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Guided Math: Best Practice for the General Education Classrooms

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Abstract

Flexible small grouping and Guided Math is becoming widely used in elementary mathematics instruction around the world. However, there are some different viewpoints on whether or not this is the most effective math instruction for students and teachers. Research proves that being successful in math is important in order for students to be successful later in life at their careers. Since mathematics is so important for a successful life, many teachers and researchers are studying new intervention strategies to help students be successful in math. This literature review will contain peer reviewed, scholarly journals researching the history of education, math anxiety, the Guided Math Approach, math interventions, and the similarities to Guided Reading. The results of the studies throughout this literature review revealed that the Guided Math Approach is effective for improving math achievement scores and will help students gain confidence in mathematics.

Key Words: flexible small groups, guided math, guided reading

Guided Math: Best Practice for the General Education Classrooms

Math is a subject that many students seem to hate or struggle in at school. Due to this, many educators have tried to implement new curriculum or intervention strategies to improve students' achievement scores and perception of mathematics (Multu, 2019). Many researchers have found that many students when it comes to the subject of math have anxiety and many teachers have anxiety when it comes to teaching mathematics to students. According to Picha (2018), nearly fifty percent of Americans suffer from math anxiety. This is a major problem when having good math skills is important for a successful life in the working world. According to LiveScience (2013), about eighty-six percent of all jobs require good math skills. This issue has caused many researchers and teachers to begin researching ways to help students be successful when it comes to math. Many companies have invented math programs that are engaging for children or new curriculum to help teachers. Schools have also implemented new math clubs, early interventions for struggling students, and new programs to help teachers be more confident in what they are teaching.

Guided math or flexible small grouping is one strategy or intervention that educators are using to try to decrease math anxiety and increase math achievement scores. Guided math is very similar to guided reading in many different ways. In guided math students take the end of the chapter test or a pre-test before any teaching is done whether in a whole group setting or small group setting. Based on the students' test scores they are grouped into small groups with students who have similar abilities. The small group may change daily, weekly, or monthly based on the different skills being taught throughout the curriculum. For each lesson the teacher would teach for about fifteen minutes in a whole group setting. After the lesson is taught students will work on different skills around the room. While students are working around the room the teacher will

pull back different groups to provide enrichment or intervention on the skill being taught. Pulling students back in small groups allows the teacher to differentiate lessons and activities to the students' level. At the end of each lesson the teacher will give the students a formative assessment to collect data (Benders & Craft, 2016).

Flexible small grouping or guided math allows teachers to have the opportunity to focus student needs and efficiently manage teaching time (Benders & Craft, 2016). Before pulling back small groups teachers will need to provide whole group instruction. During this time, teachers will introduce new skills. After the whole group instruction students will working at different stations. The stations will last from 10 minutes to 15 minutes. One of the stations would be "meet with the teacher". During these stations the teacher will work with a small group of students reteaching past skills or focusing on the new skill taught. After the teacher has met with every group and students have worked at each station then everyone will come back for whole group instruction (Benders & Craft, 2016).

Studying guided math and its results in the classroom could provide structure to be able to meet the needs. There are many reasons why guided math enhances teachers' ability to differentiate instruction to reach the needs of students (Benders & Craft, 2016). The first reason is that it allows teachers to improve the effectiveness of their instruction (McKeen, 2019). Another second reason guided math ensures that students are working with classmates that with similar abilities (McKeen, 2019).

McKeen (2019) states that a huge challenge in the education system with school being non-segregated or non-tracked is teachers being able to adequately meet the needs of the diverse student population in the classroom. Over the years, researchers have completed studies researching the affect guided math has on decreasing math anxiety and increasing math

achievement scores. This literature review will cover the topics of the history of education and mathematics, math anxiety for students and teachers, the effects of guided math and flexible small grouping in the classrooms, and the success of guided reading in the classroom.

Literature Review

History of Mathematics and Education

While students learning mathematics in school still an important topic, there has been many changes in how it is been taught and what is taught. Morgan and Sfard (2106) discuss how math taught to students today is not how people remember being taught to them when they were in school.

The first type of school that Americans had was a one-room schoolhouse (McKeen, 2019). In a one-room schoolhouse students of all ages worked together in one room with one teacher. McKeen (2019) discusses that students during this time worked on tasks that were appropriate to their level of development. The more advanced students would then help teach the less proficient students. This process allowed the needs of all students at different academic levels to be met. The Industrial Era brought many changes to education. During this time there was a huge increase in the economy which allowed schools to buy books and students were able to afford more schooling. This caused an increase of knowledge for students and teachers (McKeen, 2019).

The next big event that brought change to the education system was the civil rights movement. Due to this movement schools were no longer able to be segregated. This meant that schools had to allow students of a different race, socio-economic status, and ability into their classrooms with other students (McKeen, 2019). The segregation movement McKeen's (2019) research discuses that know teachers have to be prepared to help students be successful in education no matter what their socio-economic status is or their academic level. Due to this, many educators have been trying to develop new curriculum or strategies to meet every students' needs.

What is Guided Math?

Guided math is a new concept for educators in the mathematical setting. Benders and Craft (2019) define guided math as a data-driven intervention that matches a student's readiness level for learning with the appropriate instructional strategy, delivering the right content at the right pace. Another name for guided math is flexible grouping. According to Mckeen (2019), guided math or flexible grouping ensures students with similar abilities or capabilities are grouped together to ensure students are receiving instruction at their academic level. Guided math allows students to help each be successful by collaborating and learning together according to Mckeen (2019).

Guided math can be beneficial for many reasons. One reason is that small groups offer opportunities for active learning and engaging conversations (Cohen, 1994). Another reason would be that students are able to work at an appropriate instructional level and at the right pace (Benders & Craft, 2016). The third reason guided math or flexible small grouping is beneficial is the framework offers educators an alternate for how math instruction is given to students (Benders & Craft, 2016).

Math Anxiety

Math anxiety is very common in students who do not have math learning difficulties and in students who do have math learning difficulties according to Mutlu (2019). A study published by Mutlu in June of 2019 examined the relationship math anxiety in schools with and without learning difficulties in math and achievement in math. To complete this study Mutlu observed 288 third grade students located in a low socioeconomic area. During Mutlu's study, he collected data using a math anxiety scale and math achievement test scores. Throughout this study Mutlu was trying to determine the relationship between math anxiety and math achievement in students.

Mutlu's study found that there was not a significant difference between girls and boys having math anxiety. The findings of this study revealed that there is a strong relationship between math anxiety and math achievement. According to Mutlu (2019), it was also found that students begin to develop math anxiety in lower elementary. At the end of the study it does discuss that having effective instruction with review and practice can help eliminate math anxiety before it has a negative effect on student achievement.

In 2011, the National Assessment of Educational Progress required 4th, 8th, and 12th graders to be assessed in reading, math, and social studies. The results of this assessment showed that eighty-two percent of elementary students reached only partial mastery of math knowledge and skills fundamental for proficient work at the 4th grade level. Boes and Ruff completed a study in 2014 determining how math anxiety affects the achievement of students in the fifth grade. Boes and Ruff defined math anxiety as stress causing negative physical reactions that interfere with the manipulation of numbers and problem solving in both academic settings and everyday life. To complete this study Boes and Ruff found 14 students that did not meet the winter target and were identified as students with math anxiety. Boes and Ruff met with the students twice a week for six weeks in a small group setting. During the sessions the group discussed expressing feelings, positive self-talk, and stress reduction. At the end of the study students were given a survey to determine their attitudes towards math. The data from the surveys showed that after the twelve sessions the students experienced less math anxiety and higher math achievement.

A child's self-efficacy beliefs in learning and performance have an effect on their math achievement. Ozkal completed a study in 2019 determining the relationship between self-efficacy belief, engagement, and academic performance in math lessons. Self-efficacy is defined

as the belief of the individual about his/her capacity to do things. Ozkal (2019), students being disengaged in school has become a huge problem for educations. Research proves that students who are disengaged will provide less effort and have a higher risk of dropping out or displaying problem behaviors in the classroom. To conduct this study Ozkal had 658 sixth, seventh, and eighth grade students take a learning questionnaire that included questions about self-efficacy, and motivation. Data was collected by different surveys and math semester grades. The results of this study showed that students' self-efficacy beliefs in learning and performance has a significant effect on their math achievement. According to Ozkal (2019), students who are anxious, bored, unmotivated, or display negative behaviors in math are going to be less successful than other students in the classroom.

It has been found that elementary teachers that experience math anxiety play a huge role in their students' math achievement (Ramirez et al. 2018). In this study conducted by Ramirez et al. math anxiety is defined as a persistent fear, tension, and apprehension related to situations that require math. Ramirez et al. completed a study in 2018 determining the relationship between teachers with math anxiety and their students' achievement. The researchers took 1,886 students from 11 different public high schools. They collect data from surveys completed by the students and teachers and the students' final math grade for the first semester. At the end of this study they found that higher teacher math anxiety is associated with lower math achievement. Ramirez, et al. (2018) stated, that students' perceptions of their teachers' beliefs can have an impact on their achievement scores. For example, if students believe that their teacher does not believe all students can be successful at mathematics, lower math test scores can be predicted.

Math anxiety is something many teachers have, and it can have a great impact on student achievement (Ganley et al., 2019). In 2019, Ganley et al. completed a study with 399 public

school teachers in Florida to measure their math anxiety and the effects it can have on student achievement. To measure teachers' math anxiety teachers took the Math Anxiety Scale for Teachers (MAST) and interviews. The study found that the feeling of math anxiety occurs when a teacher is teaching math or engaged in mathematical activity. It found that math anxiety was higher among lower elementary teachers than upper elementary teachers and this is because of lower mathematical knowledge and more traditional beliefs about math teaching and learning. The research in this study reveals that teacher math anxiety can have an effect on their teaching practices and the students' math outcomes. At the end of this study the researchers stress the importance of learning how and when to intervene to stop the harmful effects of math anxiety in teaching and learning.

Students' today live in a society where everything relies heavily on technology, problem solving, science, and mathematics (Furner, 2017). Due to this, it is important for students to feel confident in their mathematical abilities. Furner completed a study in 2017, noting the importance of math teacher and school counselors working together or math teachers taking on the role of counselors to decrease math anxiety in students. Furner discusses that students with math anxiety tend to give up rather than face their fears and try something new. When this happens, students have the chance to not get better at math or overcome their math anxiety. In this research it discusses different ways to help students build confidence in math. Some of the ways were allowing students to journal and share how they feel about math, completing lessons or activities that focus specifically on reducing math anxiety, and having class discussions about math anxiety. During this research Furner considered the teacher's obligation in students' confidence. Furner argues that it is the teacher's obligation to ensure that their students are confident in their math abilities because it has such a huge impact on their career choices.

Different types of teaching styles can have an effect on math anxiety. Van der Sandt and O'Brien completed a study in the fall of 2017, investigating how math anxiety is impacted by the instructor's teaching style. To complete this study Sandt and O'Brien took 160 preservice teachers who were attending a math content course for elementary school teachers. The courses were taught by two instructors and the students were split between them. Instructor A had a problem based, inquiry-driven teaching style. Instructor B had a direct teaching style. Sandt and O'Brien collected scores from two semesters and surveys to form their results. The results of this study showed that problem-based teaching style had a huge positive impact on anxiety. However, direct teaching style did not have a positive or negative effect on math anxiety.

Math anxiety is very common in pre-service teachers and it is be found that many experience higher levels of anxiety than other college students (Sanders et al. 2018). In the Winter of 2018, Sanders et al. completed a study with the purpose of determining the perspectives of pre-services teachers with math anxiety in doing mathematics in a whiteboard room. The researchers define a whiteboard room as a room lined with large, wall-mounted, standard whiteboards on all four walls of the classroom with no desk in the room. This requires students to complete math problems on the whiteboards. To choose participants for this study, students were required to complete a Diagnostic Skills Test. If students score less than eighty percent on the test, they were required to attend weekly math workshops held in a whiteboard room. The results of this study showed that students gained confidence due to having positive interactions with peers and instructors. Results of the study done showed that participants working on math in a whiteboard room had a positive experience and were actively engaged in the lessons. The whiteboard room offered positive interactions between peers and educators and

cultivated an engaging learning environment that helped decrease math anxiety (Sanders et al., 2018).

Research has found that there is a relationship between a student's participation in the mathematics setting and the student's self-efficacy. Choi and Walters published a study in December of 2018 examining the relationship between student participation and confidence and self-efficacy in math and if student participation is related to math performance. To answer these questions the authors observed the students' level of participation and final grade at the end of the course. Students also took reflection assessment at the beginning of the course to measure confidence and self-efficacy. Data was collected from participation logs, reflection assessments results, end of the course grades, and state assessment results. The results of this study found that most of the students that participated in the daily sessions liked math and thought they were good at math. They also found that the students' confidence and self-efficacy did not change over the course of time. The results also showed that students who participated in group discussions often had higher final scores.

Guided Math/Flexible Small Grouping

Within-class ability grouping (WCAG) has become commonly used in math instruction. However, many critics believe that it limits the learning opportunities for students. Webel and Dwiggins published a study in 2019 examining how teachers' past experiences can have an effect on ability grouping in the mathematics. For this study the authors gave two assignments to eighty-eight elementary teachers. For the first assignment, teachers had to read about the benefits of ability grouping and write a reflection of the experiences and thoughts of ability grouping. The second assignment, teachers had to interview their host teachers about differentiating instruction and small groups. Then the teachers had to write a reflection about what they learned. Webel and

Dwiggins found that most teachers in the study had experience with some form of ability grouping and their perspectives on ability grouping did have an effect of their instruction.

According to Webel and Dwiggins (2019), throughout this research some participants expressed concern about labeling and separating students into different levels. The participants discussed that labeling and separating students based on levels can have detrimental effects based on their past experiences. Teachers expressed concerns about students knowing which group was the high group or low group and that causing some self-confidence issues with students. At the end of the study the authors discussed how to no matter if students are great at math or struggle, they all deserve high quality math instruction.

McKeen discusses in this study that research has shown that flexible small group is one of the prime strategies for students with special needs in the classroom. It is one of the best strategies because it allows teachers to give more support to students during the instructional process. In the winter of 2019, McKeen published a study discussing the impact of flexible grouping on math achievement scores in first through fourth grades. The participants of this study were first through fourth graders from Harris County School District. Students were grouped based on their scores from the Criterion Referenced Competency Test (CRCT) taken the year before. To determine the success of flexible grouping scores were taken from the CRCT at the end of the following year. The results of the impact of flexible small grouping varied in the different grade levels. The results showed that the students in grades 1st through 3rd greatly improved after being exposed to flexible small grouping. However, the 4th grade students that were exposed to flexible small group did not have a significant effect on their CRCT scores at the end of the year.

Guided math has been proven to have a positive impact with students in first grade. Benders and Craft published a study in the Spring of 2016 exploring the impact of guided math on first grade students' math achievement scores. In this study researchers had a class of twenty-five students that were at all different levels and did what is called guided math with them. To determine the Bender and Craft used the students' MAP test scores. Eleven out of the twenty-five students, eleven of them were below grade level. They would teach a lesson for about fifteen minutes and would then pull the groups back to work with the teacher on the skill taught that day for about 10 to 15 minutes while other students worked at stations. This allowed the researcher to do enrichment with the students above grade level and spend more time helping students below grade level understand the skill. To record data the students were given a pre and posttest. At the end of the study the research showed an increase in student growth. The average test score students received was ninety percent and many students scored one hundred percent on the test. According to the post-test, 6 students reached "mastered level while 5 are considered to be in the "In Progress" level". They found that pulling students back in small groups based on their level was very beneficial to improving math scores. Bender and Craft stated, the flexible small group intervention allowed them to identify and target individual student's particular difficulties.

Throughout this study research shows that small group interaction during math instruction can produce conceptual mathematical understanding for students. In the 2014, Hunter and Anthony published a study examining the impact of mathematical talk in small groups. This study was completed over six years and was part of three consecutive studies. To collect data the researchers used teacher and student interviews, classroom artifacts, field notes, video recorded lesson observations. While in small groups students were engaging in mathematical conversations in a safe environment. At the end of this study the evidence showed there was

positive outcomes in mathematics learning from small groups. This study proves that when in small groups students are more willing to be discussion with their classmates.

Enu, Danso, and Awortwe completed a study in 2015 researching whether or not group size has an effect on the students' math achievement in a small group setting. The researchers took two third year classes and broke the students into twelve different groups. Groups were made out of three students four students, and five students. To complete this study the researchers observed the groups working on face to face communication activities, independent worksheets, and group lessons. To collect data the researchers used a pre achievement test and a post achievement test. At the beginning of the study the researchers hypothesized that the smaller group would have bigger achievement gains, but when they collected data, they found different information. After collecting data, the research showed that there no significant difference between the groups' achievement scores. Enu et. al (2015), stated that the group size is less important when predicating student achievement. They claim that what the students do within the small group setting has a bigger impact on the students' achievement scores. However, they do suggest that groups sizes should stay between three to five students to benefit the students academically.

When pulling students back for guided math or flexible small grouping it is important for those groups to be productive. Cohen in 1994 completed a study researching what conditions are needed for a small group to be productive. Cohen reviewed multiple studies researching the process of making small groups productive. One important piece of information Cohen found through her research was consider whether the assignment in given a small group setting is a true group work task or independent seat work (Cohen, 1994). The goal of small groups is for the students and the teacher to interact and have meaningful conversations about the topic. This

brings up another important piece to remember when constructing productive small groups. Teachers need to spend time fostering meaningful, engaging, and positive interactions between students in the small group (Cohen, 1994).

Math Interventions

Problem-solving is vital to mathematics education throughout the world and many students struggle with this skill. In the Spring of 2109, Alvi and Nausheen completed a study examining the effects of working as individuals and in a small group setting on mathematical problem solving with 9th grade students. The participants for this study were made up of five 9th grade boys that ranged from high achievement to low achievement in math. To collect Alvi and Munaza took interviews, observations of students problem-solving when in small groups, written response to problems, and group interviews. The results of the study showed that when in small groups the students rarely used their learning tools, instead they would rely on help from each other. The students stated that they preferred to work in small groups because it developed unity and support from each other. The findings of the research revealed that the participants sometimes put more emphasis on group work based on the problem. Research recommends that teachers should utilize both individual work and small group work to help meet the needs of all students.

Many different interventions and strategies have been implemented in classrooms to help meet the needs of students in math. One strategy implemented is mathematics through modeling approach. In the Fall of 2019, Riyanto and Putri completed a study exploring the impact mathematics modeling approach had on students. Riyanto and Putri (2019) discuss that using the mathematical modeling method when teaching helps students have a better understanding of the relationship between mathematics and real-world problems. The participants of the study were

seniors in an Indonesia high school. Data was collected through student work and student comments on the new approach. The evidence shown in the data found that students were enjoyed learning math using the mathematical modeling and were able to make mathematical models on their own. While this study proved to make math more enjoyable for students it did not prove that it had any impact on the students' achievement.

High school math skills are related to a host of adult outcomes, including job selection and salary size (Watts et al., 2014). The in Spring of 2014, Watts et al. completed a study examining the effect math achievement growth in early grades has on upper grades. The participants of this study were children from preschool to fifth grade. To collect data scores were taken from The Woodcock Johnson-Revised Applied Problems to measure their math achievement. The results of the study found that early growth in math ability are associated with later achievement.

In order for interventions to be successful teachers need to have the knowledge to implement them into the classroom. In December of 2018 Hurlbut and Tunks completed a study. The purpose of this study was to examine how elementary pre-service teachers transfer mathematical intervention practices into the classroom. The pre-service teachers were required to use Response to Intervention (RTI) with working with small groups of students. They had to provide four to six intervention lesson while tracking the students' progress. Hurlbut and Tunks collected data through the pre-service teachers' assignments and focus group interviews. Pre-service teachers demonstrated a foundational understanding of mathematical instructional practices including using assessment data to plan meaningful interventions, making necessary instructional adjustments according to student learning needs, using manipulatives and engaging learning opportunities to facilitate conceptual learning about math, and implementing appropriate

pedagogical practices to maximize the learning experiences (Hurlbut & Tunks, 2018). Hurlbut and Tunks stress the importance of teachers being knowledgeable about RTI and how it is important for at-risk students.

Equality in mathematics access has generally been considered an important issue in mathematics education. Supporting opportunities to learn mathematics for all students, especially for low-SES and low-math students, is a key approach to implement equality in mathematics (Yang et al., 2014). This study was completed in the Fall of 2014. The purpose of this study was to examine the effect of remedial instruction on low-SES and low-math first grade students. Previous studies indicate that low-SES students and low achievers in mathematics who are at risk in mathematics performance need more and assistance; unfortunately, they usually do not receive enough attention researchers and instructors (Yang et. al, 2014). The participants of this study were fifty-seven first graders. Thirty-one of the participants were boys and twenty-six were girls. Out of those fifty-seven first graders twenty-four were low-SES. After the students were given a basic mathematics competence test and fourteen scored at the bottom thirty percent of their class. These fourteen students received remedial instruction. For the next eight weeks the fourteen students received forty minutes session twice a week. During each lesson a story was told to the students, a key question was posed, students used materials to solve the problem, and groups shared their ideas on how to solve the problem. To collect the data the researchers scored the work the students completed two ways. The first way was response accuracy (correct answer) and the second way was the scoring solution process (strategy used to get the correct answer) After collecting this data over eight weeks the students were given a posttest. The results showed the low-SES and low math students that received remedial instruction scored significantly higher on the posttest then on the pretest. The researchers found that remedial instruction also helped

students gain confidence in math and interest as well. As stated above equality in math is an important issue but is hard to achieve due to many different reasons. Remedial instruction in small groups is proven to help students that are from low-SES and have low math achievement. The small groups allow teachers to focus on the skills or strategies the students need to be successful.

Similarities of Guided Reading

Guided math and guided reading have many similarities. The main similarity is that students are put into small groups based on their ability. In 2014, Gaffner et al. published a study discussing the effect of collaborative effects between a school district and a university when conducting a reading clinic that conducted small guided reading group lessons with elementary students that are reading below grade level. The clinic was a yearlong and was put on by a local university. To determine the success of the clinic data was collected from two different reading assessments. The authors found through this study that clinic had a positive impact on the reading growth of elementary students. The growth was even larger for students that participated in two semesters of the clinic. This study proved that collaboration with schools and universities will have a positive impact on the students and that putting students that are below grade level into small groups to differentiate their reading lessons will also have a positive impact on the students. To relate this to guided math it shows that small groups can help students have higher achievement and that teachers should be collaborating with universities to help students have positive growth.

Teaching students to read is a challenge all on its own, but it is even a bigger challenge when students have a disability. In this research it discusses the impact of guided reading had on students who were deaf. Schaffer and Schirmer decided to implement the Guided Reading

Approach on a daily basis to investigate the effectiveness of the program when working with students who are deaf. To begin this study a child is tested to determine their reading level. After determining their reading level, the student spends around five sessions on one book doing various activities. The results of the study found that deaf students gain one-third of a grade equivalent change during the school year. They also found that student achievement dropped from the end of the year to the beginning of the next year. The teachers spend the first few months working to get the students back at their last year's level. Schaffer and Schirmer (2014), discuss that the Guided Reading Approach provides educators with instructional tools that allow students the opportunity to become very capable readers. The Guided Reading Approach allowed the teachers to choose books and activities that were at the child's level and interest. This made the lessons more personalized. The reason this research relates to guided math is because guided math also allows the teachers to choose lessons and activities that are on the students' level or skills/strategies that they are struggling with. The lessons are then personalized to the student or groups. When teaching math to a student who has a disability this method can be very beneficial.

Guided reading has been shown to improve students' reading skills. Makumbila and Rowland completed a study in 2016 to test the statement above. The goal of this research was to see if the guided reading approach would help students become independent readers. Four third grade teachers volunteered to participate in this study. Before implementing the guided reading approach into the classrooms, teachers were required to have professional development where this approach was taught. During the study the teachers were also required to participate in teacher group discussions and classroom observations. At the beginning of this study the percentage of struggling students was higher than students who were proficient. After collecting

data, the research showed that the percentage of students struggling in reading dropped to ten percent. Makumbila and Rowland (2016), observed that teachers needed more training and resources for the guided reading approach to be truly successful to improve students' reading skills.

Application

This literature review has provided many valuable resources to bring back to the classroom. According to Yang et al. (2014) math for all has been internationally considered a key issue of mathematics education. Every student should not only have the right to approach mathematics equally but should also learn and understand mathematics equally. It is important to understand why they are struggling in math. Pulling students back in small groups could be could in the best growth for the students. Teachers could plan to incorporate small groups into their math lessons and determine what strategies or skills work best with each group. One of the first thing a teacher could is sit down with other teachers in that grade level that they work with and collaborate with one other what strategies work or them and which do not. This is would be important to do every year to ensure that everyone is on the same page to start the year off. By collaborating regularly, it will allow teachers to review data and discuss any instructional changes that need to be made. Using data to guide instruction is a major component to a students' growth and success in mathematics.

This literature review has revealed many positive effects of pulling students for small groups for success in mathematics. There have been several different strategies for pulling students back for small groups whether it is using the guided math, remedial instruction, or interventions. As Mutlu (2019) stated the importance of mathematics in daily and professional life has been increasing with the contribution of developing technology. As the world continues to improve the technology and invent new types of technology math as become more prevalent in society. It shows how important it is for all students to be successful in mathematics. Teachers have taught in small groups for a very long time. However, the strategies being used in the small groups are important when implementing small groups. The different skills or strategies used in

the small groups can change the whole outcome. Benders and Craft (2016) stated flexible grouping provides students an opportunity to learn at their level and proceed to higher levels of achievement. Student achievement growth should improve by getting the support they need. The key part to remember is to give the students the opportunity to learn at their level with the support they need gives them the chance to be successful in mathematics.

The first step that teachers could do to implement the Guided Math Approach is to decide how to group students. This literature review revealed several different resources teachers can use to decide how to group students. Some of the resources were state test math scores, pretests, MAP testing, classroom observations etc. It does not matter which resource or test teachers decide to use to group students. The important aspect to remember is students need to be grouped by their ability and students need to work at their level with support to help them be successful. As Benders and Craft (2016) pointed out these scores can be used by teachers to pinpoint what students have learned and what students are ready to learn.

The second step that teachers could do to implement the Guided Math Approach is choose stations or work for students to work on while they are not with the teacher. It is important not to choose “busy work” to keep the students quiet while the teacher is working with a small group. Instead the work needs to be help students practice the skills they are working on. Mckeen (2019) discusses that it needs to enrich the knowledge students acquire from their teachers and from fellow students who have a better grasp of specific content or skills. It is imperative that students are constantly working on skills and strategies that will help them become successful at mathematics. While pulling students back it is important to progress monitor them to see if the intervention is making any improvements with the students.

The third and final step teachers could do to implement the Guided Reading Approach is to use the data to guided instruction. Benders and Craft (2016) say that interventions should be guided by data to identify a student's strengths and weaknesses. Flexible small grouping in mathematics, also known as Guided Math, is a data-driven intervention that matches a student's readiness level for learning with the appropriate instructional strategy, delivering the right content at the right pace. Whether it is weekly or daily teachers need have formative assessments to collect data. Teachers could take their data to the other grade level teachers they are working with to make decisions. This would also teachers to share idea and strategies or skills they have used that have been successful in their classrooms.

Conclusion

As Mutlu (2019) says the level of mathematical knowledge and skills directly influence the quality standards of our individual and social life. This literature review reveals there are many different ways to implement small groups in the classroom to increase student achievement and confidence in mathematics. The research in this literature review has proven that pulling students in flexible small groups based on their abilities to significantly impact students' math achievement and allow them to gain confidence in mathematics.

The future research done on increasing math achievement within flexible small groups needs to be focused and implemented in multiple schools, variety of grades, and with students at different ranges of academic levels. Another important component when conducting further research is when seeking the most effect flexible small group strategies to increase student math achievement, also measure how well students are able to complete the skill on their own with no support. The goal of flexible small groups is for students to learn strategies to use on their own after they receive the support needed. Another goal is for students to no longer need intervention to support their math needs. Bender and Craft (2016) stated early intervention programs designed to target early mathematical skills in the primary grades can have positive effect on children's achievement throughout their educational career.

It is important for teachers or staff members, that work with students are taught math strategies to help the students be successful. Even involving the parents will be beneficial for the students. Teachers can send home math information or have informational meetings to teach parents the strategies their child is using in school. Teachers, staff members, and parents need to work together as a team. Everyone works together as a team, that is when the biggest impact will be made.

Even though there have been multiple studies done to see if guided math is an effective intervention program to increase math achievement, there is still a lot of research that needs to be done to determine the most effective math intervention to be determined. It is important to remember the students learn in many different ways. Mckeen (2019) discusses one of the biggest challenges faced in desegregated and non-tracked classrooms has always been effectively meeting the needs of diverse student populations. Teachers must be prepared to help students be successful no matter what level they are at. This means teachers need to be constantly researching to find more strategies to meet the needs of all students.

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