Determining the Impact of Individual Goal Setting Aligned with Standards on Kindergarten Students' Math Proficiency

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Abstract: This research study explores the effectiveness of personal goal setting on students' proficiency in math standards. A convenience sample of 18 kindergarten students from a diverse low-income school was used. Employing a mixed-methods qualitative and quantitative research design, this study spanned over a five week period and utilized a participant researcher. As the participant researcher, I implemented one intervention in the classroom and through data collection, I tracked independence in learning as well as increases in student math scores. Data collection strategies used in the study include pre and post-assessments, a survey determining students' feelings around goal setting and interviews gauging students' abilities to identify their goal. A teacher journal documenting observations of students working independently, small group interventions, and thoughts as the research progressed were employed as well. I have synthesized and triangulated the data to show unexpected abilities of five and six year old learners. The results have formed unanswered questions regarding the effectiveness of a spiral math program and implications for further research have been made.

M y first two years of teaching have been very challenging, as schools have been shifting into standards-based education. Districts have been working towards aligning curriculum, reading, writing and math programs, and report cards directly to the Common Core State Standards. This shift has not only caused a lack of consistency among grade levels and schools, but has made tracking student progress very difficult. My district has recently adopted the use of an online program titled, "Empower." It is required that we grade literacy and math proficiency through this program. Being directly aligned to the Common Core, students will receive a P for "proficient" or an IP for "in progress." The standards that have yet to be introduced are left blank. With the pressures of getting students proficient in the CC math standards and the requirement of tracking their progress through "Empower," I chose this topic for my research. The purpose of my study is to implement a strategy/multiple strategies to better track student progress, make students aware of what they are learning and why, and support them in becoming proficient in math standards. The main strategy I have chosen to base my study around is the use of personal goal setting towards standards, along with providing clear, unpacked, and kid-friendly objectives. I know that a main goal of Common Core implementation into classrooms is to create stronger learner-centered environments and guide students into being more in charge of their learning. I have seen how higher grades in my district have students track their own progress through checklists, binders, and online resources. However, I have not been able to see personally how this can be modified for younger students. I hope to learn how independent kindergarten students can be in their own learning through goal setting. Once students have set their goals with me, I hope to see how effectively they can work towards proficiency. My intended audience is of course the other kindergarten teachers in my district. Aside from kindergarten, I feel that all primary grades could benefit from research based around strategies to implement the Common Core and support students in becoming independent learners. The biggest impact I hope to make through this study is to benefit my students' success and proficiency in math standards. I hope to become more organized in tracking my students'

progress, creating stronger differentiation in math instruction and activities, and supporting students into taking charge of their own learning.

Review of Current Literature

With schools just recently switching into standards-based systems, there is little current literature into implementation strategies or ways to organize, track, and motivate students towards proficiency. However, during my search for literature that supported these ideas of action research, I found that goal setting was a main theme providing positive effects on student motivation, performance, and independence.

Jie-Qi Chen and Gillian Dowley McNamee's article, Positive Approaches to Learning in the Context of Preschool Classroom Activities (2011) discusses that positive learning approaches, such as attentiveness and goal orientation are associated with higher levels of early school achievement in math and reading. Their research review found that children who frequently exhibited positive approaches at the start of kindergarten were more likely to score high on standardized math and reading achievement tests by first grade (Denton and West 2002). In their quantitative study, Chen and McNamee scored 47 pre-kindergartners and 45 kindergartners performances in seven activities, including drawing, playing number games, and reading books. As the children's performances were scored, their positive approaches to learning were rated and included initial engagement, goal orientation, focus, and planfulness. In their results after one month of data collection, it was found that positive approaches do have an effect on children's performances in school. Positive approaches were most highly correlated with performance in solving pattern block puzzles and building a model car. In each of these activities were a clearly defined goal, materials given to solve the problem, and a series of actions to reach the activity's goal. Chen and McNamee (2011) conclude that positive approaches to learning are an undeniable contributor to young children's performance. Where my research focuses specifically on the effectiveness of goal setting, the other positive approaches to learning, such as focus and planfulness, align directly to the implementation strategies of the Common Core Standards. It is required that students, in order to demonstrate their understanding of standards, are given clearly defined learning targets and focused steps on how to get there.

In Lowell E. Madden's article, Motivating students to learn better through own goal setting, (1997) he states that goal-setting is the level of achievement that students establish themselves to accomplish. It needs to be clear that this is different from academic expectations in the classroom, which students must reach to satisfy the standard established by the teacher. Rather than a standard that must be reached, goal-setting is a target to aim for. Madden (1997) states as well that there are three properties to goal-setting, which are specificity, difficulty level, and proximity. The student needs to know exactly what should be accomplished, the difficulty level should be moderate so that the goal can be reached, and proximity aims to help the learner reach the goal quickly. In his qualitative study, Madden sought to to find what teachers do to motivate their students' learning. Therefore, he surveyed one hundred and twenty-six elementary teachers. His research found that 62% of them employ goal setting. Betty Jane Punnet (2001) shares that goals may provide a form of motivation in which persons compare current performance with internal standards and the anticipated satisfaction on attaining a goal leads to sustained involvement until performance meets or exceeds standards. She states this in her article, Goal Setting and Performance Among Elementary School Students, where she experimented with "do best" goals and specific difficult goals among the spelling performances of thirty sixth grade

students. Her research found that overall, "students with a specific goal did outperform those without" (2001).

There are steps one must take to utilize goal setting effectively in the classroom to improve student performance. Punnett (2001) suggests that specific and difficult goals improve individual performance more than no goals or "do best" goals. In Madden's (1997) qualitative study, teachers report that they try to be very specific about what they are trying to accomplish rather than "doing your best." Punnett (2001) reported an average increase of 16% in her quantitative study when subjects were given a specific target and a 20% productivity increase. The next suggestion for effective goal-setting in the classroom is individualization. Because ability is a prerequisite of performance, individually set goals are generally more effective than one goal for all students (Punnet 2001). With setting individual goals, students experience more personal success rather than stress from competition (Madden 1997). Lastly, in order to support students in reaching their goals, they must be provided with frequent feedback. Teachers implementing goal setting reported that providing rewards and rapid feedback to children when they work to reach the goals help students achieve better. Rapid feedback is particularly effective because it encourages evaluation and control of behavior on an ongoing basis (Punnett 2001).

Teachers play a critical role in helping young children develop positive approaches to learning, such as goal-setting. Guiding children towards these approaches elevates their self-regulation skills and executive functioning so that they learn more effectively and efficiently (Chen and McNamee 2011). Overall, research shows that the use of individual goal setting accompanied with appropriate feedback and teacher support tend to be very effective motivational approaches to motivate students to learn (Madden 1997). Whereas two of the research articles adopted a quantitative approach in specifically measuring performance aligned with goal setting, I will take a qualitative approach. However, unlike Madden, rather than surveying teacher's views, I will survey, observe, and track my students and focus solely on the positive approach of goal-setting in measuring kindergarten student's proficiency in math standards.

Method

The next few years for school systems, students, and parents are going to be extremely difficult as all involved are trying to find the most effective strategies for Common Core implementation and understanding. The only consistency found among the grade levels in my district is the use of an online tracking program directly aligned to language arts and math standards called "Empower." However, the pathways leading to the grading system are undefined. In an aim to find an effective, consistent strategy that would best support my students in their proficiency of these standards as well as track their progress in an organized way, I asked myself: "What impact does personal goal setting have on kindergarten students' proficiency towards math standards?" While required to continue following the Everyday Mathematics curriculum, I wanted to also clarify, "after providing clearly defined standards in kid-friendly language before each math lesson, how effectively will students be able to identify the learning targets in math? I found that there were other questions around goal setting that needed to be answered as well: "What impact will having a goal setting binder have on tracking students' proficiency towards math standards?" "How effectively will students be able to work towards their goal with support of the teacher as well as independently?" and "How will students feel about goal setting, pursuing, and reaching goals?" These questions aim to answer all aspects around goal setting as an effective strategy to build student independence, organize a tracking system, differentiate for the needs of all learners, and best support student progress toward standard mastery.

Research Design

My research study has a mixed-methods qualitative and quantitative design. The aspects of a qualitative design I felt to be most supportive of the research were the use of field notes, surveys, and observations through a teacher journal. These allowed me to interpret my students' thoughts and actions around the intervention and provide a narrative for my findings. On the other hand, through a math pre and post-assessment as well as tracking student interview and survey answers, the quantitative design allowed me to analyze scores and percents to identify the effectiveness of the intervention through numerical data by looking for patterns and student increases in performance. I felt each type of design offered effective methods for adding depth to my research and triangulation through the process.

Sample and Setting

As a participant researcher, I was given the advantage of working with my own class in a school where I have taught for two years. Therefore, I had a prior strong connection the sample and setting of the research. My kindergarten classroom is located at Carl J Lamb School in Sanford, Maine. This school is a federally recognized low income school serving 560 students from kindergarten to sixth grade. A convenience sample of eighteen students took part in this study, including twelve boys and six girls. Of those students, three struggle with unpredictable behaviors, two have IEPs, and one has a 504 plan. There are also two paraprofessionals in the classroom during the math block, one providing one-on-one support for a student, and one supporting me in management and various interventions. All students in this study have permission for their photographs to be taken and student work as well as observations were shared with no name attached. With nothing being conducted out of the ordinary of my own teaching practice and with no risk of harm being done to my students, it was not required that families be notified of the research taking place. However, I sent a research notice to the school administration and shared the goal setting intervention with the parents of my students during conferences.

Intervention

The intervention used in my research study was a goal setting binder for my students. Each student had their own section in the binder including their pre-assessment, the Common Core math standards written in kid-friendly "I Can" statements, and a goal setting worksheet. Once the pre-assessments were conducted, during individual conferences with students, I had them color in a box next to the standards where they showed mastery. Using the standards not colored in, students selected one to be their goal and filled out their goal setting worksheet. From there, I put students into groups by similar goals and created a math center system that was aligned to the standards selected. The centers were color coded to student goals and each color had one to three centers for students to choose from. The math block during the research consisted of sixty minutes. The first fifteen minutes to half hour of the block included teaching a lesson from the Everyday Mathematics program. Next, students were sent to work on centers that would help them progress towards their goal. Each center round was about fifteen minutes long and two rounds of centers were completed a day. Every other day, students were allowed to work on any center of their choice, including those that were not their assigned color. This supported students in practicing and gaining skills in other areas of counting and cardinality. The center system

allowed me to differentiate centers for students as well as provide choice to support and create a learner-centered environment. One limitation of the math block during research was my requirement to continue following the spiral of the district math program. Unfortunately none of the lessons taught during the research were directly focused on counting and cardinality skills. Results will show that this caused some confusion of learning targets for students.

Methods of Data Collection

The data collection methods chosen for this study reflect different aspects of qualitative and quantitative designs. I used a teacher journal to document individual goal setting conferences, small group intervention work, and how effectively students worked independently during center time. I conducted pre and post math assessments (see Appendix A) that were directly aligned to the Common Core math standards and tracked what standards students were proficient in prior to goal setting as well as the progress made at the end of data collection. These assessments are also what I used to log student proficiency through "Empower." Randomly throughout the study, my paraprofessional administered student interviews (see Appendix B) to document how effectively students could identify their personal goal and/or the goal of the math lessons for that day. The third week of my study, I added worksheets into the math centers and collected student work to give me a better sense of how effectively students were working on their own and their understanding of strategies used to reach their goal. Lastly, at the end of the study, students completed a survey (see Appendix C) by coloring in a happy face, medium face, or sad face documenting how they felt about goal setting and their personal performance towards proficiency of their set goals.

Validity

Validity in research encompasses whether or not the tools used are accurate in reflecting what the researcher wants to measure. In choosing the tools to be used, I tried my best to make sure my research question and sub-questions could be answered precisely. The assessment chosen measured all aspects of the Counting and Cardinality standards of the Common Core. The interviews were conducted by my paraprofessional to remove any personal bias from myself as well as potential prompting I may have used with my students. These were also conducted randomly throughout the study. The surveys were completed by students anonymously, however, being five and six years old, the validity of this tool in accurately measuring the feelings of students around goal setting is a concern. For my teacher journal, I tried to remain unbiased, however, as a participant researcher, I do realize in my observations and reflections, some bias may be present.

Procedures of Action(s)

- Week 1: Math Counting and Cardinality pre-assessments were conducted to all students to gain baseline data and results were logged onto "Empower."
- Week 2: I had a whole class conversation around goal setting to lead into the individual goal setting conferences that were administered (see Appendix D). During this time, each student filled in the standards they were proficient in (see Appendix E). They were then read the rest of the unmastered standards and chose one to be their goal. The goal setting worksheet was filled out documenting their goal and possible steps to reach it (see Appendix F). Conferences were documented in the teacher journal. Students not

being met with worked on math centers. At this time, a center system was not in place and students could choose any center offering various manipulatives, worksheets, and games to work on.

- Weeks 3 and 4: The math center system was put into place, where students were assigned a color corresponding to their goal and tubs were labeled with colors (see Appendix G). I began meeting with small groups of students to provide interventions, strategies, and practice on specific counting goals. My paraprofessional began conducting random interviews at this time and my assistant principal came in for an evaluative observation of my math practices, but being aware of the research, also conducted short interviews with students on their goals.

- Week 5: Math Counting and Cardinality post-assessments were conducted and results were logged onto "Empower." Student surveys were conducted to determine feelings around goal setting and personal performance.

Findings

In analyzing the data, I coded each page of my teacher journal to easily reference the observations, conferences, and interventions documented throughout the study (see Appendix H). Quotes from students were coded using student numbers and the context of the quote. Patterns were looked for and analyzed within this coding system. The surveys and interviews (see Appendix I and J) were analyzed through a qualitative reflective view as well as put into graphs and analyzed quantitatively based on the number of given answers. Lastly, the pre and post assessment scores were graphed and overall student performance was analyzed and reflected upon.

After providing clearly defined standards in kid-friendly language before each math lesson, how effectively will students be able to identify the learning targets in math? Since the Sanford School District is piloting the Everyday Mathematics 4 program, I was required to follow this
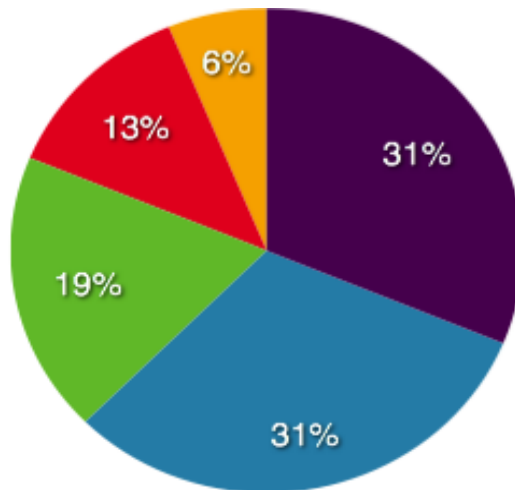
- Yes
- No: About Goal
- No: Didn't Know
- No: Related to Activity
- No: Random

program for math instruction during my research. Therefore, each math block included an Everyday Mathematics lesson followed by math centers aligned with student goals. Because each math lesson from the program focused on a variety of skills, I was curious to see if students would be able to show understanding of the lesson by identifying the objective. Results from the interviews showed that only 31%, or five students, were able to identify the correct goal of the math lesson. The other eleven, or 69% of students were unable; five responses were about student goals, three responses were either, "I don't know," "I can't remember," or "I forgot," two responses were about the activity being worked on at the time, and one response was random, stating, "I learned with Mr. Donahoe to cut numbers." (Mr. Donahoe is the art teacher). See the pie chart below.

What impact will having a goal setting binder have on tracking students' proficiency toward math standards?

As part of this study, I not only wanted to answer what students were capable of when goal setting was introduced, but also the impact a goal setting binder would have on my personal progress of student tracking. Throughout the study, I kept a teacher journal logging each time I provided interventions to small groups including the strategies taught and the progress each child in each group was making. This helped me to determine what strategies to teach next. Here are some examples of notes taken:

- "Student 7- counted by 10s to 40; Student 15- counted by 10s to 80; Student 12- counted by 10s to 100; Student 9- first went from 40-100, then did great!" (tj,p8,l1-4)
- "Student 1- wrote 11 for 12 and didn't know what 14 or 16 looked like" (tj,p8,l19-20)
- "Student 8, 17, & 11- did good counting 20 things and telling me what would come next if one more was added; Student 4- gets stuck on teen numbers" (tj,p9,l4-7)

Not only did having a structured math center system give students more focus and practice towards their goals, but it had the same impact on myself as a teacher in tracking student progress. Similar goals formed small groups for me to work with and allowed me to focus on a specific set of skills to teach and monitor. The journal provided a great place for me to log student progress and check back later to determine next steps. I feel as though in answering the true impact of the goal setting binder on tracking student progress, it's hard for me to remain unbiased, as I am basing the results around my own personal impact and success.

How effectively will students be able to work towards their goals with support of the teacher as well as independently?

Before beginning my research, I was experiencing difficulty in getting students to work independently on math centers. On my math shelf, I have ten centers students could choose from and I spent a great amount of time making sure each center was different, providing a range of games, manipulatives, and puzzles that students could complete. However, I still found I was doing more managing than teaching and students were fooling around more than learning. This sub-question for my research was a big one, because what would be the point of goal setting if students were unable to work on their goals independently? The answer to this question was a surprising one. Notes from my teacher journal, pictures of students working, and student work show positive results below.
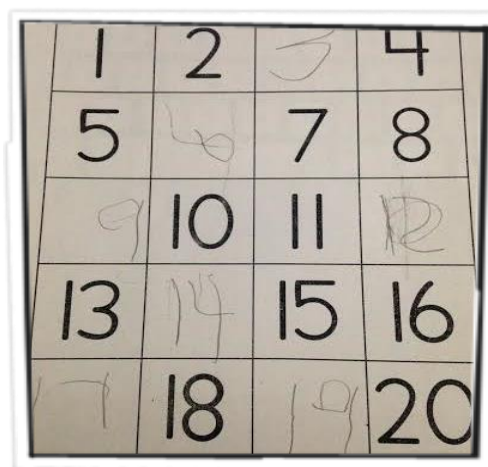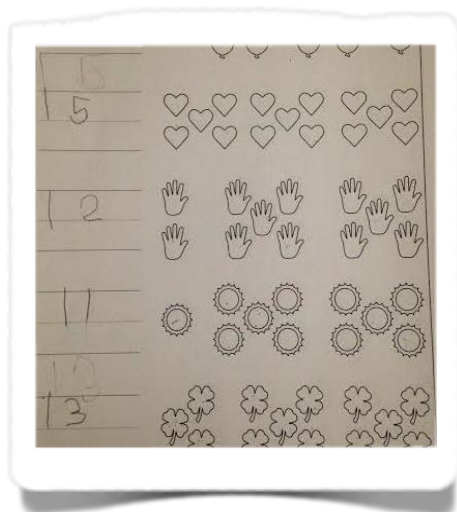
Teacher Journal:

- "The clear explanations of the center system and the purpose of the tubs made students extremely excited to get to work." (o,iw,p3)
- "..students working much more independently on their tubs. It seems as though they are trying harder knowing it's towards their goal." (o,iw,p4)
- "students independent...they choose quickly and get right to work." (o,iw,p6)
- "Previous to having a structured system with only specific tubs students could choose from, students were unable to work on their own. They fooled around, used the materials incorrectly, and got bored more easily. However, with the tub system, students got right to work and worked the whole time, only little management was needed from my paraprofessional." (o,iw,p1)

Students Working:

- Top left: student working on counting to 100 by ordering tens.
- Top right: students working on writing numbers 1-20 by putting a 1-20 puzzle together and using the laminated sheets to write the numbers that come next.
- Bottom left: students working on counting 20 things by using the table and counting out the corresponding number of bears.
- Bottom right: students working on counting 20 things by spinning a spinner, counting the objects, and finding and coloring the corresponding number.

Student Work:

- Left: student work practicing writing numbers 1-20 by filling in the missing numbers.
- Right: student work practicing counting 20 things by counting groups of objects and filling in the corresponding numbers.

Quotes from my teacher journal, pictures of students working during math centers, and collected student work all triangulate and show that students needed little support from teachers to work independently and effectively towards their goals. Having focused math tubs and providing a purpose for the activities motivated students to work hard on their own and with their peers. I also feel another aspect that supported independent learners was a "Ways to Reach Our Math Goals," list I put together based upon the goal setting worksheets (see Appendix K). Before each round of math centers, we read this list together and discussed what it meant and what it looked like. Again, this provided students with clear expectations and purpose for their activities and showed effectiveness in their abilities to work independently.

How will students feel about goal setting, pursuing, and reaching their goals?

In creating a learner-centered environment, other than simply providing students with choice and supporting them in becoming more independent, students need to be given the opportunity to share their feelings about aspects of the classroom and their learning. Therefore, at the end of the study, I had students complete a survey, where I read them the questions and asked them to color in a happy face, a medium face, or a sad face. For each question, I made it clear what the happy, medium, and sad face meant in the specific context. The table below shows the results.

Question	Happy Face	Medium Face	Sad Face
1. Do you know what your goal means?	12 students	4 students	2 students
2. Do you think you are close to meeting your goal?	14 students	3 students	1 student
3. Do you like working towards your goal?	14 students	2 students	2 students
4. Do you like to set goals?	14 students	2 students	2 students
5. Does goal setting make learning math easier?	14 students	3 students	1 student
6. Do you want to set new goals?	11 students	2 students	5 students

Overall, the results show that the majority of the students responded having a positive experience through the goal setting process by circling smile faces for the six questions. One area of the results that surprised me was that five students showed they would not like to set new goals by circling the sad face. One of these students circled sad faces for every question, showing a negative experience through this process. However, what surprised me most was the combination of responses resulting in a sad face for setting new goals. Two students circled a smile face for question 4, but responded by not wanting to set new goals. Two students circled a smile for question 5, but again, responded by not wanting to set new goals. I wondered why students who liked setting their goal and working towards their goal and who felt that goal setting made math easier, would not want to set new goals. I wonder if this is because they want to continue working on their current goal, if they didn't want to go through the process again, or if they just didn't care for the experience.

Did students meet their goals?

After giving the post-assessment to each student, I was able to see if students met their goals. Results showed that nine students (50%) were able to meet their goals. Below, I broke this down to show how many students from each specific goal were able to meet it, make progress, or stay the same.

I Can Write Numbers from 0-20 (4 students)
- Student 1- did not meet, but progressed by writing up to number 10 to writing up to number 13
- Student 13- met goal
- Student 15- did not meet, made same mistake of writing 20 backwards (02)
- Student 17- met goal

I Can Tell if the Objects in One Group is Greater Than/Less Than/Or Equal to the Objects in Another Group (1 student)
- Student 2- met goal

I Can Count Up to 20 Things (6 students)
- Student 3- met goal

- Student 4- did not meet, makes same mistake of skipping from number 15 to number 18
- Student 6- met goal
- Student 8- met goal
- Student 11- met goal
- Student 16- did not meet, continues to double-tag

I Can Count to 100 By Ones and Tens (5 students)
- Student 5- did not meet, went from counting to 30 to counting to 100, but needed prompts after 89 and 99, counted to 100 by tens
- Student 7- did not meet, went from counting to 29 to counting to 39, counted to 100 by tens
- Student 9- did not meet, went from counting to 13 to counting to 39, counted to 100 by tens
- Student 18- met goal
- Student 14- did not meet, still gets stuck after 39, counted to 100 by tens

I Can Compare Numbers 1-10 (1 student)
- Student 10- did not meet goal, made no progress, very confused with concept

I Can Write a Number for a Group of Objects (1 student)
- Student 12- met goal

I have also created a table to show the breakdown of specific goals, goals met, and goals not met.

Goal	Number of Students that Met Goal	Number of Student that Did Not Meet Goal
I Can Write Numbers from 0-20	2	2
I Can Tell if the Objects in One Group is Greater Than/Less Than/Equal to Objects in Another Group	1	0
I Can Count Up to 20 Things	4	2
I Can Count to 100 By Ones and Tens	1	4
I Can Compare Numbers 1-10	0	1
I Can Write a Number for a Group of Objects	1	0

Results show that the majority of students from the counting 20 things group were able to meet their goal and the majority of students from the count to 100 group were unable to meet their goal. These results surprised me in a way that only half of the students were able to meet their

goal, however, when broken down by goal, I am not surprised. Most of the students who met their goal were from the counting 20 objects group and when working with those students, I found that the mistakes they made on the pre-assessment were from lacking strategies while counting. Once they were taught those strategies, they were able to succeed in their counting. On the other hand, counting to 100 is a very large goal, especially since the students who chose that as their goal could only count to 20 or 29. I did not expect students to be able to make such a big leap in such a small amount of time. Although when their goal was set, it was based on the actual standard of counting all the way to 100, I should've broken their goal down by creating one that was attainable, such as counting to 30, 40, or 50. Each student from this group, however, was able to count to 100 by tens, which they were unable to do on the pre-assessment, showing that some progress was made.

Results from the Pre and Post Assessments

Aside from determining whether or not students could set a goal, work towards it independently, and meet it, I wanted to see from my study if aligning math centers with a specific set of standards would aide students in progressing towards proficiency.
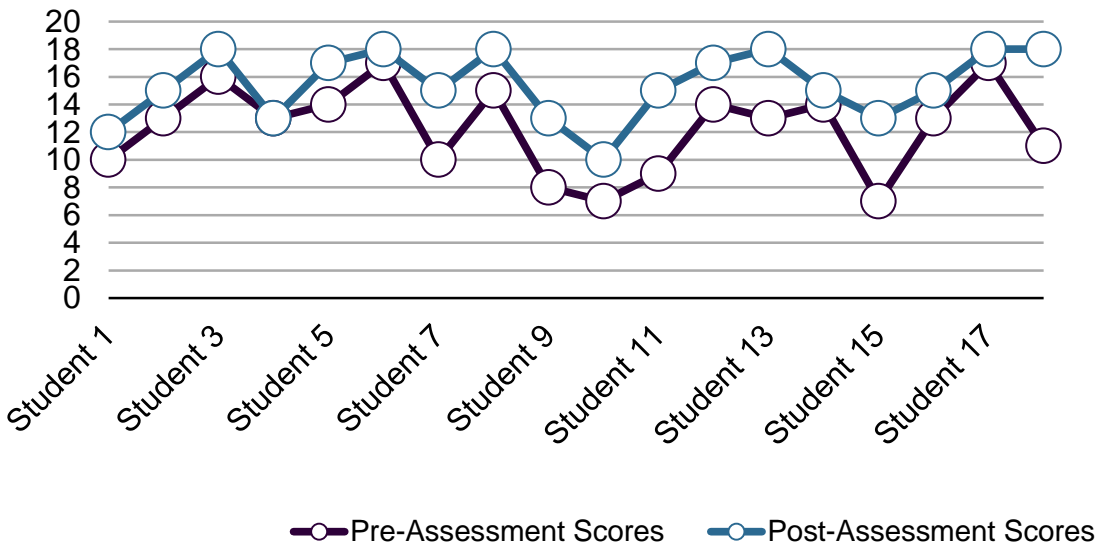

In analyzing the results from the pre and post math assessments, I created scores based upon the number of questions students answered correctly out of the total eighteen questions on the assessment. This does not necessarily show proficiency because one standard may have required a student to get a number of questions correct to prove proficiency in that given skill. Results show that all scores, besides one that stayed the same, increased. Although only half of students met their goal, 17 out of 18 students were able to progress in other areas of counting and cardinality and increase their scores on the assessment.

Discussion

One main purpose of this study was to find a strategy that could help students aim towards proficiency but also help me better track student progress, and log proficiency onto "Empower." For the first trimester of this 14-15 school year, it was not required for teachers to log any

counting and cardinality standards unless students were proficient, meaning if students were not, we would just leave it blank. However, since this study focused on that set of skills, I chose to use the tracking I was completing to my advantage. After conducting the pre-assessment, I logged all proficient standards onto "Empower," I then went back after conducting the post-assessment and did the same. The difference in the logs in just four weeks is shocking.
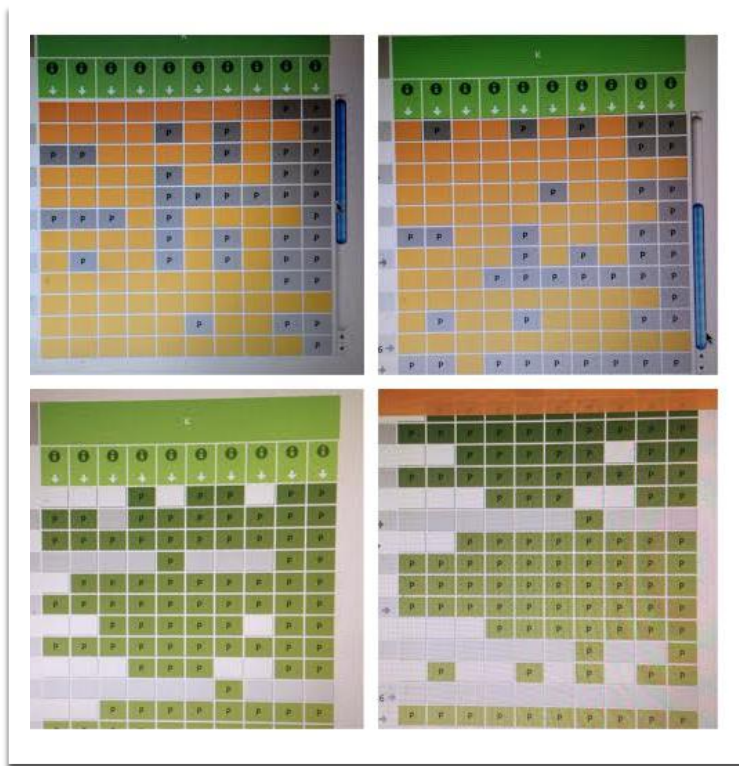
Caption: The top two photos are results from the pre-assessment and the bottom two photos are results from the post-assessment. The rows are each student, the p's are the standards students are proficient in, and the blank squares are standards students are in progress with. Results show that after four weeks of goal setting, interventions, and independent work, all students made great gains in their proficiency towards math counting and cardinality standards.

Limitations

Sample

The small convenience sample used in this study limits the reliability of the results. The study would've been stronger if all kindergarten students at Carl J Lamb School could've participated and random control groups could've been assigned. That way, results would show if the group being provided the intervention over a certain period of time had higher scores than the group without the intervention.

Observations

One of the questions my study asked was how effectively students would be able to work on their own towards their goal. Although student work and progress helped to show that they were able to work on their own, I would've liked to have been able to complete more observations of students working. During center time, I was always working with a small group of students providing them with interventions towards their goal. Because of this, I was only able to write down a few short notes on how the rest of the class was doing. Although it looked as though students were working effectively, the accuracy of my observations from my desk are limited.

Data Collection Period

I felt the short four weeks of data collection was not enough and next time would extend the overall study. Although I was surprised at the growth that was made in such a short amount of time, the data collection period felt very rushed. I would've like to provide more focused interventions to small groups and individual students as well as differentiating the centers even more by providing new activities each week.

Generalizability

Because of the short data collection period as well as the participants of my own kindergarten classroom, it makes it very difficult for me to generalize my findings to a larger group. I'm unable to say whether or not a goal setting intervention would have the same impact on another class, another grade, another school, or a different set of standards. However, because so much progress was made from my students, as I continue to set goals on new standard clusters and collect data, I may be able to generalize results in the future.

Implications for Future Practice

Through my research, I found that the use of goal setting and a well-structured math center system had a very positive impact on student motivation, independence, and progress during the math block. When students are able to choose an attainable goal, they seem more excited to learn and work towards it. By aligning the math system with student goals, they were given purpose with the activities they were completing. Prior to setting up this system, although the math centers offered variety for students and students were able to choose what they would be working on, centers were never used the right way and students got bored very easily. However, when students were given structure and purpose with the activities, they got right to work and used the tubs the way they were taught. Moving forward, I will continue setting goals with my students. However, as the year progresses, I will not always have to conduct a pre-assessment because some students will remain working on the goal that was previously set, whereas other students will move forward with their needs. This intervention has truly helped to create a learner-centered and differentiated classroom in the aim to support all students with all needs towards proficiency.

Implications for Further Research

If I were able to conduct this study without any program requirements from my district, I would've planned to have all of my math lessons align directly to the counting and cardinality standards. This way, students would be given direct instruction on the different strategies needed to become proficient in the variety of counting skills. However, having to follow the Everyday Mathematics 4 program made my math block seem like two different things. First, I would teach a lesson on shapes, or measuring, or decomposing numbers and next students would work on applying their knowledge towards counting skills. During this, I would ask students what the target of the math lesson was. It didn't seem reasonable to expect students to know the difference between the goal of the math lesson and their own personal goal when the two weren't even close to being aligned. A major question arose throughout my study of whether or not a spiral program is the most effective in supporting students towards proficiency.

Summary

Overall, I feel I had a positive experience engaging with the process of action research. I chose to focus my attention around the Common Core to find ways to better my practice, organization, and tracking and help support student proficiency in math. Although this process was very stressful and felt rushed, I am extremely pleased with not only the progress made by my students, but what I learned about teaching math and becoming more organized. My students seemed to truly enjoy setting goals and working towards them and I can say I'm proud of the interventions I was able to provide and my organization and tracking strategies. I cannot wait to share my results with staff and help show them that students of any age are capable of taking charge of their learning!

Action research is like coloring with broken crayons, the process is challenging, but the finished product at the end was worth the struggle, however, would the finished picture look any different if colored with new crayons?

REFERENCES

Bjork, R.A. (1999). Assessing our own competence: Heuristics and illusions. In D. Gopher & A. Koriat (Eds.), *Attention and performance XVII: Cognitive regulation of performance: Interaction of theory and application* (pp. 435–459). Cambridge, MA: MIT Press.

Chen, J., & McNamee, G. (2011). Positive approaches to learning in the context of preschool classroom activities. *Early Childhood Education Journal, 39*(1), 71-78.

Dempster, F. N. (1988). The spacing effect: A case study in the failure to apply the results of psychological research. *American Psychologist, 43*, 627–634.

Madden, L. (1997). Motivating students to learn better through own goal-setting. *Education, 117*(3), 411-415.

Pashler, H., Bain, P., Bottge, B., Graesser, A., Koedinger, K., McDaniel, M., & Metcalfe, J. (2007). Organizing instruction and study to improve student learning (NCER 2007-2004). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ncer.ed.gov.

Punnett, B. (2001). Goal setting and performance among elementary school students. *Journal of Educational Research, 80*(1), 40-43.

Rohrer, D. (2009). The effects of spacing and mixing practice problems. *Journal for Research in Mathematics Education, 40*, 4–17.

Schmidt, R.A., & Bjork, R.A. (1992). New conceptualizations of practice: Common principles in three paradigms suggest new concepts for training. *Psychological Science, 3*, 207–17

Son, L. K., & Simon, D. A. (2012). Distributed learning: Data, metacognition, and educational implications. *Educational Psychology Review*, 1-21

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Karly Davis is a kindergarten teacher in Sanford, Maine. She has been teaching kindergarten for three years and looks forward to furthering her career in other grades. She holds a Bachelor of Arts in Liberal Studies with a concentration in English and a Master of Science in Education in Teaching and Learning from the University of Southern Maine. She truly enjoyed the experience and knowledge gained from being an action researcher and will continue to find the most effective strategies that support lifelong learning.