GIVING STUDENTS CHOICE IN MATH WORKSHOP AND ITS EFFECTS ON STUDENT MOTIVATION

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Abstract The purpose of this action research study was to explore whether giving students' a choice of learning activities impacted their motivation to learn math. According to research, allowing students more ownership in their learning increases their motivation in that subject (Godzicki, Godzicki, Krofel, & Michaels, 2013). The study took place in a second grade classroom comprised of 21 children. Upon noticing a high level of student disengagement during math, instruction was changed from a traditional, whole class approach to a workshop approach using math stations and differentiated instruction. This approach included four stations: targeted small group instruction led by the teacher, a journal station designed to give students practice using pencil-and-paper methods, a game station, and an electronic station. Students were required to participate in the teacher led station, however they were given the choice to attend whichever remaining station/s they felt would best benefit them. The results of this study support the idea that students prefer math workshop to a traditional instructional approach and their motivation to learn increased when this approach was used to instruct math. Interestingly enough, the results of this study did not support the idea that students were more motivated to learn when given the freedom of choice in their learning. Other factors in the workshop approach seem to drive students' motivation to learn more than choice. This study is significant because it provides educators some surprising insight into what motivational factors influence students' learning.

Keywords: math workshop; choice and motivation, differentiated instruction

Introduction

Almost immediately after school began, students began to exhibit a wide range of mathematical abilities in my second grade classroom. Some students were obviously struggling to understand the new math concepts being taught while others were bored and disengaged. It seemed that students were unmotivated to learn in the whole class setting, which had a negative effect on student learning. Disruptive behaviors such as hyperactivity, disengagement, and poor attention span were prevalent behaviors exhibited by students

during math whole class instruction. The wide range of student abilities made teaching to the class as a whole challenging. Struggling learners were frustrated because they lacked the foundational knowledge of math concepts needed in order to learn new grade level material. Students who scored poorly on several formative assessments exhibited a lack of understanding of basic math skills, such as skip counting and number sense, which impacted their ability to perform the math goals contained in the first math unit (counting money, using a number line, and using a number grid). Accelerated learners were disengaged because they had already mastered the grade level material and were not being challenged. These students appeared bored and unmotivated to learn. The students' learning and behavior issues seemed to get worse as the learning progressed through the first unit. They had no choice in what material they were learning or how they were learning it. Several weeks into school, instruction was changed from a whole class approach to a math workshop approach in an attempt to provide students with the differentiation needed to address the wide range of student ability in the classroom. The primary purpose of math workshop is to provide targeted and differentiated instruction to small groups of students. When students are taught at their own learning level, they are more engaged in their learning (Godzicki, Godzicki, Krofel, & Michaels, 2013). This increase in student engagement is positively correlated to their knowledge acquisition (Smith, Sheppard, Johnson, & Johnson, 2005). In this approach, students rotate through stations organized by the teacher. These stations are designed to allow the teacher an opportunity to directly instruct small groups of students while the remaining students practice math skills at various other station activities. Because math workshop has been positively linked to increased student engagement and overall learning, I was interested to see if students in my own classroom would react positively to the workshop approach.

Literature review

Math Workshop. Traditional whole class math instruction differs from the math workshop approach in that it centers on the teacher instructing the entire class at one time. It typically involves memorization of rote skills, demonstration of mathematical techniques, and a "sit and get" approach to learning (Hedman, Birky & Dirks, 2015). Traditional math instruction typically involves the educator teaching to the middle academic ability level, therefore not addressing the needs of challenged or accelerated learners (Andrews, McFeggan, & Patterson, 1998). In this approach, learning in the classroom becomes a competition of sorts – the first one to get the answer "wins" (Medoff, 2013). If a student is struggling, he or she must ask questions in a high pressure environment in front of a classroom of his or her peers (Medoff, 2013). Kids may feel embarrassed to participate if they are not positive they have the correct answer. The traditional math approach is disengaging for many students, as indicated by several off task behaviors (Martin & Pickett, 2013).

During workshop, teachers typically follow an "I-do", "we-do", and "you-do" approach. In this focused session, all learners come together (Wedekind, 2011). This is a technique commonly used in elementary classrooms in which the teacher scaffolds instruction in order

to provide students with enough support to be successful independently over time. In this approach, the teacher first demonstrates a new skill to the class. In these 15-20 minutes, the teacher connects prior learning to new learning, demonstrates the skill being learned, and sets expectations for the class (Bowgren & Sever, 2010). This phase of the workshop replaces the traditional approach to math instruction. This is one preferred method of delivering instruction because it allows the teacher to differentiate material to better serve students. Bowgren and Sever (2010) remind us that a teacher's primary responsibility is to meet the needs of every learner; otherwise he or she only reaches a portion of students. Because of its design, the traditional approach addresses a classroom of learners at one time, knowing and reacting to individual students' needs becomes improbable. In the math workshop approach, however, teachers are more readily able to reach the needs of all students. "Differentiation has become the instructional powerhouse that helps move all students toward worthy outcomes" (Hedrick, 2012, p. 35). Small group work allows the teacher to offer direct support and specifically target instruction to meet students' needs (Medoff, 2013). While the execution of math workshop varies among classrooms, the approach is founded in the idea that teachers provide small groups of students with direct and differentiated instruction. While the teacher is working with small groups, the other students rotate among additional activities designed to give them additional practice on predetermined math skills.

Student Choice in Math Workshop. Another important aspect of my research was to investigate whether giving students more choice in their learning influenced their motivation to learn math. Specifically, I was interested in giving students a choice of which station(s) to visit during math workshop in order to most benefit their learning, to determine which station(s) were students' favorites, and to determine if learning still occurred when students were given that choice. According to researchers, allowing students to make more choices in their learning is motivating to them. Some research attributes this increase in motivation to the students having the option to choose activities that suit their natural strengths (Birdsell, Ream, Seyller, & Zobott, 2009). Students who learn best with a classmate, for example, may learn more from playing a partnered math game than an individual worksheet. Some researchers also found that allowing students more choice in their learning produced more positive behaviors and an increased motivation (Birdsell, et al, 2009). In my math workshop, all students rotated through every station daily, however, they were not given a choice as to which station they want to visit or how long they want to stay in each station. I made every effort to ensure students received direct instruction as well as an opportunity to practice skills at their own learning level, but I wondered if I could motivate them more if I provided them with more choice in their learning. The purpose of this study was to explore whether I could increase students' motivation by offering them the freedom to choose which math stations they participated in.

Methodology

In the workshop approach, the teacher presents a 15-20 minute “mini-lesson” to the entire class and then the class breaks into small groups to do collaborative work. Students rotate among the stations for the remainder of math workshop time. In the teacher led station, instruction is targeted directly to students’ needs and differentiated between groups of students. During this time, the teacher can re-teach previous material students are struggling with, scaffold instruction on the day’s lesson, or provide enrichment opportunities to groups of students. When students are not working directly with the teacher in a small group, they rotate among several other learning stations in the classroom in predetermined groups. These stations may vary from teacher to teacher, but in my classroom there are three stations in addition to the teacher-led station. These stations typically include a math game designed to give students an opportunity to practice existing skills or newly learned skills with a partner, an activity intended to help students memorize basic math facts, and a worksheet. The worksheet either gives students an opportunity to practice the skill taught that day (Monday – Thursday) or is used as a formative assessment to measures skills taught up until this point in the year (Fridays). These worksheets are collected and students’ progress is noted on a tracking sheet. I then use the tracking sheet to plan for the next week’s small group instruction and re-group students as needed based on what skills they could be taught (or re-taught). All stations in my classroom are typically differentiated based on student skill in an effort to maximize learning potential and interest while minimizing behavior issues.

This study was conducted using a mixed methods approach, looking at both qualitative and quantitative data. Qualitative data was collected concerning student opinions about whether or not the Math Workshop approach is more motivating than traditional, whole class instruction. Data was collected by observational notes and transcribed interviews with students. The data gathered contributed to the understanding of what, if anything, about math workshop is most motivating to students. It will also gain insight as to whether or not there is a relationship between motivation and learning. Data will be used to guide instructional strategies to fill those voids. Quantitative data was also collected by a student survey designed to gain insight into students' feelings about math workshop.

The research questions that guided this study were:

- Which method of instruction do students prefer – traditional or workshop?
- If students were able to choose which station/s to visit in math workshop, which station/s would they choose?
- Would having more choice in their learning motivate students more to learn math?

To gain insight on these questions, mathematics was taught using a workshop approach. Students continued to receive small group targeted instruction in the teacher led group, however they were free to choose which of the remaining three stations they visited daily. A tally of which stations were most visited was kept in order to determine which were most

popular. In addition to this, some students were interviewed to gain insight into what they liked/didn't like about this new approach.

Participants and Setting. The research was done at a Midwestern elementary school serving 395 students in grades kindergarten through fifth. It has an unusual demographic, in that the school is located both near an affluent golf course and low-income apartment housing. Fifty-nine percent of the families served are listed as having low income, and the majority of the rest of the students are from upper middle class, two parent families. Families from both demographics attend school functions, such as parent-teacher conferences and family events held at the school. Fifteen percent of the students enrolled have an individualized education plan. The school has a 15% mobility rate.

The class participating in this study contained 21 students; 12 boys and 9 girls. Of those students, 47% are Caucasian, 33% are African-American, 14% are Hispanic, and 6% list their race as "other." Two students had individualized education plans that included support for both math and reading. Most of the families were involved in their children's education, as based on teacher/parent communication and returned homework.

According to the measure of academic performance (MAP) standardized testing data, 62% of students scored below average on the math portion of the assessment. This assessment measures students' ability to perform the following math functions: operations and algebraic thinking, numbers and operations, measurement and data, and geometry. Students who failed to meet expectations on the math assessment typically failed all subsection of the assessment, which is to say that the results did not indicate one specific area of concern for students.

Data Collection. Before the unit began, I explained to students the changes being implemented in math workshop for the purpose of this study. I explained to students that while they would still work in a designated small group with the teacher daily, they would choose how to spend the remainder of their time during math workshop. We spent some time discussing what each station was designed to teach them and I asked them to consider how they felt they learned best. I also spent some time reviewing the behavioral expectations in math workshop. I felt that reviewing the parameters of math workshop was vital to ensure students stayed on task, remained focused, and continued to learn once they were provided with more freedom of choice in this study.

This research combined both qualitative and quantitative methods of data collection. The first piece of quantitative data came from a 3 point Likert scale-based survey. This questionnaire was designed to measure their overall perception of math workshop versus the traditional instruction approach. This questionnaire was also designed to measure whether students had a favorite station to visit during math workshop and whether they felt the benefits of small group instruction. As the teacher, I anticipated students would prefer the workshop approach to a traditional approach based on my informal observations of how the class reacted when I changed from a traditional approach to a workshop approach earlier in the year. I was interested to conduct a more formal study to explore whether my

assumption was correct. I was also interested in finding which station/s were students' favorites so I could further incorporate these stations in my math instruction.

The second piece of data collection involved tracking students' learning throughout the unit of study. To measure students' learning throughout the unit, I administered the unit pre-test in order to gain an understanding of what material students already knew. This information aided me in forming groups and planning small group instruction throughout the unit. The results of the pre-test were entered into the skill based tracking sheet previously mentioned. The tracking sheet was updated weekly as students were formatively assessed and used to guide future instruction. This information was used at the conclusion of the unit to measure whether or not learning occurred.

The third piece of data collection occurred through observational notes. Once we began the unit, students were grouped homogeneously to work in the differentiated teacher led station based on the results of the chapter pre-test. When students were not receiving direct instruction in the teacher led station, they had the opportunity to choose to visit one, two, or all three remaining stations. They chose their partners or could choose to work alone. Each station was fifteen minutes in duration, which allowed me sufficient time for direct instruction in the teacher led station. After fifteen minutes, I asked the next group of students to meet with me while the remainder could choose to stay in their current station or switch to a different one. I recorded which stations students chose using a tally sheet. This was repeated four times until each student had visited the teacher led station.

The fourth piece of data collection involved student interviews. At the conclusion of the unit, I analyzed data to determine which station(s) were the students' favorites. I conducted interviews with 6 students (two struggling math students, two students performing at grade level, and two talented students) to gain insight on why they chose their favorite station. I also administered a unit post-test and analyzed the information to determine if learning occurred while students were given the choice to choose which stations they visited during math workshop.

Skills in Small Group Instruction. At the beginning of the school year, students were administered two pre-tests over the course of a week. The first pre-test measured student knowledge of math skills to be taught the first month of school (unit 1). The second pre-test measured student knowledge of math skills to be taught the first trimester of school (units 1-3). Students also took the MAP standardized test. Using a tracking sheet listing all the skills measured on the pretests administered to students, skills each student were and were not able to successfully complete were noted. Students were then placed in four homogenous groups based on the skills they needed to learn and math goals for each group were planned throughout the first three units of study. These groups are flexible and are subject to change based on students' progress throughout the unit. Goals for the lowest performing group centered on the foundational skills students lacked, but will need in order to grasp new second grade concepts. The group performing on grade level will concentrate on practicing grade level skills and will be provided scaffolding in order to be better able to document their math reasoning skills in a written format. The group of students that

showed a mastery of the material on the pretests administered will receive enriched instruction. This instruction includes some extension of grade level material, pre-teaching third grade skills, and will be provided scaffolding in order to be able to document their math reasoning skills in a written format. Data from the MAP test will also be used to guide instruction for the students performing on and above grade level.

Coding. Each student in the class was assigned a number used throughout this study to help organize the data and keep it confidential. In order to determine which math station/s were most visited, observational notes were collected daily to determine how students chose to move throughout the stations. The notes indicate which station each student chose to visit first and documented each time they changed math stations throughout that day's math lesson. At the end of each lesson, results were tallied. Student numbers were also used to label the surveys and the pre-tests and post-tests.

After the six student interviews were transcribed, I compared student responses to the questions asked. I then used NVivo Coding to look for common themes among student responses. Differences in opinions were also noted. NVivo Coding is used when the researcher is interested in coding responses based on the participant's own language (Saldana, 2016)

Results and Discussion

The overall purpose of this research study was to investigate ways to improve math instruction in my second grade classroom. I aimed to answer several questions with this study pertaining to the instructional approach itself and student motivation. I will discuss those findings according to each of my three sub-questions that were proposed earlier in this study.

Math Workshop Versus Traditional Approach. The first question I sought to answer in this study was whether my students enjoyed learning math in a workshop or a traditional approach. I intentionally didn't ask students to choose a favorite method of instruction because I wanted to know their general feelings about both forms of instruction. According to data collection from the survey, 76% of students reported that they enjoyed learning math in a small group, while 57% of students said they liked to learn math as a whole class. When asked to elaborate in an interview, students who said they liked the workshop approach felt that way for several reasons. Students who struggle with math said they liked math workshop because they got extra help from the teacher in a small group. They also said they liked working with a partner because they could "figure it out together." It seems that the workshop approach motivated these students because they received the additional support they needed (both from the teacher and from peers) in order to feel successful in the classroom. Struggling students weren't the only ones who said they liked math workshop. Students working at grade level indicated that they liked workshop because it gave them a chance to practice what they learned with classmates. They too said that they liked working with the teacher in a small group, but they also felt that collaborating with peers was beneficial. Students working above grade level commented that they appreciated

the workshop approach because they could be challenged. They liked being taught more difficult concepts in the teacher led group and appreciated being able to work collaboratively with peers on differentiated activities in the math stations.

For the purpose of this study, students had to participate in a differentiated small group as one of the math stations, however they were given the freedom to choose which remaining stations they visited. When asked what their favorite part of math workshop was, most students responded that they most enjoyed the teacher led small group. The students who struggle with math mentioned that they liked the teacher group because they "feel like they get help" and they like working with kids at the same level as them. One student in particular said that sometimes she "feels lost" in a whole class math instruction but she feels better when she is with other kids who are working at the same level as her. Students also reported that they felt like they learned more when working in small group (71% of students felt they learned best when working in small groups versus 38% felt they learned best when instructed using a traditional whole class approach).

At first glance at the data, I was surprised that the survey indicated that the size of the learning group didn't seem to influence students' confidence levels (61% of students reported that they felt comfortable raising their hand in front of the whole class and 71% of students reported feeling confident in a small group). Upon further investigation of the surveys, however, I noticed that 5 of my 6 students who struggle the most reported that they were not comfortable raising their hand to ask questions in front of the whole class. It seems from this survey that the majority of learners felt confident in both methods of instruction, however my most struggling learners felt more confident while working in small groups as opposed to the whole class.

When I asked students about this in the interview, the information conflicted with what was reported on the survey. All but one student said that they were, in fact, intimidated when I taught math using the traditional approach and they were more likely to ask questions and provide input when working in small groups. All students interviewed agreed that they felt like they learned more in a small group versus a whole group math lesson. One student in particular said she thought she learned more in a small group because, "in a whole group you're basically talking to all of us but in a small group you can talk to us one by one."

Table 1: Student Interest Survey

	Yes, I agree	I "kind of" agree	I disagree
I like learning math as a whole class	**12**	**5**	**4**
I like learning math in a small group	**16**	**4**	**1**
I feel confident raising my hand and asking questions	**13**	**2**	**6**

when Mrs. Hedman teaches the whole class at a time			
I feel confident when Mrs. Hedman teaches me in a small group	**15**	**6**	
I feel like I learn when Mrs. Hedman teaches the whole class at a time	**8**	**10**	**3**
I feel like I learn when Mrs. Hedman teaches me in a small group	**15**	**6**	

Favorite Math Stations. The second question I sought to answer in this study was which station was the favorite among students. For the first six days of the study, the game station was the overwhelming favorite among the second graders. Although the games themselves changed daily over the course of that time, all students chose to spend at least one rotation daily playing math games with a partner, with many students opting to spend their entire math time in that station. Conversely, the fact station was the least favorite, with only three students opting to visit during the first six days of this study. During that time, this station was comprised of flash cards, fact triangles, and other non-electronic methods of "kill and drill" practice. Approximately half of the students opted to visit the third station, the journal station, daily. It is interesting to note that most of the students who were performing above grade level visited the journal station daily while most of the students performing at or below grade level chose not to participate in the journal station at all when given the choice.

After noticing how few students opted to participate in the fact station when given the choice, I wondered if I could entice students to practice facts by making the station more interesting. I re-introduced IXL Learning (an online math program) to the class on day 4 as the fact station. Our classroom had access to a class set of laptops and students were familiar with how to use them. Students had reported to me earlier in the school year that they enjoyed using this program and I was curious to see how using it instead of flash cards or fact triangles would impact the study. Once I changed the fact station from a traditional means of fact practice to one using a laptop, every student in the study opted to participate in the fact station.

On day five of this study, I replaced the IXL online learning program with fact triangles and flash cards once again to observe if this would impact how students chose their stations. When I did that, the results were similar to the first three days of the study – only one student opted to participate in the fact station and once again the game station was the

overwhelming favorite. In response to this, I decided to integrate even more technology into the math stations. On day 6, I advised students that the fact station for that day would be an app available on the classroom's iPads. Students again had the choice of which stations they'd visit, however they would have to be mindful of taking turns because we only had six iPads to share in our classroom. In response to this, the students asked me for a class meeting. On their own, students decided that they didn't feel like every classmate would get an equal opportunity to use the iPads because some students wouldn't want to share them. In an effort to maintain fairness in the classroom, they asked if we could "go back to the way things were" in workshop and have pre-arranged groups rotate among pre-set stations. According to students, it was so important to them that everyone get a fair opportunity to visit iPads in the fact station that they were willing to forgo having the choices afforded to them previously.

This study indicates that the activity, rather than the station itself, dictates its favor among second graders. Students heavily favored the use of technology in math, with the game station being a second favorite. When asked to elaborate, students indicated that they liked using technology in math for several reasons. Most students said they liked using technology because it was "fun" and "doesn't feel like learning." Other students liked using technology because the apps available vary greatly, which makes it easy for students to customize the day's activity based on what they think they need practice with. One student remarked that she liked using technology because, "nobody else knows if I miss something."

Students who liked the game station enjoyed it because they "like to work with friends". They indicated that they enjoy being paired up with partners because they can learn something from or teach something to their classmates.

Station Choice. Students had a one-hour math block daily and were divided into four groups for this study. They were required to spend one 15 minute block of time with the teacher in a small group, but had the option to choose which station/s they would visit for the reminder of their time in math workshop. Students could, but didn't have to, switch stations every 15 minutes. Table 2 explains the number of students who visited each station daily.

Table 2: Students' Visits to Stations

	Journal Station	**Game Station**	**Fact Station**
Day 1	Differentiated worksheet 13	Partnered math game 45	Fact triangles 1
Day 2	Review worksheet 29	Partnered math game 42	Flash cards 0
Day 3	Differentiated worksheet 7	Partnered math game 51	Fact triangles 1

Day 4	Differentiated worksheet 6	Partnered math game 11	IXL online program 42
Day 5	Differentiated worksheet 13	Partnered math game 46	Flash cards 1
Day 6	Review worksheet 21	Partnered math game 21	iPads 21

Choice and Motivation. The third question I was interested in studying was whether or not providing students choice in math workshop increased their motivation to learn. I was surprised to find that information gathered in this study conflicted with the majority of research supporting the idea that students are more motivated to learn when given more choice in their learning. In this study, students opted to forgo their opportunity to choose which stations they visited during math workshop to ensure that they would each have an equal opportunity to use technology. Making sure students had at least one enticing station was more important to students than being able to choose from three stations that did not offer the use of technology. When asked about this further in interviews, students said that they liked using iPads and laptops because they offer fun ways for students to learn. They enjoy "taking a break" from a pencil and paper and they "forget" they are learning. Several students also noted that math workshop became too chaotic when all students had the freedom to choose their own stations. They reported an increase in off task behaviors, which was distracting for them when they were trying to learn.

Table 3: Questionnaire and Results

1. Which station in math workshop do you like the best? The mini-lesson, the small group meeting with me, the journal station, the game, or the fact/ixl station? What do you like about it?					
Student 4 *game station *Like working with partner *Like learning with a friend	Student 20 *teacher station *feel like I get more help *also like the game station *like learning with a friend	Student 13 *teacher station *math is boring otherwise. I can learn harder stuff *game station because it always changes	Student 6 *teacher station *math is easier at the teacher station because I can get help *math is too hard when it's whole class	Student 17 *teacher station *you can help me	Student 11 *teacher station *I like to be challenged *second grade math is boring when we learn it whole class

2. Why did you choose the state you chose? Did you choose it because you thought it was what would help you learn the best?					
Student 4 *game station *I get to work with my friends	Student 20 *I always chose the journal station first *I know it helps me learn, but it's not fun. *Like to get it over with	Student 13 *fact station *know I need to memorize my math facts *It's the most fun	Student 6 *iPads *bunch of different apps so I can pick what I need	Student 17 *iPads *It's fun *can do it by myself, so if I need practice at something my friends won't know	Student 11 *iPads *I can work on multiplication because I already know my addition and subtraction facts

3. Do you like working independently or with a partner? Do you feel like you learn better when you work independently or with a partner?					
Student 4 *partner *they help me when I don't get it	Student 20 *partner *like to help my friends	Student 13 *partner *my friends can help me learn *can ask them questions and they can help me figure it out	Student 6 *by myself *sometimes my classmates tell me the answer when I am trying to figure it out *sometimes I feel dumb	Student 17 *by myself *I don't like to work with other people *like to figure it out on my own *don't like to teach kids how to do it	Student 11 *partner *my friends and I can challenge each other *we can make the games harder

4. Do you feel comfortable raising your hand and asking questions during the whole class mini-lesson? Do you feel comfortable asking questions in a small group? Why?					
Student 4 *I don't like to raise my hand in front of the whole class *feel dumb *will ask questions in a small group	Student 20 *don't like to raise my hand in front of the whole class Don't know why, just don't *will ask questions in a	Student 13 *won't raise my hand in front of the whole class in case I'm wrong *okay talking with a small	Student 6 *won't raise my hand in front of the whole class *feel shy *afraid to be wrong *can't really hide if I'm in	Student 17 *will raise my hand in class or in small group	Student 11 *will participate in whole class or small group

	small group	group	a small group		
5. Do you feel like you learn more when I teach the whole class at a time or when I teach in small groups?					
Student 4 *Small group *teacher can help me *get lots of attention	Student 20 *small group *classmates help me *teacher can help me	Student 13 *small group *whole class you're talking to all of us, small group you can talk to us one by one	Student 6 *whole class because people goof around when they work in small groups	Student 17 *small groups *get to move around *get to do work that's not too hard	Student 11 *small groups *you teach me harder stuff

The results of this study indicate that incorporating electronics into math stations can be highly motivating to students. Most students prefer the workshop approach to a traditional approach because they feel more comfortable asking for assistance and participating in the group. This is especially true for students who struggle with math content. Students also favor the workshop approach because they have an opportunity to learn from their peers.

Recommendations

This research stems from my desire to design a math instruction that was appealing to students. I was interested in creating an environment where students were engaged and motivated to learn. I wanted to empower students to take ownership in their own learning and provide them with the support they needed to be successful math students. In the beginning of the year, my students were disengaged, uninterested, and not working to their full potential. This research sought answers to overhaul instruction to change the learning atmosphere.

One implication of this study is for teachers to consider using math workshop in their classrooms instead of a traditional approach. My students were more engaged and more confident in their own abilities when this approach was used. Math workshop lends itself perfectly to differentiated instruction, which resulted in an increased confidence and overall satisfaction for my students. Another implication of this study is for teachers to consider using technology in their own math instruction. Students overwhelmingly favored iPads and online math games to a more traditional approach to practicing math skills. This increase in engagement means students are more focused on the task at hand, which results in more material being learned.

As for my own classroom, I learned that giving students more choice in their learning wasn't as important as designing stations that were likely to highly engage students. Incorporating technology in the classroom is highly motivating to students and I changed my curriculum to

include technology as much as possible. In my conversations with students, I discovered that the time they spent with the teacher was invaluable and that I had the opportunity to greatly influence their self-perceptions of their mathematical abilities. Designing differentiated curriculum to be taught to small groups of students is invaluable in impacting their overall self-confidence in math. As I consider all that I learned in this study, I believe that the additional time it takes to design math curriculum that closely matches the needs of students is well worth the outcome.

Limitations

This study's limitation was that the learning groups were not equal in size. Because the instruction is differentiated, students were grouped by ability as determined by their unit pretest. Some groups were larger than others.

Conclusion

While overhauling my math curriculum seemed daunting before this study, I am grateful for all that I learned. After weeks of data collection, I determined that my students were more motivated to learn when they were given the option to use technology in the classroom. For them, the freedom to choose which math station to visit was not as important as the activities presented in the stations themselves. Students felt more confident in a workshop approach not because of the station choices themselves, but because they each had an opportunity to work directly with the teacher in a small group on math that was tailored specifically to their needs. Overall, they enjoyed playing math games with a partner and felt the benefits of learning from peers, but this collaboration was not as appealing to them as using technology in the classroom or receiving direct instruction from the teacher in a small group. The insight gained from my research inspired me to make a concerted effort to consider the individual needs of my students as I planned my math curriculum. I found a renewed passion to design engaging and differentiated lessons in order to achieve marked progress for each individual student.

About the Author

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