting Details to a lesser but still measurable effect.

The high effect for Main Idea (1.53) could be attributed to multiple teachers concurrently using similar strategies at Linden Grove while this research was being conducted. And the low effect of effectiveness on Supporting Details (.394) could be attributed to the cognitive development of students. Many of the students included in this study were at the 2nd to 3rd grade reading developmental level. Identifying Supporting Details is a 4th grade cognitive ability. Although many students could identify at least 1 supporting detail in their own words, they could not identify 2 or more as required according to the parameters of the study.

Table 1: Bryant-Kuiphoff Pre and Post Assessment Scores

Stud. #	Pre-Assessment		Post Assessment			
	Main Idea	Supporting Detail	Main Idea	Change	Supporting Detail	Change
1	1	3	3	2	2	-1
2	2	1	4	2	1	0
3	3	2	4	1	1	-1
4	2	1	4	2	2	1
5	1	3	3	2	2	-1
6	1	1	4	3	2	1
7	3	2	4	1	1	-1
8	0	0	3	3	3	3
9	3	1	4	1	1	0
10	3	1	3	0	1	0
11	3	3	3	0	1	-2
12	0	1	4	4	1	0
13	3	3	4	1	4	1
14	2	2	3	1	2	0
15	1	2	1	0	2	0
16	3	2	4	1	4	2
17	0	0	3	3	3	3
18	3	1	3	0	3	2

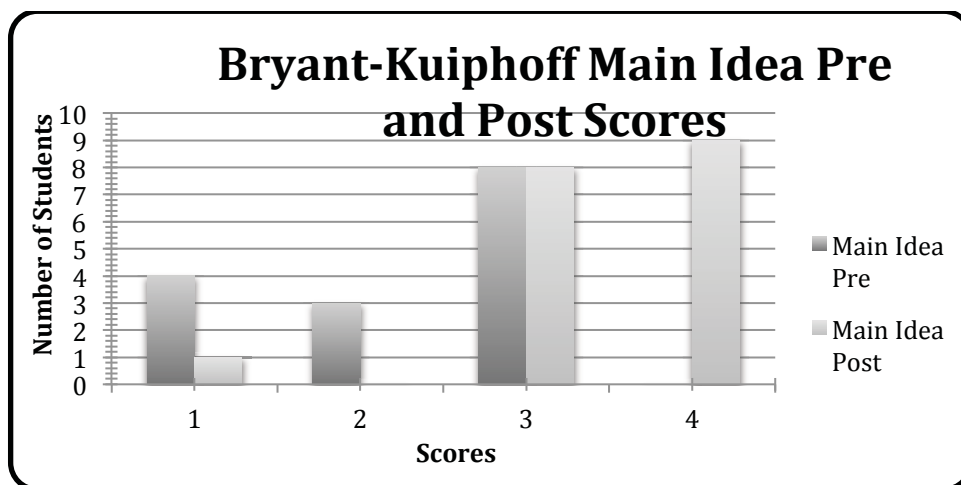


Figure 1: Bryant-Kuiphoff Main Idea Pre and Post Scores

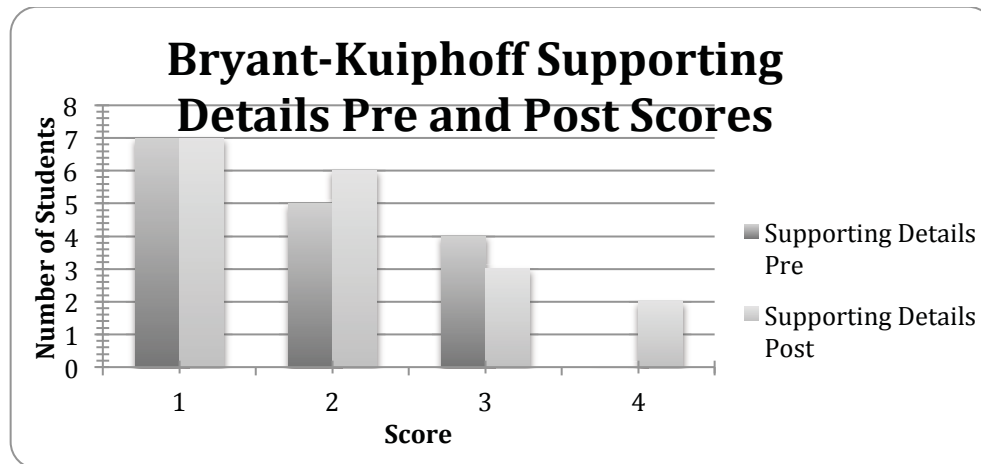


Figure 2: Bryant-Kuiphoff Supporting Details Pre and Post Scores

Ernstes Data Analysis

According to Table 2 showing the scores of the 16 students in my class all but four students showed at least one level's worth of improvement when identifying the main idea of the text. Three students did not show growth, but maintained their current level between the pre and post assessment while one student shows a negative growth dropping one level on the rubric. As for identifying the supporting details only half (8 of the 16) showed growth while the other eight students maintained their current level between the pre and post assessments.

After completing the pre and post assessment I completed a t-test for both the main idea and supporting details sections of the project. When looking at the main idea pre and post assessment sections a p value of 0.006 was found. I also calculated the p value for the supporting details part which was found to be 0.01.

In these cases it was shown that implicitly teaching and modeling the SQ3R method was significant to a 0.01 level or lower.

Now knowing that my data is valid and that what I as a teacher was doing had an impact on my student's learning I calculated my effect size using Cohen's Coefficient. For the main idea it was calculated that I had a high level of effect at 0.87 while for the supporting details a medium effect was obtained at 0.74. In both cases the teaching, modeling and use of SQ3R as a tool to read and comprehend expository text is valid and having a strong impact on student learning.

Table 2: Ernestes Pre and Post Assessment Scores

Stud. #	Pre-Assessment		Post Assessment			
	Main Idea	Supporting Detail	Main Idea	Change	Supporting Detail	Change
19	1	1	2	1	2	1
20	2	1	3	1	3	2
21	2	1	2	0	2	1
22	2	2	3	1	2	0
23	1	1	2	1	1	0
24	2	1	1	-1	1	0
25	1	1	2	1	2	1
26	2	2	3	1	3	1
27	1	1	2	1	1	0
28	3	2	4	1	3	1
29	2	1	2	0	1	0
30	2	2	2	0	2	0
31	2	1	3	1	2	1
32	1	1	2	1	1	0
33	2	2	3	1	2	0
34	2	1	3	1	2	1

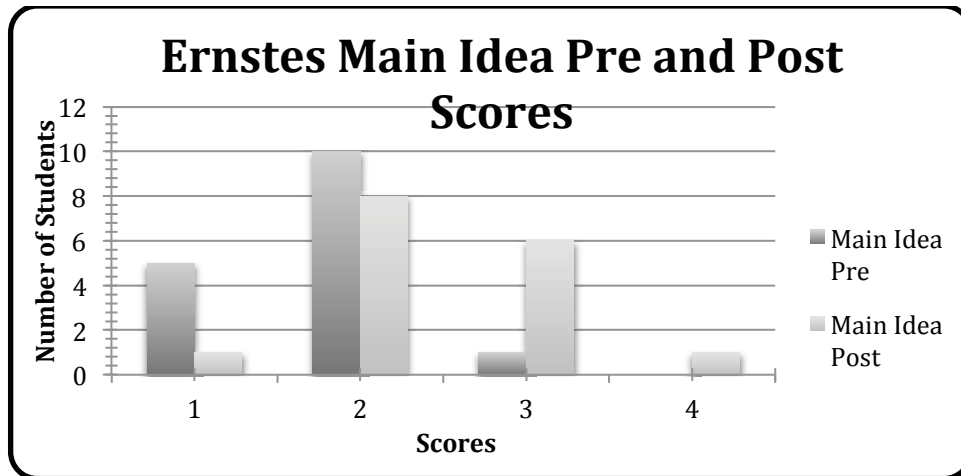


Figure 3: Ernstes Main Idea Pre and Post Scores

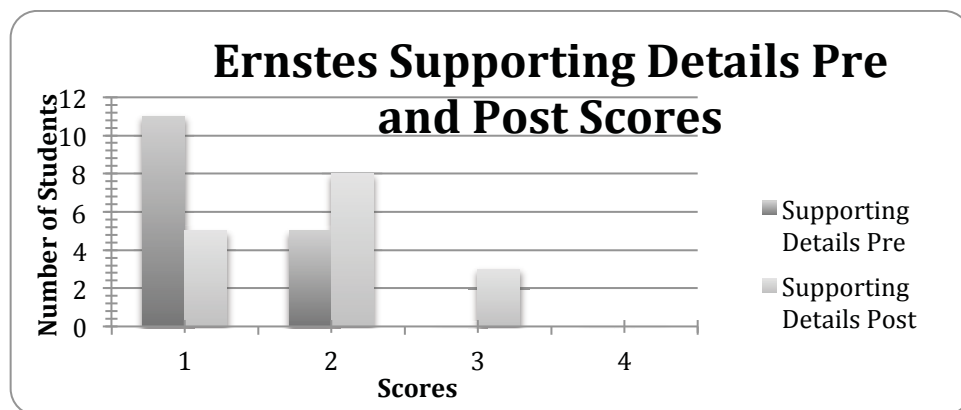


Figure 4: Ernstes Supporting Details Pre and Post Scores

Kahler Data Analysis

When looking at the data for finding the main idea, 11 students showed growth in choosing the main idea for the article. Three students showed a loss of growth. Ten students showed no growth. The data table for supporting details

shows that 12 students showed growth in finding supporting details. No students showed a loss of growth and twelve students maintained.

The p score for main idea shows that for the main idea score of 0.07 means that teaching SQ3R and DRTA did not make a significant difference for student scores to improve. The supporting detail score of 0 .0007 does demonstrate a significant effect by using this strategy. When looking at the overall composite score for the main idea and the supporting detail, there are high effect scores (See Table 4: Overview of Results).

I then used Cohen's d, to determine the effect of what I taught was a medium effect for the main idea since the score was 0.50. The effect for supporting detail was 0.81, so it was a high effect. This helped me to determine that the use of DRTA used in correlation with SQ3R had a positive impact on student comprehension of expository text.

Table 3: Kahler Pre and Post Assessment Scores

Stud. #	Pre-Assessment		Post Assessment			
	Main Idea	Supporting Detail	Main Idea	Change	Supporting Detail	Change
35	2	1	3	1	2	1
36	2	1	1	-1	1	0
37	2	1	2	0	2	1
38	1	1	2	1	2	1
39	1	1	1	0	1	0
40	3	2	3	0	2	0
41	1	1	1	0	1	0
42	2	1	2	0	1	0
43	1	1	3	2	1	0
44	3	1	3	0	2	1
45	2	1	3	1	3	2
46	2	1	1	-1	1	0
47	4	1	4	0	3	2
48	3	1	3	0	2	1
49	2	1	3	1	2	1
50	3	1	2	-1	1	0
51	1	2	3	2	2	0
52	2	2	4	2	3	1
53	1	1	2	1	2	1
54	3	2	3	0	2	0
55	1	1	2	1	1	0
56	1	1	2	1	2	1
57	2	1	3	1	2	1
58	2	1	2	0	1	0

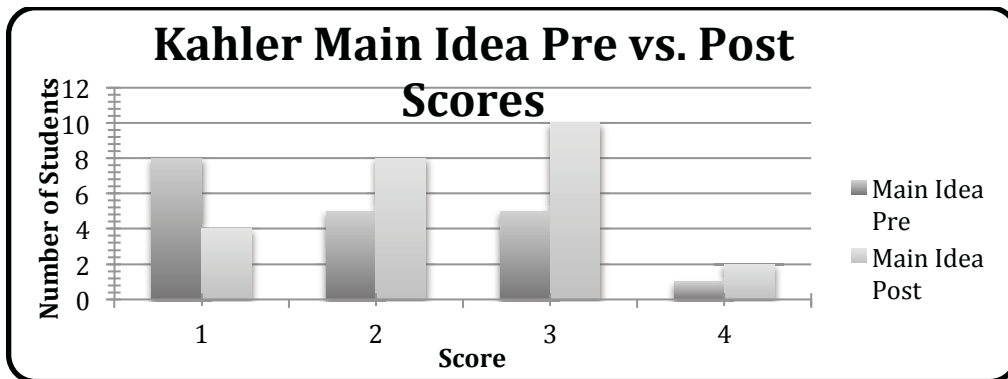


Figure 5: Kahler Supporting Details Pre and Post Scores

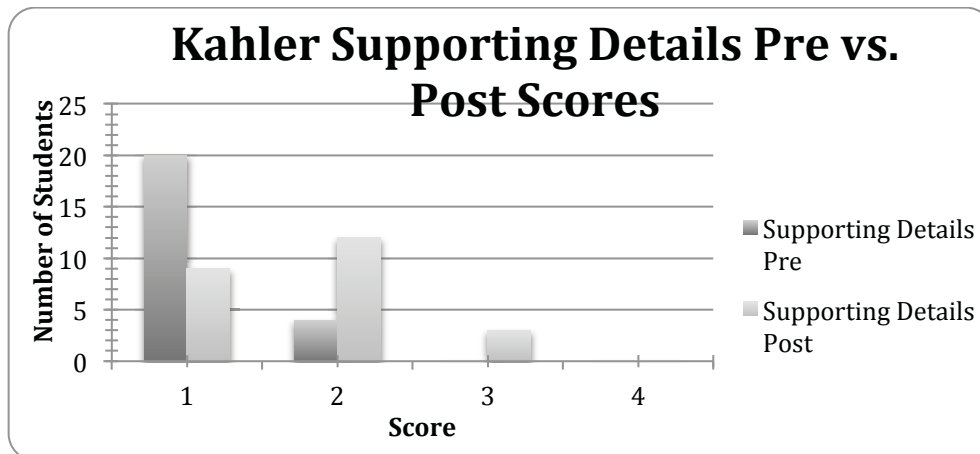


Figure 6: Kahler Main Idea Pre and Post Scores

Composite Score Analysis

Table 4: Overview of Results

	Mean		Standard Dev.		P value		Cohen's d effect size	
	Main Idea	Supp. Detail	Main Idea	Supp Detail	Main Idea	Supp Details	Main Idea	Supp Detail
Study 1 (Bryant-Kuiphoff) (n = 18)	3.38	2.00	0.75	1.00	0.00001	0.25	1.54	0.39
Study 2 (Ernstes) (n = 16)	2.44	1.88	0.70	0.70	0.006	0.015	0.87	0.74
Study 3 (Kahler) (n = 24)	2.42	1.75	0.86	0.66	0.07	0.00007	0.50	0.81
Composite Study (Study 1,2 & 3) (n = 58)	2.72	1.86	0.91	0.80	1.94×10^{-6}	0.00026	0.89	0.61

Individually each class showed different levels of change and effectiveness in student achievement through the use of SQ3R and DRTA. However, when the class data was combined it showed an overall student growth in both the main idea and supporting details sections was evident. The p values of these composite scores were much lower than the threshold of 0.05 for both cases showing a significance of less than 0.01. Also, Cohen's Coefficient was calculated showing that implicitly teaching and modeling DRTA and SQ3R as a method of reading and comprehending expository text had a high effect on

student's ability to correctly identify the main idea and a medium effect on their ability to pull out relevant and important supporting details.

Conclusion

Unit Successes:

Overall, the process helped our students. It gave them an organized and methodical way to attack expository text. The explicit teaching, modeling, and practice of SQ3R and DRTA led to an overall maintenance or growth in comprehending of expository text. The maintenance of student scores leads us to believe as text increases in difficulty, they will be able to continue to attack and interpret expository text in a meaningful way.

Problems Encountered:

Student attendance was a big obstacle. Those students with attendance issues did not seem to maintain or show growth. These students missed teacher instruction, modeling and practicing of the techniques. Secondly, students with low reading scores were found to be more apathetic and showed more resistance to using the strategy. They were less likely to attempt the strategy and give a measurable effort when practicing in the classroom. Last of all, there was one team member who did not officially have training on the use of SQ3R or DRTA and relied heavily on assistance from the other members for guidance.

Suggestions for Revision:

When looking at the two problems of absenteeism and reading ability related to effort, we discussed several changes that could make a difference. One thing was to take this model and use it throughout the entire school year. This could assist students with high absenteeism and allow them to acquire these skills and practice them. In continuing this and implementation across other areas, we would suggest another training to be certain that all staff members have been adequately trained and understand both practice of SQ3R and DRTA.

Secondly, we would address varying reading levels and interests. We would attempt to differentiate the expository text related to interest and ability level during the practice sessions to give students practice and confidence allowing them to give better effort. By doing this, we hope to get more student buy in and engagement on the pre- and post- assessments to observe students' best effort.

Educational Implications:

It is hoped that through the use of these strategies, that students have improved their comprehension of strategies for reading expository text and that they can use this in all subject areas. The use of SQ3R and DRTA reaches across all content areas and could be implemented in districts school-wide helping all students regardless of reading ability. We also found it worked in both rural and urban school districts as well as classrooms of different sizes. PLA schools should be looking into this strategy or similar ones to quickly impact student comprehension of expository text.

It is our recommendation that we continue to use this in our own classrooms. We will be sharing our findings with our building and department teams. Also, we will be sharing the data gathered with the consultants who shared and educated us on the use of these strategies.

Individual Reflections on the Project

Bryant-Kuiphoff Reflection

After completing this study and looking at the data, my students were successful in the tasks I instructed. If I were conducting this study again, I would communicate with our Strategic Reading teacher, so I would have been aware beforehand what she was teaching, as many of the students in the class I used for data collection were also in the Strategic Reading class. But the data reflected that multiple teachings could enhance student grasp of concepts. I would also use a larger sample size using at least two of my mixed ability classes. This would allow me to also gather a broad amount of data for students who were not being taught identification strategies concurrently and had more varied reading comprehension levels. Although my students were excited to be a part of my study, some were still resistant to reading and writing about expository text as they had negative experiences in the past, but as I shared the results with them, many became less resistant to reading and began to use these strategies more and more after the conclusion of this study.

The details of the study were shared with our Literacy Committee, and we are currently using a version of SQ3R called Reading Around The Text, as an

instructional Literacy Strategy school wide for the 2nd Marking Period, and student involvement is high.

Ernstes Reflection

Upon completion of the action research project I feel it was a success. In both the areas of main idea and supporting details comprehension my students showed overall growth. Students showed at least one grade level of growth in both areas except for one student. When reviewing the data I compared this student's growth to attendance, which as a teacher you are always aware of its impact on learning. The student who showed decline in the main ideas area and did not improve in the supporting details area was one with high absenteeism. It is my belief that this was the main contributing factor as this individual missed almost all the instruction and modeling of the methods which led to no change or growth.

Based on my own observations as a teacher in my classroom SQ3R is most valuable in that it provides students with a tool to address expository text, which is lacking in the overall curriculum. Providing this direct and focused instruction helps to lessen anxiety for most students allowing them to be more engaged. In my own experiences I met resistance or work avoidance by students when using expository text like our textbook or other online materials that was minimized once I started to teach DRTA and SQ3R to my students. I feel they now felt more confident in approaching the text and having a way to successfully break it down for information.

While the overall project was a success I do wish I would have had a larger and more diverse sample size. This is why the composite score was so valuable to me and my principal as it showed how it worked on a more diverse population. While most of my class was at or above grade level in reading level this helped to show that DRTA and SQ3R can work for all students regardless of their own reading level. With the help of this research and ongoing discussions in our school improvement teams we have included SQ3R in both our middle and high school improvement plans. I have also been able to take a leading role in mentoring and modeling how to use the approaches in my own building and district.

Kahler's Reflection

The actual research for my own classroom went smoothly except for the movement of four students. Three were moved into other classrooms during the period of research and one student moved to another school district. This made the sample size smaller than anticipated. . If I was going to do this over, I would be sure to get a larger sample size. I also would be sure to stress with my students more mini-lessons on determining the main idea from the reading. I believe this would have showed a better p value for my students' main idea and thus my students would have scored better on the main idea. Due to the composite scores from this research, my principal has asked me to teach the staff at Milwood how to implement this strategy of combining DRTA and SQ3R with expository text to prepare students for the MEAP that is being given this year in the spring. We are

hoping to see improvements on our scores for the MEAP and thus begin to move off the Persistently Low Achieving Schools list.

MITEP: AN EVALUATION OF GROWTH, LEADERSHIP AND DEVELOPMENT

When the MiTEP Program was first presented, I seriously considered passing it up. After all, I started out teaching earth science 20 years ago, and I had a rock collection to rival most other science teachers, and I already knew about the rock cycle. I have to admit the biggest draw was the 20 free credit hours. But, when I really thought about it, I realized I needed to give my students more than I had been. They deserved the very best for each unit I had to teach. Even if I was only teaching the rock cycle and rocks & minerals identification at that point, I felt I should get a deeper knowledge to be able to share more with my students who are more advanced than my average student.

Wow - My pedagogy, practice and my appreciation of Michigan have been expanded! I had never been across the bridge except to go Sault Ste. Marie to watch the boats. On the way to Houghton for the first week of class, the scavenger hunt gave me my first hint, not only of the program, but also of the geological structures, eccentricities, and beauty that makes Michigan. I never would have paid attention to the Solar Arrays, the face in the rock, the giant windmill, or even the Mystery Spot. Now, I see windmills, solar panels, layers in rock formations, and can even identify a good many of them pretty much wherever I go! I can explain to my own children as well as my students why the rocks are slanted. I can explain how strike & dip indicate geological incidents – (finally!), how to identify Jacobsville Sandstone, and tell how old it is, I know where there is an impact of a meteorite in Michigan and even evidence of ancient

lava flows. I can explain why Michigan Geology looks like a set of stacked bowls. I no longer have to look outside of Michigan for examples for my students; I just have to look around the Kalamazoo, Jackson, Lansing, Grand Rapids areas, and the U.P.

Being in Houghton and the surrounding area, learning about the mining and the geologic formations that make the U.P. different from the Lower Peninsula, Hungarian Falls, copper and silver mines, the stamp sands, and how man impacted Nature (one of our Big Ideas) both positive and negative, and learning about Earthcaching, and then creating my own earthcache, allowed me the opportunity to not only take what I have learned, but also expand it and share it with my students and others who are interested in learning more about the Earth. One of my opening questions for my students during the Earth Science Unit is “Basalt is an igneous rock – where in the U.S. do you think this rock can be found?” My students will always answer with Hawaii, Alaska and California. When I tell them it is also found in Michigan – they are instantaneously interested! I have many opportunities to share my pictures, and lessons from the U.P. A few of my students who vacation in the U.P. have come back excited that they found the areas I have talked to them about, a couple of families have taken up Earthcaching, and at least 2 families have taken their first vacation in the U.P. as a result of my new enthusiasm.

The oldest rock in the U.S., Morton Gneiss, is found in MN and Northern Michigan. It is about 3.5 billion years old, and is dated to be formed in the Archean Era. This information shocked me as I always assumed that the Grand

Canyon, and the Rocky Mountains were the oldest. But now that I know it is right here in the Midwest I was enthusiastic to tell my students about it. They were also impressed.

I really loved the fact that we started out every morning in the classroom, reviewing the previous day and then presenting the Big Ideas and goals for that day. The rest of the day actually experiencing the area and interacting with local experts in the field was the best way for me to learn and become more proficient in my personal knowledge and learning. Being able to view the sun through the telescope, and glasses that allow either the sun or an eclipse to be viewed safely, and even the basic mechanics of a sun dial, while part of our high school curriculum, was still very informative for me as a middle school teacher to begin to think about ways to support the high school teachers. We were not under pressure to take a test, but we were able to interact with professionals in their fields, explore new concepts, gain experience, and receive inquiry-based instruction as students. As a result, we explored from a student perspective, and gained a unique perspective of experiencing inquiry instruction as students, to use as teachers, as well as acquire materials and resources to use in our classrooms. We were all in the same boat - we wanted to learn more and become better teachers for our students. MiTEP allowed us to not only work with teachers in our district, but also teachers in similar districts to ours.

Another highlight was being able to experience and explore the geology behind the creation of an artesian well. This was an experience that probably only a few teachers have ever been a part of. We all can teach about artesian wells, but

few of us have probably ever really seen and been able to conduct tests on one. Or be able to say we actually drank from an actual well that was not part of a bottling plant.

Hungarian Falls was another one of my high points. Seeing where the fault line was exposed by the fall and the Jacobsville Sandstone beneath it was a treat. I am able to tell and show my students that Michigan does indeed have an ancient fault line going through parts of it

Being able to observe the stamp sands and see the destruction caused during the copper mining heydays, how nature has rebounded around it, but not on it, is an amazing testimony of how man has impacted Nature negatively. We were able to talk to an individual who found a way to use the stamp sands to benefit the environment, and clean up the destruction was awesome. I am a little disappointed that we have not been kept updated on the idea to use the stamp sands to create roofing tiles, so we could report to our students how man is attempting to reverse the damage done in earlier generations.

In addition to study sites in the U.P., we also studied incidences of man's impact in our local areas. Coming downstate to Kalamazoo, was right after the Oil spill over by Marshall. I guess it was because it didn't make it to Kalamazoo, coupled with the fact that I don't fish in the river that I really wasn't concerned about the spill. I had a biology class back in my sophomore year of college where we traced a spring fed lake through the city to Upjohn Creek and conducted experiments on how it started out fresh and pure and the further it got into the city the more polluted it got until we could not be in contact with the creek without

waders and THEN it was deposited into the Kalamazoo River. I knew the river was polluted even before it got to the wastewater treatment plant. So even though it was a previous superfund site, I assumed most of the animal life was absent from that part of the river.

Our fieldtrip was to go to the original site of the spill, and trace it back to Kalamazoo. At each spot, we observed the wildlife (or lack thereof) and since this was my earthcache site, I was able to get great pictures and generate questions to educate my students and any other interested people about the spill and the clean up efforts through my classroom and also by developing an earthcache. I am happy that MiTEP brought the field expert so we could obtain first hand knowledge. I presented to my students how earthcache works, and gave them the opportunity for extra credit if they chose to follow and complete the lessons. A few of them did the site with their parents, and the parents reported back to me that they enjoyed being able to do a project like that with their child and they began participating in the Earthcache program, as it was more educational than geocaching!

Being a native Kalamazooan, I also was not aware of the geologic Rock depository that WMU has established or that there were local experts willing to come to our schools and talk to our students with samples of various drillings. They even have samples that we could check out. I spent a lot of time and money on my rock collection, but there are still gaps. Knowing that WMU may have some that I can borrow, as well as local experts, eases my teaching both financially and in content presentation.

Woods Lake in Kalamazoo has a wealth of information that my students can utilize while studying formations. I shared this information with our 6th grade teachers and we plan to go to Woods Lake and take pictures and samples for the students to conduct experiments for their study of the ecosystem. The lake may have seemed oligotrophic on the surface, but because of the kettle bowl shape, the deeper depths were more eutrophic because there was no oxygenic turnover at the depths. The organic matter from the storm water run off drains, natural debris of leaf litter and other organic matter from lawn fertilizers and such have settled on the bottom, and turned it pretty much lifeless, except for bacteria, from about 4 meters down. I also had no idea that there used to be an amusement park there, and that there are remnants of a roller coaster and Ferris wheel in its depths.

All three grades will be able to use information from the Woods Lake area while looking at glacial movement and how Michigan is a direct beneficiary of it, as well as Man's impact on natural resources.

Our time spent in the Jackson area was also informative. Some of the rises on the roads in the Jackson area are classified as moraines (think O-Hi-O), and knowing that a glacial outwash was being used as the gravel pit for the Road Commission was painful. There were some beautiful fossil specimens that were being sacrificed to spread dirt and build roads. Fortunately, we were able to collect some good samples. And being able to see and study some of the various outcroppings in the area and see how man is preserving and destroying our natural resources was a real eye opener. It will be interesting to see how future geologists will be able to piece history together with many parts of the fossil record being

spread all over. The opportunity to tour a water reclamation plant, and electric company, gave us a unique behind the scenes perspective of how man is impacting the environment positively by developing renewable and reusable resources.

Our Pedagogy days were varied and valuable. We were able to get pertinent, research based information, materials, and ideas that we could implement into our classrooms immediately. A couple of times we were presented with a new practice or idea that we may have wanted to or even thought about using in our classrooms, but were hesitant to try. For instance, the gallery walk is an idea that I have always wanted to try in my class, but I was hesitant because I felt my students weren't able to handle it. After a warm up on one of our pedagogy days was a gallery walk, I mentioned that I would love to do something like this, but I didn't think my students would be able to handle it. A few others had the same thought, so we had a discussion on how it might look and what are some of the parameters, expectations and comments that needed to be in place before we attempted it with our students. I worked with my students on it last year, and once they had practiced it with some non-threatening questions and warm ups, the students began to give thoughtful and positive feedback to each other. Without being able to work with my peers in a supportive atmosphere, I may not have ever tried this in my classroom. Not only did my students benefit in science from this, our English Language Arts, and Social Studies teachers also tried this technique in their classes. The gallery walk worked very well for the

Social Studies teacher, the English Language Arts teacher was not comfortable with this technique and only used it with the advanced English classes.

We also had reflections on our beliefs as teachers, and a few times we even had reality rubs, where we confronted our own misconceptions. Sometimes our “Aha moments” were so profound, we immediately wanted to develop a way to show our students while it was fresh in our minds! We had many discussions on Next Generation Science Standards, were able to reflect on our own pedagogies, but also interact with our peers who added depth and angles to our instruction to draw the best from our students. We were also given opportunities to develop our individual leadership skills by leading workshops in our own cohorts and then at the state level through presenting to MSTA (Michigan Science Teachers Association) Annual Conference and the geological conference at WMU (Western Michigan University), in groups and as individuals. Even though I have presented many times in various conferences in the state and a few times nationally, I have never presented by myself. I really appreciated the atmosphere of being able to present to my peers, get constructive feedback, and gain confidence in my own presentation skills during a pedagogy day.

I never felt what I was doing in my classroom was especially unique, but as we worked through our pedagogy days, exchanging ideas and classroom practices and getting ideas from each other, developing our lesson study, and seeing how my students responded and benefitted from it, I developed the confidence to be able to become part of the Science Leadership Team for the District, as well as present to other teachers throughout the district and state.

As a result of my confidence I was able to go before the State Board of Education and give a brief talk about what implementing the NGSS standards looks like in my classroom compared to the currently used HSCE (High School Content Expectations) and GLCE's (Grade Level Content Expectations) for grades K-7.

Being able to take classes online during the school year allowed me to move at my own pace, review the lessons that I had problems with, email the instructor any questions, have a peer study group, while still being able to carry out my teaching duties, and family obligations. There were times that deadlines were not convenient to our school schedule, or even our family schedules and I am thankful that our instructors were cognizant of that.

My internship was spent at Pictured Rocks. I had never been there and I wanted to learn about the geologic formations of this National Park. I learned so much more than that. The Jacobsville Sandstone that I saw in Pictured Rocks (I also created an earthcache on it) is among the oldest in the United States. I never really expected to see an outcropping of rocks that could be dated that long ago in Michigan. Working with the Park Rangers and the Park Geologist, I learned about the origins, composition of rock, and services of the park, but we also interacted with the public helping to educate them about rockslides, wildlife, and how Lake Superior contributes to the weather in the area. We were able to learn and understand more about layering and deposition of Pictured Rocks. Tracing the base of Jacobsville Sandstone from the visible outcropping at the Lighthouse, to the layers above it at Chapel Rock, to only being able to know it is there from

Miner's Castle, took a lot of thought and visualizing on my part. It was hard for me to think of the angle of deposition because the land around it looked flat.

Through hiking, taking lots of pictures, and becoming familiar with the park and the trails, the project was completed for the park rangers regarding the beauty and danger of the possibility of rockslides and collapse in the park will be implemented using the flyer method, at the trailheads and the ranger office. Park users are also able to access the Public Service Announcements by audio using their smart phone and QR codes that was created.

Perhaps one of the most beneficial classes was the Lesson Study. Our students were experiencing difficulties in our Cells unit with differences in Prokaryotic and Eukaryotic cells. Part of it was because it was a little bit cut and dry and even though we tried to make it interesting with various pond examples and labs, our students just weren't grasping the similarities and differences. Zombies were popular in the youth culture, so we were able to work as a peer group and develop a mini unit and assessment that would challenge our students to really get into and know the differences between the two types of cells. We developed the Zombie Revolution. Students were assigned to be a part of a research team that was charged with the task of developing a vaccine to combat the "zombification" of the world. They needed to develop a treatment that would only attack the zombie cells (prokaryotic) and leave the healthy cells (eukaryotic) unharmed. The students were able to determine that eukaryotic cells were human cells during previous lessons. So they had to become familiar with the structures that were similar and different between the cells. They had to develop what

structure of the cell their vaccine would attack and their reasoning for that particular structure. They could develop the name, advertising, and market their vaccine to their peers through a presentation. The students really enjoyed this project and according to their test scores, were really able to differentiate between prokaryotic and eukaryotic cells. This project has been a popular one with our students the last couple of years. My advanced students were a little disappointed when we didn't have enough time to get into the project, we could only talk about it and use it as a whole group discussion.

As perhaps our "capstone" class, studying the National Parks in Utah/Colorado was an intense but fun class that gave us first hand exposure to geological formations that compose the bedrock of the North American plate. As we learned about the formation of the Uncompahgre Uplift, and the missing layer of Navaho at one site, and a large deposit of Navaho on another, it began to come together as we moved further into the course, and into the bedrock. Through studying the uplift, erosion, deposition and basaltic flow patterns, I was able to come to a better understanding of the region, and can better explain missing layers, layers that have deeper deposition than others, and how the Green & Colorado Rivers played a role in the establishment of region of the Rockies.

As we discussed and observed the formations and layers in Utah/Colorado, I was better able to grasp the possible explanation of missing layers and differences in thicknesses of the deposition of the layers in Utah/Colorado, it began to make sense about the missing layers between the Pictured Rocks area and the Wisconsin, Minnesota layers. I still want to do a

little more research and gain more confidence in my own understanding before I present it to my students though. I plan to use the pictures of the geological layers of Michigan, Wisconsin and Minnesota to help me better understand the geological history of the area. I already have a copy of the Michigan geological map, thanks to the MiTEP program.

The Saltwater Oyster Beds in the middle of an area that is far from any salt-water body was eye opening and could make an excellent project for my advanced students to explore. I would be interested in having my regular students trace the Green River and its changes and explore the reasons behind the changes from a healthy, bustling river to the trickle it is today, comparatively speaking.

I know my students will really like the pictures and information from studying how the dinosaurs walked. I would like to be able to develop it further to incorporate it into our unit on speed and acceleration.

I based my final lesson plan of the program on information gleaned from the Henry Mountains. I was able to develop lessons helping students understand uplift, intrusions, layering, volcanic activity, mountain building and how tectonic plate movement can impact soil composition and deposition inland and away from the edges of tectonic plates. I am really looking forward to using this lesson to help my students finally grasp and cement those concepts.

Looking back on the multitude of learning experiences, and how my teaching pedagogy and practice have been deepened and my leadership skills developed, I am grateful that I took part in MiTEP, the hardest, most enriching, learning experience I have ever taken part of. I have been challenged

intellectually, mentally, spiritually and physically, and my teaching strategies, understanding and confidence in and out of my classroom have been enriched exponentially. Many of the experiences and practices learned have been shared with other teachers on my team, school, district and in the state. Being able to share the information and experience gained will only lead to better teaching practices and pedagogy from those I and my other peers from MiTEP will work with in the future.

Summary Writing Rubric

	4 Advanced	3 Proficient	2 Partially Proficient	1 Not Proficient
Main Idea	Correctly identifies the main idea in a clear and accurate manner.	Correctly identifies most of main idea.	Identifies an important idea but not the main idea.	Identifies a detail but not the main idea.
Supporting Details	Clearly states 2 or more important details using own words or statements.	States at least 2 important details with some paraphrasing of information.	States at least 1 important detail. Demonstrates little if any paraphrasing.	Includes only unnecessary details. Does not demonstrate any paraphrasing.

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