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What effect does intervention (RTI) have on student failure rates in Math?

Daniel Coover

Capstone Project: An Action Research Project

Northwestern College, Orange City, Iowa

An Action Research Project Presented
in Partial Fulfillment of the Requirements
For the Degree of Master of Education

Northwestern College

Dr. Kenneth Hayes

Abstract

The purpose of this action research project was to determine what effects response to intervention (RTI) had on student failures in a math. The researcher examined a Supported Study Hall, which is a tier II intervention strategy used to target key skills to help perform better. The Supported Study Hall was teacher led and only for students in the study who failed the pretest. In total, twenty-four Algebra I students were involved in the study. The research was conducted to analyze the effectiveness the Supported Study Hall had on student growth throughout the six-week intervention period. The findings revealed that the Supported Study Hall did in fact play a huge role in student growth from the start of the unit to the end of the unit. The data collected supports the need for this practice in schools today. The outcomes from the study provide key insight and highlight the direct benefits that RTI has on student growth in math.

Keywords: supported study hall, response to intervention, tier II intervention

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What effect does intervention (RTI) have on student failure rates in Math?

An often overlooked or under utilized component of education is intervention, otherwise known as response to intervention (RTI) or multi-tiered support system (MTSS). Many schools have adopted a version of intervention that fits their school to better help their students succeed. Where some schools have issues is how they go about rolling out the plan and selecting effective intervention strategies. Oftentimes, districts install intervention models without adequate research, personnel, or resources. In order for these plans to fully work, full district support and school buy-in need to be in place (Choi, et. al., 2017). The problem is, when these plans aren't adequately planned or don't have support, the effectiveness of intervention is lessened. Ultimately, the students are largely impacted by those scenarios. They suffer from these circumstances because not all students are receiving the support and resources they need in order to be successful. This study will focus on the effectiveness that RTI has on student failure rates in math. The goal is to further justify the need for a well thought out intervention system to help support students as best as possible.

The purpose of this action research project is to evaluate the effectiveness of intervention and to further establish the need for all schools to have an intervention system in place. In particular, freshman level math students will be examined. Educators don't want their students to fail. That is why intervention can be such a great tool to prevent failures or make failures less evident. Intervention is at its best when it is paired with proven, evidence based educational strategies (McBreen, et. al., 2022). Hopefully, as a result of the research, intervention practices will improve and highlight that RTI can be an effective approach to reduce student failures in math. The research findings will be beneficial for anyone who is looking to justify the need for intervention in their school or a teacher looking for strategies to enhance their tier II intervention

with their students. This paper will provide insight into strategies, techniques, and a firsthand experiment that justifies the need for intervention in schools.

There is an extensive body of research available on the effects of various types of intervention. For this project, peer-reviewed articles from education based journals were utilized to accumulate the research for this project. These journals were found in both the DeWitt Library as well as Google Scholar. Most of the research reviewed is current and has been published between 2013-2023. Although for foundational research purposes, some articles reviewed and analyzed were published outside of the current ten year window. Some of the research from those studies is included in this action research project. The article inclusion criteria had a lot of elements to it. The inclusion criteria included research studies that examined many different types of intervention strategies. The studies were also conducted in diverse areas to get an authentic perspective. Articles also needed to have qualitative data, quantitative data, or mixed methods. Lastly, for an article to be considered, the research must be focused on student performance or intervention implementation.

An extensive analysis of quantitative data displayed that struggling math students can improve their grades as a result of receiving tier II intervention. The data shows that students performed better on the post-test after receiving intervention. Additionally, the students' overall grade in the course improved. All students who started with an F or D increased by at least one letter grade. RTI is an important practice for developing math students because it gives them additional support, valuable instruction time, and necessary resources to help them grow as a student. A goal of this research is to further justify the need for schools and teachers to utilize intervention to better help their students' succeed.

It is no secret that some students are further along than others. Reaching each student is something all school districts should be considering. Utilizing intervention strategies is a great way for school districts to address the need to provide their students with the proper education that they need. This literature review examines the need for RTI or MTSS in schools, key tier II strategies used in mathematics, and proper school level implementation. An in depth investigation into these topics will give the readers a clearer understanding as to why intervention is a crucial component of education that cannot be overlooked.

Review of the Literature

RTI in schools is a growing practice that has many different layers to it. The whole idea of it is to help students be as successful as possible and help close the gap between underachieving students and those who are currently achieving a standard or topic. When considering RTI, it is important to understand four key factors. Those factors are justifying the need for RTI in schools, effective Tier II strategies, how to properly implement RTI in a school and classroom, and finally, factors that affect the intervention processes. In order to fully grasp RTI, it is important to understand the role these factors play in successful RTI implementation.

Why RTI (Intervention) in schools?

Schools are constantly searching for ways to give their students the best educational experience possible. One way they can do this is to adopt an intervention system that best fits their school, teachers, and students. There is an abundance of research that researcher Camila Nilvius has studied that points to RTI as an effective method to enhance student performance. Identifying at-risk students has long been a struggle in schools. An intervention approach in schools can help with that. One of the reasons RTI is so effective is because of its early identification of struggling students and proactive approach of getting them caught up (Nilvius,

2020). Early identification is the first step in helping provide students with the proper support that they need. Under this approach, students are receiving proper support for where they are in the learning process and that is an important quality of intervention. Some students may need more support than others. There is a growing body of research that states that at-risk students need intervention to practice and improve their skills (Faggella-Luby et. al., 2011). That alone, is reason to consider an intervention strategy and answers the “Why” behind intervention in schools.

In a study conducted by Linda Siegel (2020), early identification and intervention were examined to prevent reading failures. In her research, she found that it is possible to “Identify children at risk for reading disabilities in kindergarten. A consistent, aligned and standardized curriculum, based on scientific research and implemented well, can result in significant improvements in achievement” (Siegel, 2020, p. 145). Even though this was conducted through the lens of reading, yet, I believe that it is still applicable to math. The research was conducted with a screening process that was designed to target students who were struggling in reading and bring those struggles to their teacher’s attention. This screening process was teacher-friendly and required little training. This proved to be an effective and easy approach to identifying those struggling students and get them the support they needed (Siegel, 2020). This same approach can be used at any grade level for any subject and is proven to be a successful tool in the early identification of struggling students.

RTI is defined as a tiered model of teaching that integrates assessment and intervention to enhance a student’s academic performance (Pool et. al., 2013). This tiered approach is broken down into three categories, Tier I, Tier II, and Tier III. Each level increases the amount of intervention a student is receiving. Tier I includes all students. These students receive core

instruction that takes place in the general education setting. In addition to core instruction, Tier II students receive supplemental instruction in a small group setting. Tier III instruction is a more intense and individualized approach that may involve support outside of the general education setting. In a study conducted by Sharon Vaughn et. al., her and her team examined the effects of Tier II intervention on middle school students. They compared students who received Tier I reading instruction to students who participated in Tier II reading instruction. They found that, “Students who received Tier II intervention outperformed those in the comparison condition on several measures, including word attack, spelling, comprehension, and phonemic decoding efficiency” (Vaughn et. al., 2010). This is just one of many studies that points to intervention as a crucial and necessary component of education. Providing students with targeted instruction helps close the gap between students who are at-risk and those who are academically on track.

Many researchers, in particular Burns et. al., 2010, have examined and justified the need for RTI in schools. Of those stories is a study that found that; “Interventions that included practice opportunities with goal setting and feedback were more effective than other treatments” (Burns, et. al., 2010). This is an important statement that helps answer the need for an intervention approach in a school. As educators, finding researched based strategies is a vital part to our profession. If we want our students to reach their full potential, consider research-based approaches to justify a need for intervention in our schools is a great place to start.

Effectiveness of Tier II Strategies

There are a lot of Tier II strategies that educators use to help their students be successful and help close the gap between other students. The question is if more strategies are more effective than others. Do different content areas have different approaches? All strategies have the potential to be effective, but we will look at some of the ones that can be the most effective.

In a study, researchers surveyed teachers to analyze the effectiveness of Tier II strategies within the RTI framework. The researchers reported, “Academic growth is subsequent to RTI” and “Promote academic growth” (Ciullo et. al., 2016, p. 45). This alone can justify the need for district administrators to consider RTI as a successful strategy to help students’ be successful in the classroom.

One of the most common strategies used by educators is small group work. There is a lot of evidence that supports small group work to improve students’ success (Coyne, et. al., 2018). Small groups allow teachers to be more responsive to students’ needs. Student’s benefit from this time by working on targeted skills. Utilizing supplemental, Tier II small groups can have positive effects on student growth within the RTI framework (Coyne, et. al., 2018). Small groups are an easy, time-friendly, researched-based approach with proven effectiveness to help students improve and close the gap between their peers. Small groups can be easily implemented into a classroom. For example, teachers can group students together depending on where they are in the learning process. Inside these groups can be targeted activities facilitated by the teacher designed to help the students. Another idea is to have small group of students pulled by an interventionist. This is a helpful strategy because the students get to work directly with someone who is there to meet them where they are at and help them get to where they need to be.

Small group work isn’t the only effective strategy used for interventions. There are many other strategies, one of which was examined in a study by Rebecca Forest and Donna Stokes (2017). The researchers looked into a math remediation intervention to see if that would increase the student’s likelihood to succeed in an introductory algebra course. In this study, four different sections were analyzed. Three of the four sections received the online math tutorial and one of the sections did not. According to their results, “From the 643 students enrolled in the course

showed that the 61 at-risk students who completed the math tutorial increased their odds of passing the course by roughly 4 times those of the at-risk students who did not” (Forest & Stokes, 2017, p. 1). The data showed that the students who took advantage of the extra help were more likely to perform better in the course than those who did not complete the tutorial (Forrest & Stokes, 2017). A tutorial, or supplemental practice opportunity is another great intervention strategy that teachers can use to help their students, especially at-risk students that this study identifies. A simple tutorial can be an effective Tier II strategy designed to enhance students’ skills. This is a particularly helpful strategy for any math teacher searching for ideas to help their students reach their highest potential. A tutorial can be anything from an introductory practice activity designed to give students a head start to a more extensive prerequisite type of lesson that has multiple layers designed to give students insight into what they are learning.

Another type of Tier II strategy that has been becoming increasingly more popular are technology-based intervention strategies. As technology has evolved, so have effective intervention strategies. Many strategies incorporate technology in some capacity. Another study closely examines the effect technology-based strategy has on student performance. Dr. Brit’ny Stein et. al. (2022), examined the effectiveness Lexia and iStation have on students’ reading results which are half computer-based and traditional based. Lexia and iStation are integrated learning systems, which means instruction is driven through a computer or other piece of technology. Results from this study showed that “Both programs resulted in meaningful growth across an academic year of implementation” (Stein et. al., 2022, p. 14). Student growth is the most important component of a well-thought-out intervention. As long as the target instruction is proven to show growth, that strategy should be considered a viable resource educators can use to

help facilitate interventions in their classroom. Teachers can be as creative as they want when it comes to implementing these types of strategies. Technology fits differently into each classroom.

Not all impactful strategies need to involve technology, though. Another strategy that has been researched and is proven to be effective is short interventions. Researcher Bridgette Brisson et. al. (2017), conducted a study on the sustained effects of short interventions, a 90-minute intervention and two short practice tasks. She and her team examined the effectiveness of a short intervention in 9th grade math students. Their results state that, “The present relevance intervention program showed sustained impact on students’ competence beliefs, teacher-rated effort, and test scores in mathematics in a real-life learning setting” (Brisson et. al., 2017, p. 1072). This method is proven to be effective in more than one area. Not only were results improved but also students’ efforts were improved. Interventions that can impact students in more than one aspect should be closely examined when determining the type of intervention that one should adopt in their classroom. Not all interventions need to be lengthy. Sometimes, the most effective way to help a student is by a short re-teaching or extra learning opportunity to help get a student caught up.

The strategies mentioned above are strategies that educators can call upon to help facilitate interventions in their classroom. It’s just important that those interventions target the specific skills necessary to help close the gap between the students and their peers. There is no one-size fits all approach in intervention, so educators have to work to find a combination that works best for their students to achieve success. Principles from different strategies can be applied to other content areas. For example, the small group interventions can be used in math, reading, science, and physical education etc. It doesn’t have to be in one specific subject areas. All academic disciplines have a place in intervention.

Intervention Implementation

The effectiveness of an intervention is determined by how the intervention is implemented on a district, school, and classroom level. Sloppy implementation can bring about many issues that could be detrimental to the quality of the intervention. One way schools can implement practices effectively is through the School-Wide Applications Model (SAM). SAM is an approach to school reform that was founded on equity-based inclusive education and RTI (Choi et. al., 2017). SAM is a proven approach to quality intervention reform and implementation. It is grounded in student achievement and is created with evidence-based practices to ensure success. SAM was found to have positively impacted the growth of students' academic performance (Choi et. al., 2017). Additionally, in another study conducted by Choi et. al., they found that "Math score growth was significantly larger for students in SAM implementation schools than in comparison schools" (Choi et. al., 2020, p. 160). School administrators should consider SAM a vital tool when implementing a school-wide intervention. Not only does it help with proper implementation, but it is also directly tied to students' math success.

Another important aspect of intervention implementation is teacher training. It's a tough ask of our educators to implement something they don't have adequate training in. Adequate training helps educators be more confident in their teaching and trust what they are implementing is effective and worth it. In the past, teachers have cited that if they are not properly trained, inefficiencies in their teaching can occur (Mulder et. al., 2022). Teacher training isn't a step that should be overlooked and is integral to the successful implementation of an intervention. In fact, in the same study (2022), the researchers surveyed teachers about the implementation of a specific intervention. They cited that teachers requested additional information on the

intervention to better understand how to implement it (Mulder et. al., 2022). This can apply to all types of interventions. It is important to not rush into things and to make sure facilitators are set up for success.

Examining the effectiveness of an intervention implementation can be tough and is something that many educators struggle with. The amount of research on RTI implementation at the school level is very limited and something that hasn't been looked into (Noltemeyer et. al., 2014). Due to the lack of research on this topic, Noltemeyer et. al., (2014) decided to assess school-level RTI implementation. This study used the RTI Implementation Scale for Reading to determine how effective the intervention implementation is. The rating scale is comprised of six different components; assessment, data-based decision-making, researched-based instruction, treatment integrity, professional development, and school-wide leadership and support. In this study, the data was collected from 53 principals. Results show that the instrument was deemed rigorous and has strong reliability when it comes to examining the effectiveness of the implementation (Noltemeyer et. al., 2014). The more tools an implementation team can have the better. This is just another strategy that RTI implementation teams can use to help improve their RTI facilitation to make sure that what they are doing is helping their students succeed.

The importance of teams evaluating data is supported by research. "Within an RTI model, team decision-making processes play a major role. Among the decisions of teams within an RTI model, universal screening data are examined to determine the appropriate tiered intervention matched to student needs" (Shapiro, et. al., 2012, p. 336). Teams are just another necessary component of the RTI implementation process to ensure that interventions are effective.

Factors that Influence Intervention Processes

There are a variety of factors that influence the intervention process. Two of the biggest factors that affect the intervention processes are student motivation and professional development. These two factors were selected because of both parties' direct involvement in the intervention. Teachers are those who facilitate the intervention and a teacher's knowledge of RTI is important for effective implementation (Brendle, 2015). Students are on the receiving end as they are participating in the interventions. To fully understand students' level of engagement in the process, their motivation and mindset need to be examined. Research supports that when student motivation is high and they have a growth mindset, they are more likely to perform better, try harder, and have higher achievement in academics (Strahan et. al., 2017). The importance of these two factors needs to be reviewed to best understand the intervention process.

Student motivation has been an important aspect of education for a long time. Trying to find ways to motivate students is nothing new to educators. They are well-equipped with strategies to help motivate their students. How does this translate to the intervention process? A qualitative study was conducted by Durksen et. al., (2017) on student motivation in math. One of the factors they found to help student motivation was the relationships built between the teachers and their students. Students' motivation is likely to increase the better the relationship they have with their teacher, especially if they are working one-on-one (Durksen et. al., 2017).

Another aspect that this study highlighted in regard to student motivation was eye contact. Students in the study stated that eye contact help with, "Confidence and willingness to continue through eye contact" (Durksen et. al., 2017, p. 173). Essentially, teachers acknowledging students and building relationships with them can go a long way in helping them be successful, especially when it comes to student motivation during the intervention process. Building relationships is no new phenomenon in education. It is important to reinforce the

importance of building relationships because of the direct effect it has on student achievement. Just by taking the time to get to know our students can go a long way in helping them be successful. The same goes for student motivation. If we can help our students by motivating them, then educators need to be aware of how this can help, especially when it comes to the intervention processes.

Students' perception of their intervention also plays an important role in their motivation. A recent study conducted by Rosenzweig et. al., (2018) investigated this effect on student motivation. Researchers found that when students perceived activities as a practice they showed a greater motivation to learn and believe in themselves to perform better (Rosenzweig et. al., 2018). The whole premise of RTI is to provide students with additional support and opportunities to practice targeted skills before they fall too far behind. If educators can frame these opportunities as practice and learning opportunities, then they are more likely to get more out of their students. That is an important realization that needs to be made when considering these factors. Teachers are facilitating interventions to help students. Those facilitating need to be aware of how their students may perceive the activities.

The second factor that influences the intervention process is professional development. Professional development has been a consistent component of education. Teachers and administrators know how important professional development is to ensure they are applying key strategies and staying on top of current trends in education. Unfortunately, some data shows that teachers lack professional development opportunities to implement RTI into their practice (Oslund et. al., 2021). The quality of professional development is equally as important as the need for it and one session is not practical when looking at the end goal of successfully implementing interventions. For professional development to be more effective, districts should

provide ongoing training and support. “Isolated or one-time professional development is inadequate for the level of knowledge needed to successfully implement” (Oslund et. al., 2021, p. 245). Administrators need to understand this factor when designing professional development for their educators. Implementation takes time. Professional development can affect students’ levels of success.

Professional development is also a key component for properly training educators to be the best they can be and implement new strategies with confidence. A professional development approach to intervention is equally as important. Researchers provide evidence that says, “Intensive PD and job-embedded coaching focused on RTI relate to improved perceived skills of educators when implemented on a large scale” (Castillo et. al., 2016, p. 908). This research is helpful in understanding the magnitude professional development carries to help make RTI as impactful for students and teachers as possible.

To conclude, it is imperative that there are a lot of factors, considerations, and obstacles that need to be understood prior to successfully integrating RTI at a school level. It isn't something that can just be thrown together and rolled out over night. It takes time, training, buy-in, resources, and support to properly implement. Students are at the forefront but teachers need to be adequately supported in order to carry out their duties. The effectiveness of RTI is obvious, especially when it comes to mathematics. How the RTI is used at the school level is where it is the most successful and students are a direct benefit.

Methods

Participants

The research site for this project is SHS. Sycamore High School is in Sycamore, IL. Sycamore High School is one of the more highly regarded public high schools in the county. The school has intervention time embedded into their weekly schedule. Each student has intervention

time four times a week. Specific teachers can “request” certain students who they feel need intervention for that day or week. Sycamore High School is 81% Caucasian, 3.6% Black, and 9.5% Hispanic. About 24% of the students come from low-income households (Illinois School Report Card, n.d.).

The research participants are 9th graders (14/15 year olds) enrolled in grade level math (Algebra I) who failed the unit pre-test. This demographic was chosen because the researcher believes they can give us the most realistic, unskewed, and raw results. The researcher chose 9th grade because they don’t totally understand Tier II RTI and will buy into the practice whereas the older grades are more familiar and may find more ways around it or are not bought into the practice of interventions. All math participants are also pulled from the same Algebra I teacher’s class. This teacher has four different sections of the class. This section was randomly chosen. The class is made up of 31 students. 7 of the students passed the pre-test and were exempt from the study. In total, 24 students will participate in the study. There are 8 females and 16 males. 11 of the students are currently failing the course. Attendance can play an important role in whether or not this will be effective. If the students miss school regularly, they may not be able to make the progress they need to improve their grades. All 24 student’s engaged in a small group intervention with their teacher. This small group intervention is called “Supported Study Hall” This small group intervention occurred four days a week for about 25 minutes over the course of six weeks.

Measures

A Supported Study Hall is an intervention strategy used at Sycamore High School designed to help students get caught up and close the gap between higher achieving students. Small group intervention is a researched based strategy that was used in this study. Students are

placed into these Study Halls based on their performance in their classes. For this intervention, students who failed the pretest were placed in a Supported Study Hall. In the intervention, math skills specific to the Quadratic Formula was used to target the growth in the underachieving students.

The measurement instrument for this study is assessment. A pre and posttest will be administered and analyzed. Assessment will be used to determine student grades and progress throughout the study. The results of those assessments will help the researcher better understand the research question. Reliability for this study is not known because they are reliant on teacher generated assessment throughout the course of the 6-week intervention period.

In order to maintain validity, time needs to be considered. In order to maintain consistency, all assessments will be taken in the same classrooms at the same time. Students will know the routine and maintain consistency, which will, hopefully, make them more comfortable. Additionally, the learning environment needs to be as safe and comfortable for the students as possible. In order to address basic needs, students will be able to use the bathroom, have water available, and a snack to make sure their basic needs will be met.

Procedure

The Supported Study Hall was implemented to help students get the help they needed from their teachers. For this study, students from the same Algebra I class were grouped together with their teacher to get the help that they needed. By working with their teacher, students were able to get quality feedback, specific instruction, and supplemental activities to help them achieve proficiency in the Quadratic Formula unit. Using positive reinforcement and formative assessments, the teacher is able to give quality feedback and keep the students engaged throughout the whole intervention process. With direct instruction and tier II intervention

strategies, students were given extra practice opportunities and assistance from their teacher to enhance their ability to meet the learning targets set throughout the unit.

To ensure that the intervention was completed with complete fidelity, the researcher kept the same group of students' together throughout the whole intervention period. Individual data such as test scores and the researcher monitored formative assessments. Students were briefed each day on what the objectives and agenda was for day were. The student's would give verbal cues of understanding when the researcher presented the objectives at the beginning of the Supported Study Hall.

Data Collection

The data collection for this action research project was really pretty simple. I selected a section of a teacher's freshman level algebra class. I had four options to choose from and the sections largest of the four sections were selected. This class has 31 students in it. The unit is the Quadratic unit. Prior to the unit on February 12th, students took a pretest on the unit. This was used to find out which of the students would need the most support heading into a brand new unit. The pretest was worth 100 points.

After the students took the test, it was graded, scores were analyzed, and data was entered into a secure Excel file. Twenty-four of the students failed the pretest and they were used for the remainder of the study. Those 24 students then participated in a "Supported Study Hall" which is an 25 min a day four days a week intervention.

At the end of the six-week intervention cycle, a posttest was administered to evaluate if the students' scores increased as a result of the interventions they received. The results from the posttest will be used to compare with the pretest and help the researcher answer the proposed research question. All 24 students took part in a four-day a week, 25-minute intervention with

their teacher. During this time, targeted intervention such as small group work and individual work took place designed to help get the failing students the support they need to get caught up.

Findings

Data Analysis

The subjects consisted of twenty-four freshman algebra I students that failed the quadratic formula unit pretest. The seven students that passed the pretest were exempt from the study. All twenty-four students that took the pretest also took the posttest. The pretest is a teacher created test that targets the key components of the unit. The test is in line with Sycamore High School math curriculum standards set forth by the state of Illinois. The same assessment was given for the pretest as it was for the posttest. Prior to the research, the researcher assumed that the Supported Study Hall would have a positive effect on the participating students progress throughout the unit. How positive the effects would be was unknown to the researcher prior to the data collection. In order for the accuracy of the study to be maintained, validity and reliability need to be examined.

In order for the accuracy of the study to be maintained, validity and reliability need to be examined. In order to maintain validity, the researcher time needed to be considered, such as the length of the study and the time spent each week engaging in the Supported Study Hall. All assessments were taken in the same classroom at the same time. This measure was taken to ensure that each student had the same amount of opportunities and safe learning environments. Reliability of this study is not known because the students are reliant on teacher-generated assessment throughout the course of the six-week intervention period.

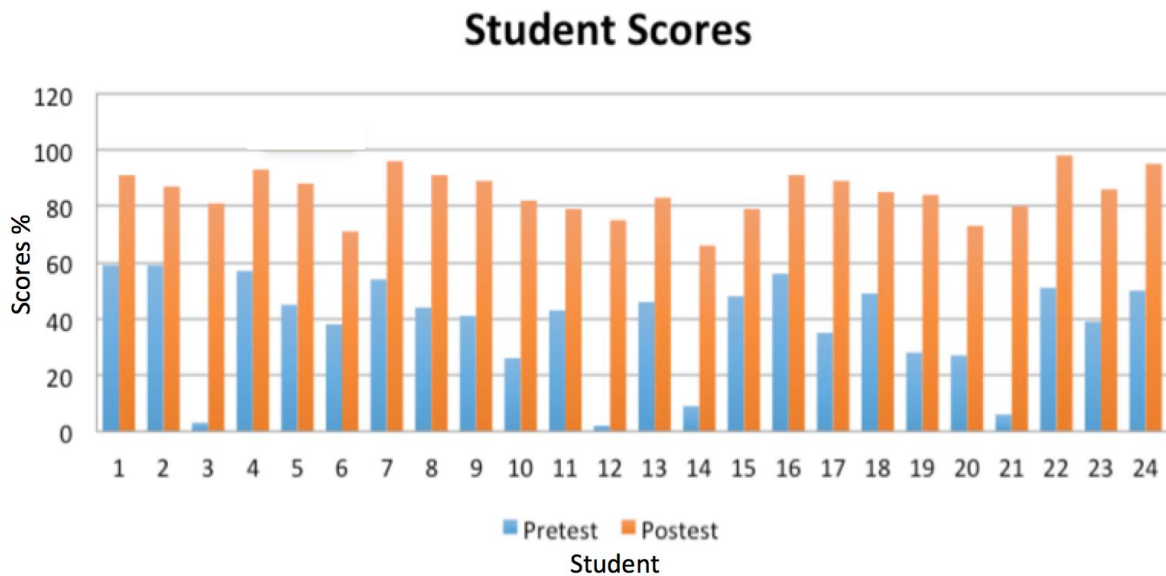
Figure 1 below accurately displays the individual student posttest data versus the pretest data and the increase in scores students made over the course of the six-week intervention period.

The intervention that was examined is a Supported Study Hall, where students were provided tier II instruction on top of their tier I instruction. The largest growth in a single student was 78%. That student went from a 3% on their pretest to an 81% on their posttest. This amount of growth could be for a variety of reasons. The researcher speculates that this student maybe didn't take the pretest seriously. The researcher believes that this student made a large amount of growth because of the Supported Study Hall. Providing a student with a smaller learning environment is sometimes very helpful for their growth.

Student 2 made the smallest amount of growth. Student 2 grew by 28% from the pretest to the posttest. Student 2 scored a 59% on the pretest and then after the Supported Study Hall, scored an 87%. The researcher believes that this student made smaller growth because of their attendance. Student 2 was absent for three days over the course of the intervention period. All students showed signs of progress over the course of the six-week intervention. Some students grew more than others but overall the results are encouraging. The overall growth students made from the pretest to the posttest supports the need for a Supported Study Hall for struggling students in Algebra I.

Figure 1.

Comparison of Pretest and Posttest Scores



Students in this study grew tremendously throughout the course of the six-week intervention. One reason for these results is the amount of intervention time the twenty-four students spent in the Supported Study Hall. Each student received an additional ten hours of instruction in twenty-four different days on top of the forty-five minute class they have each day. That increase in time alone, is reason why they improved in the fashion they did. It is important for struggling students to receive additional support. In this study, it is obvious that quality instructional time can go a long ways in supporting students. Data was also collected on the group as a whole. Earlier, individual data was discussed. The next piece of data the researcher analyzed was the group average. In this section, the researcher sought to see how a group could benefit from a Supported Study Hall. Data for this was used compiled from the individual test scores on both the pretest and posttest.

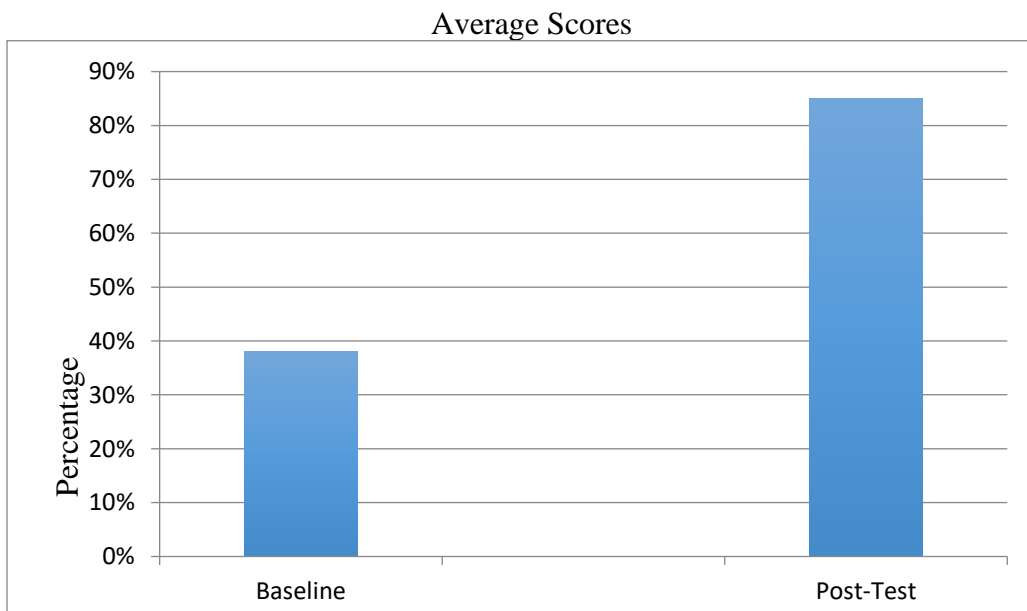
Figure 2 below demonstrates the increase the group of students made over the course of the intervention period. The students received a total of six-extra hours of support over the

course of the six-week period. On the 100-point pretest, the average score of the twenty-four participating students was 38%, which is well below the grade level proficiency. After the Supported Study Hall intervention period, the average posttest score increased to 85%.

Achieving an average score of 85% puts those students well into the category of proficient. This is a 47% jump that provides statistical significance that the intervention played a role in increasing student scores. The data displayed below shows how the group as a whole improved their scores as a result of the six-week tier II intervention they received. The additional time and efforts the students engaged in helped them achieve proficiency in a unit that they started off struggling in. The overall percent increase in the group shows that this can be applied to a classroom setting and can be successful.

Figure 2.

Average Increase



The researcher believes that these results provide critical insight into small group interventions. The researcher thinks that these results occurred because students' learn better

when working with a small group as opposed to a larger group. In a smaller group setting, a teacher can focus more attention on the students compared to a normal thirty plus student class. Another variable to consider would be that all students in the group are in the same place in the learning process. Additionally, all the students in this intervention group all failed the pretest. That means they are all in the same place in the learning process. There was no achievement gap between the students because they all failed the pretest. The data supports the need for small group instruction with students who are struggling in math.

A dependent samples t-test was conducted to determine whether there was a significant change in students' test scores following the intervention of a Supported Study Hall during the quadratic formula unit. A baseline assessment revealed that students were able to achieve an average score of 38% ($M = 38.1$, $SD = 17.44$) on the pretest assessment. Following the pretest assessment, the twenty-four students engaged in a six-week, four-times a week for 25 minute Supported Study Hall intervention. In this intervention, the students' received valuable tier II intervention strategies such as small group work and individualized instruction from the teacher to help increase their test scores throughout the unit. Following the intervention, the students' were administered a posttest at the end of the six weeks. Students' increased their scores by an average of 85% ($M = 84.67$, $SD = 7.99$). The results of the dependent samples two-tailed t-test reveal a significant difference between the pretest and posttest, $t(23) = -16.55$, $p < .001$. The Supported Study Hall intervention increased student test scores during the Quadratic Unit.

To conclude, data was not collected on the students who passed the pretest. The scope of the research was solely focused on students who failed the pretest. Other data that the researcher couldn't use was any data that jeopardized the confidentiality of the subjects. That data includes, name, gender, and prior test scores that could alter the perspective of the researcher. The goal of

the research was to specifically target the deficiencies of struggling students who failed the pretest. Results from data analysis demonstrate that a Supported Study Hall is a successful approach to helping struggling students get caught up in a freshman level algebra course. A secondary discovery was the positive effect it had on the group as a whole.

Discussion

Major Findings

The action research study on the effects RTI has on student failures in math did show that students who engage in comprehensive tier II interventions did in fact show significant growth. All twenty-four students who partook in the study earned a failing grade on the pretest. By the end of the study, all twenty-four students did show positive growth that resulted in a passing grade at the end of the study. The study found that on average, a student grew by 47% over the course of the six-week Supported Study Hall. The amount growth students' made further backs the idea that schools should consider a Supported Study Hall as a strategy to help students. It is also something educators should consider when implementing RTI into their schools.

This means that students who participated in this study made tremendous academic growth in their freshman level math class with the help of a six-week Supported Study Hall. Individual student data supports the need for this type of intervention in schools. The fact that all students made a significant jump is no coincidence and speaks to effectiveness that interventions can have on students. A reason for these findings is that students were put into an environment outside the traditional classroom setting where their individual needs could be focused on, develop new skills, and build their confidence up. Sometimes an environment like this is just what a student needs to be successful.

The findings in this action research study impact student learning in a unique way. The researcher found that the students who participated in the Supported Study Hall ultimately ended up being successful throughout the unit. A supported intervention group led by their teacher was found to have a positive impact on the participating student's growth. This can also impact a teachers approach to teaching because the data supports the idea that small group can help students be successful. Pulling a group of students who are in the same or at least similar spots in the learning process and targeting their skills was an important finding of the action research and something educators should keep in mind. This research does in fact reflect other published literature. For example, in a study conducted on short interventions, the researchers found that short intervention, less than 90 minutes, were extremely effective for student development, retention, and application (Brisson et. al., 2017). The action research in this study found that short interventions of twenty-five minutes a day, four days a week, had the same effect on student performance.

Limitations of the Study

This study did present itself with limitations. A limitation in this study was the group size. A group size of twenty-four was used. It is possible that with a larger or smaller group that results could be have been different. A larger group of students could have been hinder by the amount of attention the teacher could give each student. With a smaller size, maybe the results would have been different because the teacher could give each student the attention they needed. Another limitation was the time of the study. The study took place over the course of six-weeks. The researcher experienced time constraints that limited them to what they could do. The most noted time constraint was managing the time inside the allotted twenty-five minutes of the intervention. As the intervention progressed, some students moved further along than others.

Managing the workload for each student in the Supported Study Hall became an obstacle for the researcher.

Further Study

The findings in this action research emphasize importance of Tier II interventions in struggling math freshman level algebra I students. Future research should be conducted on the effect the Supported Study Hall had on all students, not just struggling students. For example, all students, regardless of where they are at in the learning process, can engage in this practice and see how they grew throughout the unit. These results can be compared to the current study about see how effective the intervention was for all students, not just the struggling ones. This research would be a step in the right direction towards further validating the Supported Study Hall.

Another piece of future research that should be considered is monitoring the twenty-four students beyond the research study. The researcher found that the twenty-four students made tremendous growth throughout the unit but how did they maintain this growth throughout the rest of the school year? Did the Supported Study Hall have long-term positive effects for study growth or performance? These are important factors that future research should consider to further determine the Supported Study Hall's effectiveness. This process can be done by progress monitoring, formative and summative assessments, student surveys, grade checks, and teacher feedback.

By conducting this future research, it will add to the depth, accuracy, and validity of the action research previously conducted by the researcher. It is important to expand on this research to continue to give our students the best possible education, specifically in learning math. By providing a clearer picture, the results of the future research could perhaps give educators, administrators, and key stakeholders on new perspective on interventions, specifically a

Supported Study Hall, and implement them into their schools. The findings could influence educators to adopt these practices into their teaching.

Conclusion

This study provides support for Tier II interventions for struggling freshman algebra I students who specifically engaged in a Supported Study Hall. The study shows that students who enrolled in this study showed great signs of progress. As a result on the study, the twenty-four students' who engaged in the Supported Study Hall, on average, grew 47% over the course of six-weeks from the pretest to the posttest. The results of this action research indicate that this is, in fact, an effective practice that shows positive signs in student growth over a short period of time. The results of this study are steps in the right direction towards discovering effective practices that can help students achieve great results and individual growth.

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