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Creating a Math Wall in an Elementary School

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CREATING A MATH WALL IN AN ELEMENTARY SCHOOL

A Project Report

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By

Lindsey Moorhouse

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ABSTRACT

CREATING A MATH WALL FOR AN ELEMENTARY SCHOOL

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Creating a Math Data Wall in an elementary school is a way to track students' progress in mathematics, guide instruction and provide strategic interventions to students who are at risk. A Math Data Wall is a visual representation of the students' progress across grade levels. Assessments have been used in schools for many years. Assessments are used to provide a variety of information to the teacher, school and district. Using assessments in the classroom is a necessary step to track students' progress and guide teacher instruction. A Math Data Wall will give teachers a visual representation of their students' progress across the grade level and track students' progress as they move up grades. This project presents a PowerPoint designed to help a school create a working Math Data Wall.

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CHAPTER I

The Problem

Teachers are always looking for a useful and appropriate way to assess students' progress. Assessments can be formal or informal. With formal assessments, tests are administered and graded to determine student progress. Informal assessment can include observation and conferencing with the student on his or her progress. With the achievement gap growing it is critical for teachers to be able to accurately assess their students' knowledge. It is mandated by No Child Left Behind that all racial and ethnical groups need to be 100 percent efficient in both reading and mathematics. With accurate assessments teachers can then plan instruction and provide interventions to students who are at risk. There needs to be a way to monitor students' progress and implement interventions for those students who are in need.

Student assessments are a part of the education process. Teachers use the information gathered through assessments to grade students on their abilities, what they have learned, and plan instruction based on the information given by the assessment. Assessment practices have been around since the early 1900s. In the beginning assessments were primarily used to determine a student's potential and readiness for higher education. The SATs were created around 1920 to help determine whether people were qualified for higher education (Cobb, 2004).

Cobb (2004) cites Linn who said, throughout the decades, five major waves of educational reform have happened starting in the 1950s. Individual districts tracked and selected appropriate tests in the '50s. Program accountability was the focus in the 1960s. The 1970s were focused on competency testing. Schools and districts in the 1980s and the 1990s used standard-based testing for accountability.

Cobb cites Sherpard's point of view in the article "The Role of Assessment in a Learning Culture" that teachers should be focusing on the kind of assessments that are given to students that can be used for instruction to support and enhance learning rather than the assessment that gives grades or satisfies accountability. "The transformation of assessment practices cannot be accomplished in separate tests and measurement courses, but rather should be a central concern in teaching methods course's (Cobb, 2000). Assessments need to be structured so they are assessing students learning for a purpose.

Reading and mathematics have been a focus in elementary education. Cascade Elementary School in Renton, Washington, has recently adopted a new math curriculum, and with this new curriculum, common assessments. Common assessments for grade levels help to maintain equality across the grade level. Teachers are no longer looking at their own students' progress in isolation. Teachers share responsibility for all student progress. This provides more support to the teacher and student. It allows for intervention for those students in need (Wagner, 2009b).

One way to monitor student progress is to create a Math Data Wall. The Math Data Wall may be used as a response to intervention. AIMSweb has created a tool to help assess and track students by using a three-tier model. These are broken down into Tier 1: Benchmark, Tier 2: Strategic Monitoring, and Tier 3: Progress Monitoring. Assessment probes were developed to help assess what gaps a student might have in mathematics. AIMSweb has created assessment and monitoring probes from grades kindergarten through sixth grade in an elementary school. The screening probes range from oral counting to concepts and applications with increasing difficulty at each grade level. The information these probes provide a school can be valuable to student achievement. It can tell whether students are on track to meet performance goals, if

instruction is effective, or if instruction needs to be modified. The probes will not give particular information on a standard or take the place of a diagnostic measure.

When using the process of Math Data Wall within a school or district, teachers are better able to monitor their students' progress, track their progress and plan individualized instruction for those students. It also allows a grade level to look at the students as a whole and provide interventions for individual students and whole classes. Cascade Elementary in Renton, Washington uses this information and provides strategic lessons for students at risk using Title 1 para-educator time and individual or small group instruction. During math workshop time with *Investigations Curriculum* the teacher is able to provide instruction to individual or small groups of students. Cascade Elementary has also devoted a slot of time outside the regular class time to target students. These students are pulled out from different kindergarten and first grade classes based on their ability and instruction is provided to support a particular deficient in skills.

At Cascade Elementary School there has been no longitudinal way to track student's progress until now. This school uses a Data Wall for both dynamic indicators of basic early literacy skills (DIBELS) scores in reading and AIMSweb scores for math. This allows the teachers to see the progress of their students across grade level. It can show if a student has been struggling since kindergarten or if this is a new struggle. It also provides information on the interventions provided by the previous teachers.

According to the Elementary School Journal, active instruction is critical to engaging students in math work, maintaining their focus in it, and helping them take advantage of instruction to learn. With specific instruction designed for student's needs it will help keep students engaged in their learning and feel more confident that their needs are a concern of the teacher.

One way to help students stay engaged is to use a variety of instructional methods. For example, there are times when math content should be constructed in ways that focus student's attention to specific learning goals. Other times problems should be represented in multiple ways with a variety of strategies for solving them. A teacher must blend explicit instruction with open-ended problem solving. This process becomes much easier for the teacher to develop lesson plans once the skill in need has been identified.

Typically developing students can profit from general education mathematics programs even though they often rely strongly on an inductive instructional style. General education mathematic programs are designed for students who meet benchmarks; however, students who accrue serious math deficits fail to profit from these programs in a way that produces understanding of the structure, meaning, and operational requirements of mathematics (Fuchs & Fuchs, 2008).

Scope

This project is designed for an elementary school. The outcome of the Math Data Wall will directly affect student learning and interventions provided. It will allow teachers to focus their teaching to the skill that is required. One limitation of this project is that teachers may feel that they are assessing students too much with all of the other assessments required by the district and curriculum. Teachers spend more time assessing, and this limits the time for teaching new concepts. Another limitation is that the probes will not show particular information on a standard, such as the process the students went through to get the answer. The process is just as important as the answer. The students need to understand how they got to the answer and the steps that need to be taken.

Definition of Terms

Achievement Gap: the difference between how well low-income and minority children perform on standardized tests as compared with their peers (*Definition of Assessment, n.d).*

Achievement test: a test that measures knowledge of acquired information and skill mastery, usually attained as a result of planned instruction or training (*Definition of Assessment, n.d.).*

Adequate Yearly Progress – an indicator of a district's or school's progress determined by critical variables such as student levels of proficiency, narrowing test-score gap between advantaged and disadvantaged students and providing quality instructors. "Adequate Yearly Progress" is the minimum level of improvement that states, school districts and schools must achieve each year (*Definition of Assessment, n.d.).*

Assessment - the process of collecting, analyzing, and interpreting information about academic performance related to educational goals. Assessments, as opposed to tests, typically employ a variety of procedures for evaluating student work and learning
(Definition of Assessment, n.d.).

Assessment Data - information on individuals and groups of students gathered from standardized tests, district level tests, individual tests, classroom evaluations, etc. (*Definition of Assessment, n.d.).*

Benchmark: an expected or anticipated skill or understanding at various developmental levels; a specified step along a path toward achievement of a goal or standard (*Definition of Assessment, n.d.).*

Curriculum: the courses of study offered by a school or district. California has developed a set of standards that are intended to guide curriculum and instruction. The final decisions about school curriculum are the responsibility of the local school board (*Glossary of Educational, n.d.).*

DIBELS: dynamic indicators of basic early literacy. (

Formative Assessment - assessment conducted during a performance/course/program with the purpose of providing feedback that can be used to modify, shape, and improve a performance/course/program. Observations which allow one to determine the degree to which students know or are able to do a given learning task, and which identifies the part of the task that the student does not know or is unable to do (*Definition of Assessment, n.d.).*

Informal Assessments - spontaneous assessment that may or may not include written and/or verbal feedback (*Definition of Assessment, n.d.).*

Performance task/event (performance assessments) - complex demonstration of student knowledge (i.e., project, speech, essay, concept map, experiment, research paper, etc.) (*Definition of Assessment, n.d.).*

Probe: to examine a subject in an interview in depth, using several questions (*Glossary of Educational, n.d.).*

Qualitative Assessments - assessment data than does not lend itself to quantitative methods but to interpretive criteria (*Definition of Assessment, n.d.).*

Quantitative Assessments - assessment based on analyzed data (*Definition of Assessment, n.d.).*

Validity - the extent to which an assessment measures what it is intended to measure and the extent to which inferences and actions made on the basis of test scores are appropriate and accurate. For example, if a student performs well on a reading test, how confident are we that the student is a good reader? A valid standards-based assessment is aligned with the standards intended to be measured, provides an accurate and reliable estimate of students' performance relative to the standard, and is fair. An assessment cannot be valid if it is not reliable (*Definition of Assessment, n.d.).*

CHAPTER II

INTRODUCTION

History of Assessment

Student assessment has been used by educators since the early 1900s. Teachers have used a variety of assessments to guide their instruction, evaluate student learning, and qualify students based on ability for higher education (AIMSweb, 2008).

With regard to the assessment practices in the United States, in the early 1900s standardized tests were introduced into public schools. The early tests were primarily used to determine a student's capability rather than what they have learned. The SATs were developed in the 1920s as a way to help determine a person's capability for higher education. From the early 1900s until now attention has increased on the effectiveness on assessment and teaching practices (Cobb, 2004).

Cobb (2004) cites Linn. R.L who said in the 1950s under the direction of James B. Content tests were used in the high schools to select students for higher education and qualify students for gifted programs. In the 1960s and 1970s tests shifted from qualifying students for programs to using test to evaluate federal programs such as Title 1, which is a program that provides funds to improve the academic achievement for educationally disadvantaged students who score below the 50th percentile on standardized tests, including the children of low socio-economic families SES (Ed Source, n.d.).

School districts started to become accountable in the 1980s and 1990s. Tests started to become standardized. Teachers started using tests that were uniformly developed, administered, and scored. Now that schools and districts were on the same page it became easier to look for

holes in students learning. Teachers used the data to provide direct instruction on the area or subject in need (Cobb, 2004).

By 2000 schools were using a combination of formative and summative assessments in the classrooms. Formative assessments are used to provide feedback to the students during the learning process. Boston (2002) cites Black and William who define assessment broadly to include assessment activities that teachers and students undertake to get information that can be used diagnostically to alter teaching and learning. This may include teacher observation, classroom discussion and analysis of student work including in class assignments, tests and homework. Formative assessments help make necessary changes to the instruction such as re-teaching a skill, using alternate instructional approaches, more opportunities for practice, small group or one-on-one instruction. Formative assessment can help students who are lower achieving gain progress because it focuses on the effort students give rather than the student's ability (Boston, 2002).

Summative assessments are a formal assessment that refer to the assessment of the learning and summarizes the development of learners at a particular time. After a period of time, the students sit for a formal assessment about what they have learned. This time period can be by time spans or by curriculum units. The test aims to summarize learning up to that point. The test may also be used for diagnostic assessment to identify any weaknesses and then build on that using formative assessment. It is meant to meet the school or district's needs for teacher accountability and looks to provide remediation for low performance. Areas evaluated can include classroom climate, instruction, professionalism, and planning and preparation (Boston, 2002).

One of the key reasons for looking at assessment was to help prevent deficiencies before they occur. Teachers must first know how their students are achieving before they can plan instruction or provide interventions if needed. Early intervention is a key to student success. Developing a screening tools that can detect kindergartener and first graders who are likely to experience difficulty in learning has had major advances over the last fifteen years according to the Center on Instruction. The Center on Instruction also states that students who are struggling by first grade will continue to struggle throughout their school career. This is why early intervention is a necessity in the elementary schools (Gersten, Clarke & Jordan, 2007).

The design of screening tools also needs to be guided by information on how children develop their understanding for reading and mathematics. In mathematics, when developing assessment tools, educator's expertise should be utilized (Gersten et al., 2007). Screening tools should be developmentally appropriate for the age of the child. In an article from the Washington Post, it states that standardized tests have been set too high (Are US benchmark, 2007). If it is too advanced it can lead to an inability to learn the subject matter and frustration for the students.

Although there is little evidence that children who struggle with numeracy in the early grades continue to struggle throughout their school career, it makes sense to help support these students who are struggling. Gersten et al., (2007) cites Ginsburg & Allardice who said there is some evidence that the numerical concepts children acquire in early childhood lay the foundation for later acquisition of advanced mathematical concepts.

Why It Is Necessary

Tracking students' progress in mathematics has become a necessity for school districts. As early intervention for students continues to prove its effectiveness teachers and schools need to create a way to track students' progress. By creating a Math Data Wall schools can begin to look at struggling students across the grade level as a whole and not as individual classes. The Math Data Wall also tracks students' progress through the different grade levels. This allows teachers to plan instruction and provide interventions to targeted students in their classes (Wagner, 2009b).

The No Child Left Behind Act in 2001 has hundreds of pages of complex provisions but simple and unambiguous goals. Former President Bush promised to end the "soft racism of low expectations" by closing the racial achievement gaps and bring all students to proficiency within the next eight years (Lee & Orfield, 2006). It mandates that all children from racial and ethnic groups attain 100 percent proficiency in two subject matters, mathematics and reading, with science being added later. Schools are required under strict sanctions to raise achievement each year and eliminate the achievement gap by race, ethnicity, language and special education status (Lee & Orfield, 2006).

The achievement gap provides a barometer for educational and social progress. The National Assessment of Educational Progress (NAEP) known as the "Nation's Report Card" of student achievement provides information on the achievement gap among racial and socioeconomic groups (Lee & Orfield, 2006).

According to the *19th Annual Report to Congress on Implementing of the individuals with Disabilities Education Act* (Thurber, Shinn & Smolkowaski, 2002) over 5 million students were served under Individuals with Disabilities Educator Act (IDEA) during the 1995-96 school years.

More than half of those students received special education under the learning disability category. When combined with all of the students served in special education almost one in five receive some form of remedial education to reduce achievement gaps. That is why it is even more important to provide early interventions to students who are at risk (Thuber et al., 2002).

In an article from the New Times for the Division for Learning Disabilities (Fuchs & Fuchs, 2008) approximately 5-9 percent of the school-age population is identified with mathematics disabilities. Poor math skills are associated with life-long difficulties in school and in the workplace. Early intervention activities can greatly improve performance (Fuchs et al., 2008).

Students with math disabilities have greater difficulties with counting and other strategies used to solve problems. These students have difficulty making the switch to memory-based retrieval of answers. Number combinations are a consistent deficiency with students with math disabilities (Baker & Gersten, 2002). Interventions for students with math disabilities should include seven instructional principles (Fuchs et al., 2008).

The first principle is instructional explicitness. Teachers' present materials in a way that provides understanding of structure, meaning and operational requirements of mathematics. The teacher shares the information the child needs to learn (Rivera, n.d; Fuchs et al., 2008).

Instructional design to minimize the learning challenge is the second principle. The goal for this principle is to anticipate and eliminate misunderstandings with precise explanation and carefully sequenced instruction. Instructional designs include sequencing to capitalize on prior knowledge, rate of learning and sense of accomplishment (Rivera, n.d; Fuchs et al., 2008).

The third principle of remediation is a strong conceptual basis for procedures that are taught. The fourth principle is better known as drill and practice. This goes back to the famous saying "practice make perfect" (Rivera, n.d; Fuchs et al., 2008).

Cumulative review is the fifth principle. A mix of problem types and daily review is incorporated into the daily instruction. The sixth principle incorporates the need for motivations to help students regulate their attention and behavior to work hard. Students with MD often lack motivation, attention and ability to self regulate. The student may show signs of emotional stress and no longer try for fear of failure. This is why self regulation and motivation is taught to help student reinforce positive behavior. The last principle requires on-going progress monitoring. This information is used as formative and summative assessments to help teachers individualize instruction for students (Rivera, n.d; Fuchs et al., 2008).

One goal of instruction for schools is the development of students' mathematical skills, states a study from the *School Psychology Review* (Clarke, Shinn, 2004). Clarke and Shinn define mathematics as a language that is used to express relations between and among objects, events and times. The language of mathematics uses a set of symbols and rules to express these relations.

Being proficient in the language of mathematics is becoming increasingly important in today's society. The demands of new market places require employees to have a greater fluency in mathematics that ever before. Clarke and Shinn (2004) cite Riley who said, once employed, individuals who are proficient in mathematics earn 38 percent more than individuals who are not proficient in mathematics (Clarke, 2004).

Clarke and Shinn (2004) cite Ginsburg who said, "The acquisition of basic numeral concepts during early childhood years serves as a foundation for the acquisition of later higher

order mathematical concepts. Without early intervention it can later hinder their ability to learn important mathematical concepts. With a failure to understand mathematical concepts it can lead to low interest in the subject and low self confidence with numbers and concepts".

Schools in the past have been primarily focused on reading. For the past 15 years there have been significant studies that have shown early intervention with students in kindergarten and first grade has decreased their difficulties in learning to read. Mathematics is ready for the same intervention when identifying and providing early interventions to students who struggle with math concepts. The mathematics field has developed new screening tools that can be used by teachers and schools to identify those students (Gersten et al., 2007).

In kindergarten and first grade number sense is the key to mathematics understanding. "The characteristics of good number sense should include, a) fluency of estimating and judging magnitude; b) ability to recognize unreasonable results; c) flexibility when mentally computing; d) ability to move among different representations and to use the most appropriate representation" (Gersten et al., 2007). Having good number sense allows one to understand the meaning of numbers and develop strategies for solving mathematical problems. Gersten et al.(2007) cites Griffin who said "number sense is developed in large part from both formal and informal instruction by parents, siblings and teachers".

The National Center on Student Progress Monitoring (NCSPM) has stated that the benefits of progress monitoring include accelerated learning for students who receive more appropriate instruction and more informed instructional decisions and higher expectations for students by teachers. The use of progress monitoring students results in more students meeting important state standards in mathematics (Student progress, n.d.).

Screening probes should include magnitude comparison, strategic counting, basic number facts, and number recognition (Gersten et al., 2007). Magnitude comparison is the understanding of number quantity and the concept of numbers being larger or smaller than one another. For example the number 3 is smaller that the number 7. Strategic counting is the ability to count in sequence. Counting is used to solve problems and is fundamental to mathematics proficiency. Gersten et al., (2007) cites Siegler and Roberson who said that counting strategy is a key indicator of which young students are likely to have difficulty learning mathematics. Number recognition is not a mathematics skill itself, but it is a necessary skill for formal mathematics. It is the written code for mathematics. A person has to be able to recognize a number before the problem can be solved. Basic arithmetic facts allow students to quickly retrieve additions and subtraction of number facts automatically. Students must make the move from counting on their fingers to mental math.

Why Math Data Wall Works

Studies have shown that using a prevention first approach for at risk students is reducing the number of students who qualify for special education in the later grades (Chard, Clarke & Baker, n.d.). Chard et al.,(n.d.) cites the NCR who said, "There is increasing support that, like reading, mathematics proficiency is represented by a combination of important knowledge and skills, including conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive mathematical disposition".

A field test was done based on potential screening measures a school district. There were 436 kindergarteners and 483 first-grade students in seven schools in a medium sized school district of 5,500 students in the Pacific Northwest used in this study (Chard et al., n.d.). Across the seven schools 27-69 percent of the students qualified for free and reduced lunch. 13 percent

of the students were minorities and 4 percent were English Language Learners (ELL). In kindergarten and first grade 4-12 percent of the students were on IEPs. The goal of these measures was to show growth in kindergarten and first-grade students over the course of the year and with the preliminary finding there was improvement in both grade levels (Chard et al., n.d.).

These students were assessed in the fall, winter and spring. Participants in this test were given a set of experimental measures over the course of the study. All measures were given in the fall. Based on the performance subsets of these measures were given again in the winter and spring (Chard et al., n.d.).

The experimental measures were based on number sense and curriculum-based measurement. The goal was to select measures that were proficient in early number skills and knowledge that is important to the development of mathematical skills. The measures on number sense included oral counting, number identification, number discrimination and missing number. By using these measures there was growth academically for students in kindergarten and first grade in the study (Chard et al., n.d.).

AIMSweb provides universal screening tool for the elementary grade levels. All assessments are paper pencil and administered by a trained faculty member. The screening tools for kindergarten and first grade include quantity discrimination, oral counting, number identification and computation (Test if early, n.d.). The data is then inputted into a data base and processed. By using AIMSweb, benchmark targets can be determined in four different ways. "1: schools can define their own benchmark targets based on norm tables or other data". This could be correlated with district performance expectations or grade level expectations. "2: Use AIMSweb presets. 3: Use DIBELS presets, or 4: Use AIMSweb test correlations future to

generate benchmark targets that predict success in high stakes testing" (AIMSweb CBM Tools, 2008).

AIMSweb correlates with the Response to Intervention Method (RTI). RTI is a multi-tiered approach to early identification of at risk students. It is a universal screening of all students, usually several times a year (Kim-Sung, 2008). Those who are at risk are given interventions and rescreened to check progress bi-monthly. Multiple interventions are used during this process (Wagner, 2009b). The interventions may include small group instruction, one-on-one instruction and re-teach of a skill. Interventions are a continuous assessment and improvement evaluation system designed specifically for frequent assessment and monitoring of students at-risk, struggling learners or those with specific learning disabilities (AIMSweb, 2008).

The multi-tiered approach features three tiers in response to intervention. Tier 1 is benchmark. The students who fall into this category have met benchmark and are assessed three times a year. Tier 2 is strategic monitoring. The students in this tier are categorized as at-risk. Their progress in monitored monthly and their progress determine instructional changes. The third tier is progress monitoring. Students who are in this tier are progress monitored frequently, provided intensive interventions and have IEP goals (Wagner, 2009b).

The RTI is an effective assessment plan that has four main objectives. The first objective is to identify students at the beginning of the year who are at risk or experiencing difficulties and will need extra instruction or intensive intervention to help them make the progress toward meeting grade-level expectations, as well as targeting students who meet benchmark to provide instruction that challenges them. Monitor students' progress throughout the year to determine whether at risk students are making adequate progress and to identify students who may be falling behind or need to be challenged is the second objective. The third

objective is to inform instructional planning in order to meet the most critical needs of individual students. The last objective is to evaluate whether the instruction or intervention provided is enough to help students achieve grade level expectations by the end of the year (The Colorado Department, n.d.).

Progress monitoring is a scientifically based practice that is used to assess student's academic performance and evaluate the effectiveness of instruction for an individual student or the whole class (Student progress, n.d.). Research has demonstrated that teachers who progress monitor their students for instructional decision–making purposes have higher student achievement. Teacher decision making on providing instruction improves and the students tend to be more aware of their own performance and deficiencies (Wagner, 2009b).

Progress monitoring should include individual, class and school wide assessment. The assessments should be specific to the skill and provide useful information to guide instruction. On-going progress monitoring allows a teacher to document progress in reaching the benchmark goal in the critical components (Determining instructional level, n.d.).

"Using progress monitoring and explicit individualized instruction has proved to increase student achievement with mathematical concepts" (RTI Action, n.d.). Students who are provided interventions are more likely to reach benchmark and fail to qualify for special education. Using RTI and the three tiered methods for identifying students, and providing instruction continues to be beneficial to student learning and continues to raise their assessment scores and move them closer to reaching the benchmark level. Progress monitoring assessments need to measure essential skills that children are learning in mathematics. These assessments help document student performance and rate of learning over time. Both types of information are essential to

determining if the intervention is helping the students reach grade-level expectations (RTI; about progress, n.d.).

Although using a Math Data Wall to track students' progress in mathematics is new, progress monitoring and strategic interventions for students who are at-risk have been used in classrooms for some time and been successful in raising student achievement (Wagner, 2009a)

CHAPTER III

Procedures

For the past three years Cascade Elementary School in the Renton School District, Washington, has been using the DIBELS scores to track the progress of the students as a whole grade level instead of individual classes. Cascade Elementary uses the students' scores to plan instruction and provide interventions to students who are at risk. Cascade Elementary also tracks each student and the interventions as the student moves from grade level to grade level.

Cascade Elementary uses a Data Wall as a visual representation of the students. It is basically a pocket chart that is divided into students who are at risk, low risk and benchmark. Each grade level focuses on ways to provide interventions to those students who are at-risk. This intervention can be small group instruction, individual instruction, re-teaching of a subject or Title 1 service.

Cascade Elementary has received a grant from the Math Helping Corporation for the past year. Part of the grant was to provide intensive interventions to students who are at risk. Combined with a math committee, Math Helping Corporation has created a Math Data Wall that mimics the one already in use for reading. Using specific probes provided by AIMSweb, Cascade Elementary has tracked each student in basic math concepts this year.

The staff has participated in administrating and scoring the chosen probes for each grade level. The staff has attended three Math Data Wall meetings with their grade level and the Math Helping Corporation representative to talk about the students' progress in math and identify students for interventions.

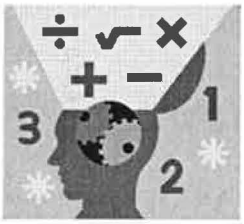
Some of the research for developing the Math Data Wall and the research that supports early interventions have come from Central Washington's University's library. This includes sources by ERIC. AIMSweb research had been used to find appropriate probes to use and to use the data effectively. The author utilized web sites off of the Internet to obtain articles and fact about students who struggle in mathematics, assessments, interventions, tracking student progress and the history of assessment.

The sources were evaluated based on content and authors. Using familiar and recommendable authors within the education sources was another way the sources were evaluated. Some of the sources used were to create a Math Data Wall at Cascade Elementary. The sources were shared with the staff during trainings on AIMSweb and Math Data Wall.

CHAPTER IV

This guide tells teachers how to create a Math Data Wall in their schools. A Math Data Wall is to be used to help teachers visually track their students' math scores using AIMSweb assessments. The Math Data Wall provides a visual representation of student progress throughout the year. By using Math Data Wall teachers can plan instruction and provide strategic interventions to students who are at risk.

Creating a Math Data Wall in an Elementary School



By:

Lindsey Moorhouse

Welcome:

I hope this guide proves to be useful in your school.

This guide is to be used to help your school build a Math Data Wall to track student's progress in math. By using this data wall teachers can plan instruction and provide interventions to students across the grade level.

Building a Math Data Wall for a school has many different variables to account for while constructing it. In order to make this a functioning way to track student progress the wall needs to be in an easily accessed place in the building and easy to read. The purpose of the Math Data Wall is to be able to easily identify students who are at risk across grade levels.

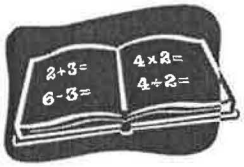
To build the wall itself you need to purchase a piece of cork board big enough to hold all of the information. It should be about 10 feet long and 5 feet tall. Hang the cork board on the wall. Place black paper over the cork board to cover it completely. This will make the pockets appear more visible.

Buy a piece of fabric that is large enough to cover the area of the cork board. You will also need Velcro for the outside of the cork board and fabric to attach together when the data wall is not in use. The data wall contains confidential information and should be covered up during times when wall is not currently in use.

Kindergarten and First Grade need to decide which probe assessment they want to track. First Grade at Cascade Elementary School is tracking quantity discrimination. All other grade levels track computation fluency only.

The most difficult part of constructing the data wall is determining the number of pockets you will need for the chart. This is figured out by looking at the data to determine where the breaks for high risk, low risk and benchmark sections need to be according to percentiles for benchmark.

For First Grade at Cascade Elementary School using AIMSweb quantity discrimination probes the breaks according to high risk, low risk and benchmark are as following; 0-3 (high risk), 4-11 (low risk) 12-20, 21-26, 27-31 (low risk), 32+ (benchmark) for the fall term. Using the AIMSweb growth table winter and spring high risk, low risk and benchmark percentiles are determined.



At Cascade Elementary for First Grade the student risk percentiles are:

Percentile	Fall	Winter	Spring
90	11	22	28
75	8	16	21
50	4	11	15
25	1	7	10
10	0	4	6

Once the breaks are established you will need to glue clear library pockets in the appropriate places for each grade level. First Grade has 6 pockets for quantity discrimination in the fall and winter and 6 pockets for computation fluency in the spring. Label the side of the data wall with the correct grade levels. Use different color labels to be able to clearly discriminate between grade levels. Label the pockets with the appropriate range of score numbers underneath. Label the space in-between the pockets with high risk, low risk and benchmark breaks are.

This will allow you to clearly see who and how many students fall into these categories.

Cut 6 different color strips on construction paper, in accordance with the color of the grade level. For example K = pink, 1st grade = red and so on. Cut enough strips for all students in each grade level. Make extra for students who move in to the district later in the school year. These strips should be about 1in. by 6in. The strips should be long and wide enough to write students name and scores on the strip. These strips will represent each student and his or her score in the school.

Doe, John				
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Moorhouse	(white and or orange dot)			

After teachers have administered the assessment probes, schedule a grade level meeting to review scores. During this meeting teacher will:

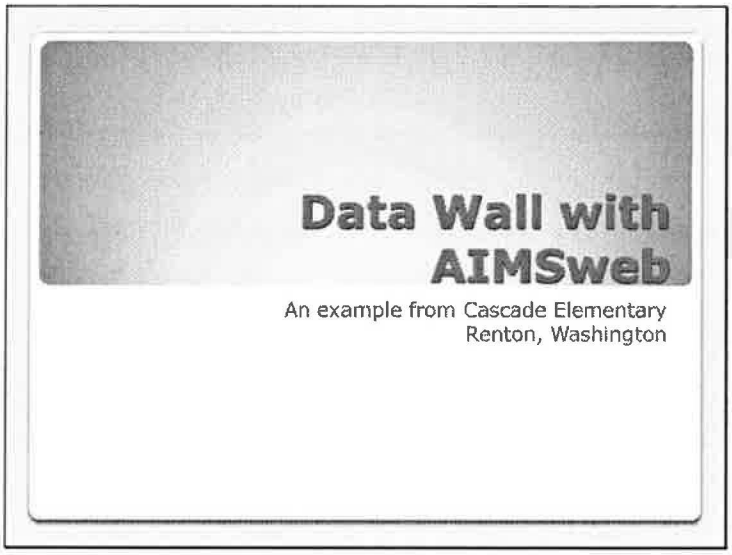
- Record student names and score. Last name, first name. Scores should be marked with an F, W, and S down the side. Write teacher's name under the student's name.
- Place a white dot sticker if the student receives special education. Orange dot if the child is in ELL.

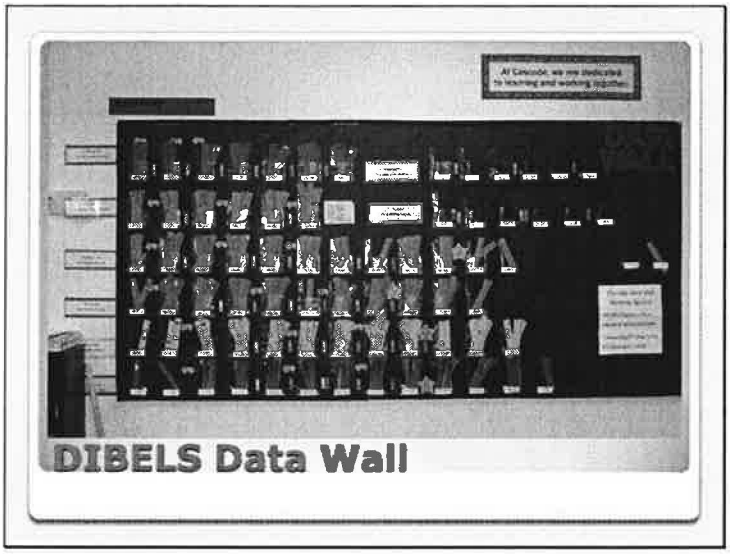
Once the name strips have been filled out place the strips with the score up and out in the appropriate pockets. This will give a visual representation of which students are at risk, low risk and benchmark. Discuss those students who are at high risk and the appropriate intervention.

On the lower part of the data wall have two extra pockets designated for students who have moved and need to be tested.

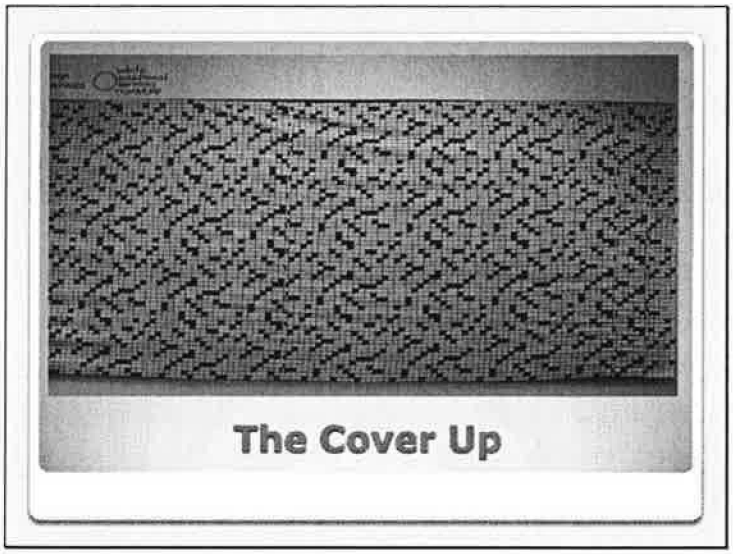
As the students move from grade level to grade level staple the previous strip with scores to the current strip to help track the data long term.

Text of the Power Point Presentation:

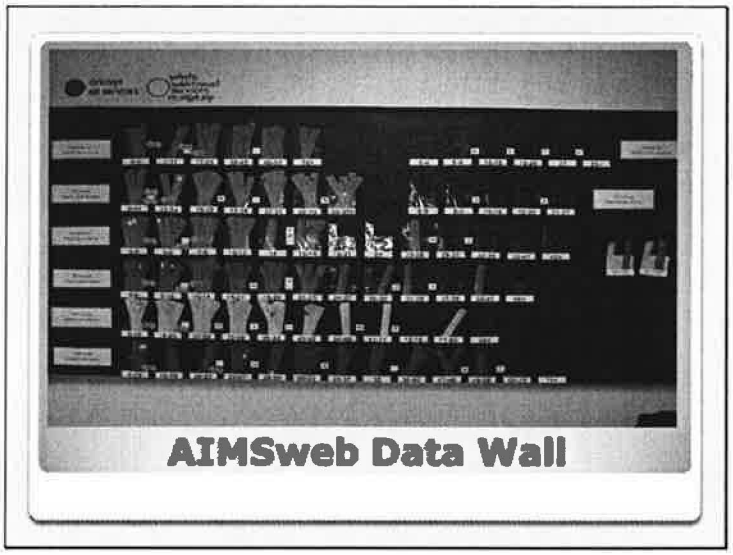




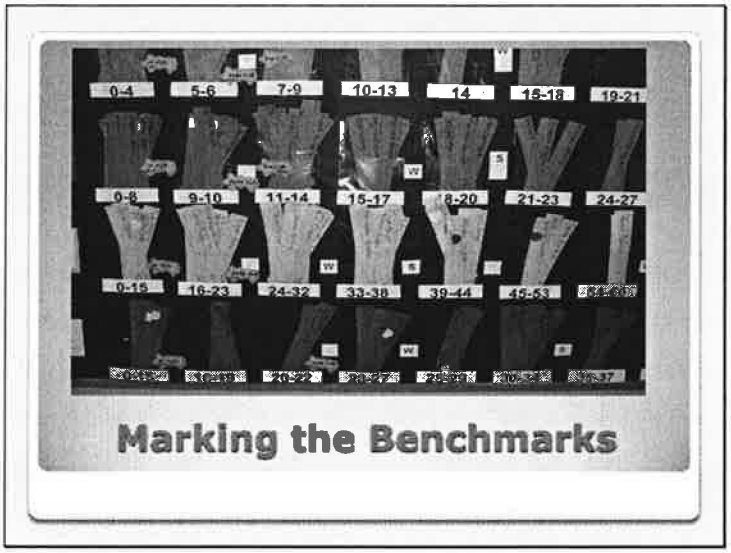
This is a picture of the data wall we use for DIBELS scores. Cascade Elementary has tracked students' progress using this data wall for the past 4 years. It was the inspiration for the Math Data Wall.



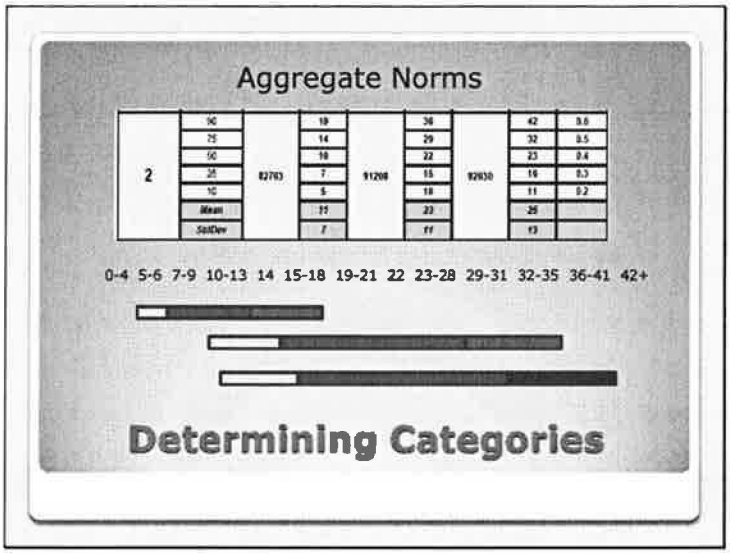
The Math Data Wall contains confidential information and must be covered up when not in use.



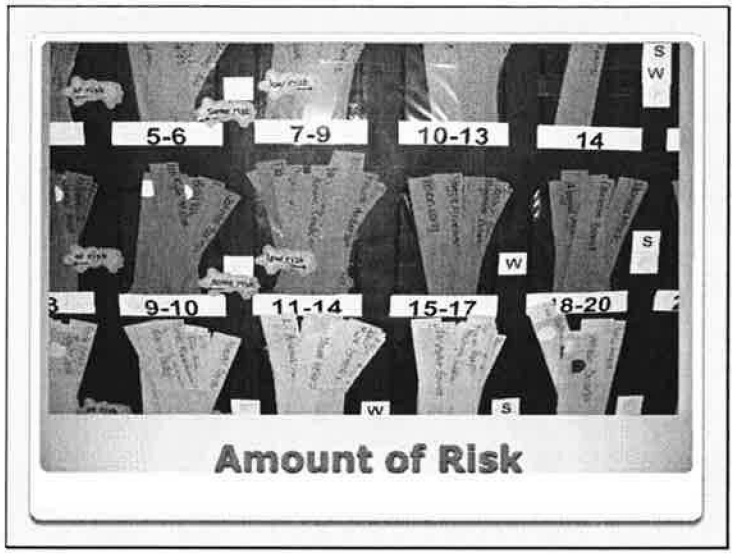
This is a picture of the Math data Wall Cascade Elementary uses to track students progress in mathematics.



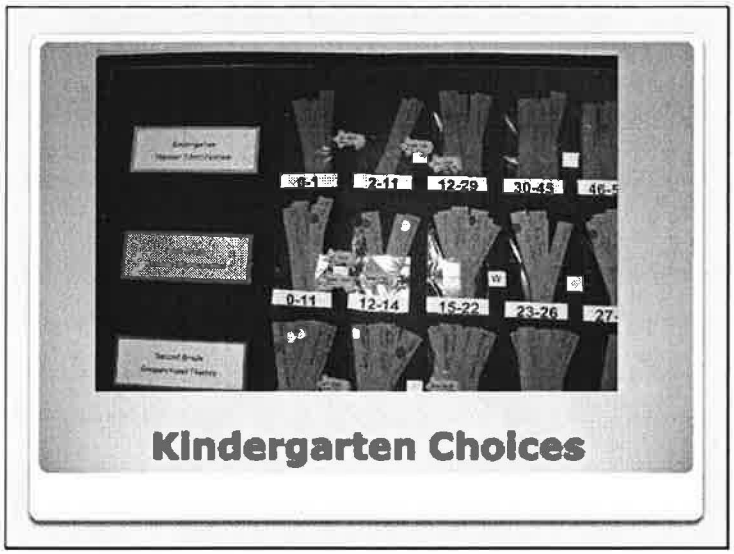
This is how Cascade Elementary has marked the at-risk, low risk and benchmark scores using star post-its for fall winter and spring.



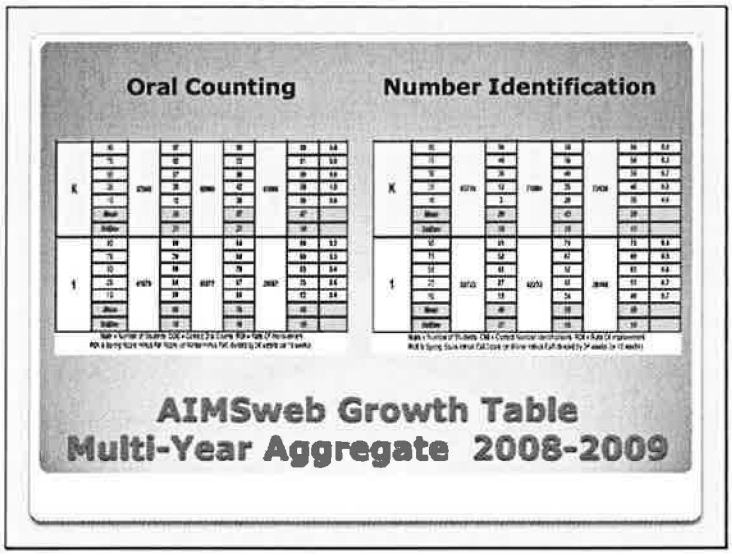
Cascade uses these percentile scores to determine the pocket numbers.



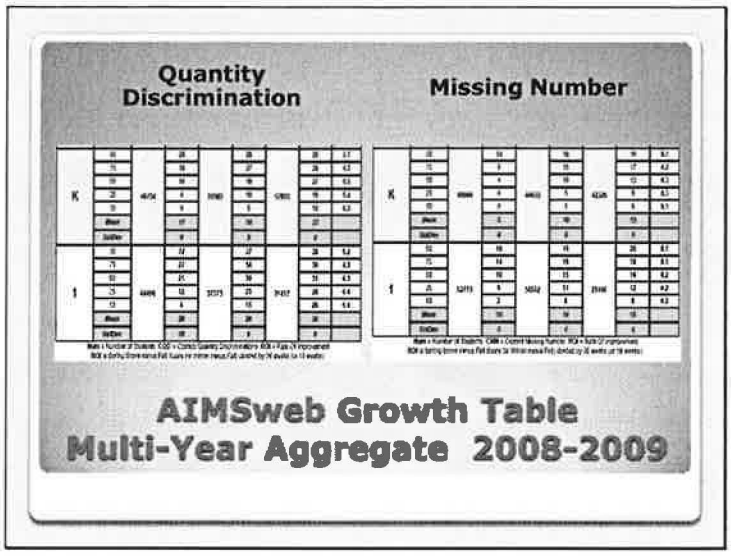
This slide shows at-risk and low risk pockets with students names and scores.



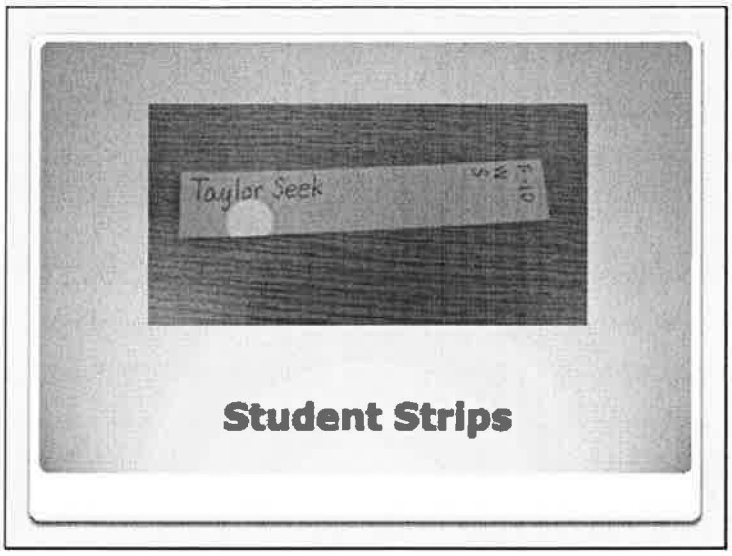
Kindergarten and First Grade's screening measures. Kindergarten uses number identification for fall. First Grade uses quantity discrimination. Second -Fifth Grade use computation fluency.



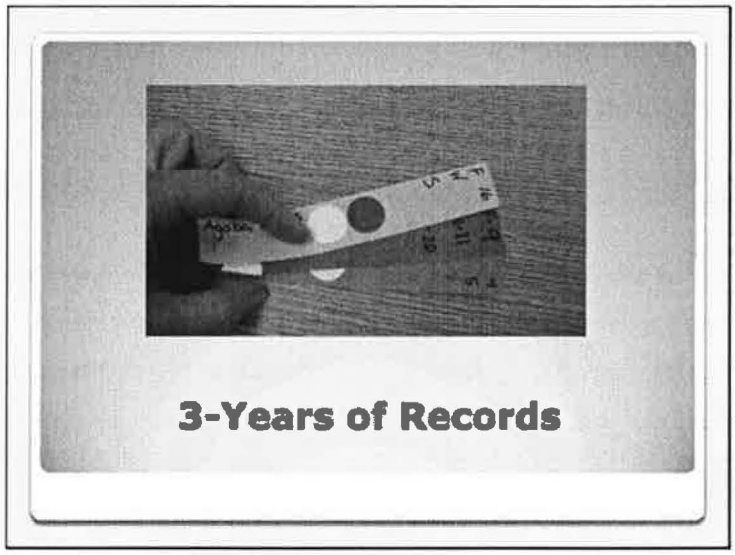
We use this growth table and percentiles to determine at-risk, low risk and benchmark scores.


Quantity Discrimination
Missing Number
AIMSweb Growth Table
Multi-Year Aggregate 2008-2009

Continued...



It is important that all grade levels mark the strips the same way. The students name should be able to be seen along with the scores. The color dots represent ELL or special education.



Cascade Elementary tracks each student across the grade levels. Each year their previous strip is stapled to their new on.

It is proven that early intervention works! This is one way to help determine those students who require interventions (Wagner, 2009c).

CHAPTER V

Summary

Assessments have been around for more than 100 years. Although they have been used for a variety of purposes, assessments have one thing in common and that is information. Assessments, however they are used, provide a person with particular information. This information can be to qualify them for higher education, program accountability, grading, provide interventions or direct instruction. As assessments become more common and standardized in the schools it is important to use the information to help students progress, particularly in mathematics.

Schools that use standardized tests to guide instruction and provide interventions to students who are at risk have a higher success rate. Research has demonstrated that early interventions given to students in kindergarten and first grade reduce the need to qualify them for special education and increase their achievement in mathematics.

By creating a Math Data Wall, grade levels can track students in a visual way. This allows a grade level and individual teachers to provide interventions and individualized instruction to those students who fall into the at-risk category.

Conclusions

At Cascade Elementary School in Renton Washington, where I teach, we have used a Math Data Wall this year. Cascade has been using a Reading Data Wall for the last three years

and it has been a very powerful tool in helping guide instruction and provide interventions. This year the Math Data Wall has done the same.

In my kindergarten classroom I have used the data that AIMSweb has created on my students to provide individual and small group instruction to students in need. I have a para educator in my room for my math period, and I utilize the assistance by creating small groups that she sees for specific skills. During this time I also pull individual students and work with them on a particular skill. The rest of the class is participating in a math workshop which is independent activities students perform.

Using a Math Data Wall to track student is successful to both the teacher and the students. I have participated in the Data Wall meeting, trainings and the building of the Data Wall. I have gained a lot of knowledge on my students this year using the AIMSweb probes and the Math Data Wall. I feel that my students have benefited from this information. It allowed me to see the students who fell into the at-risk category with simple and quick assessments. I then provided appropriate interventions and guided my instruction based on the information provided. The more information teachers have on their students the easier and more accurate it is to guide the instruction and provide interventions. Cascade Elementary will continue to use the Math Data Wall each year to help determine students who are at risk and provide strategic interventions for those students.

Recommendations

Using a Math Data Wall to tracks students' progress this year has greatly increased my awareness of my students learning. I was able to provide interventions to students in need and guide my instruction for students who met benchmark and students who are at risk. I

recommend that schools participate in a Math Data Wall three times a year. This will provide information on students' progress. Grade levels within buildings should meet three times a year to discuss scores and interventions. I also recommend that grade levels check in during a grade level meeting once a month to discuss student progress and the interventions that are being provided and if there need to be any changes.

I recommend that using a Math Data Wall will help guide instruction during whole group and small group instruction. It allowed me to easily see who needs interventions and on what skill. It also allowed me to plan my para educator time and have her support the students at risk on particular skills. I recommend that using a Math Data Wall is a useful tool within a school building that gives teachers a snapshot of their students' skills.

The next step in using the Math Data Wall in a school would be to create a way for the students to participate with tracking their progress. This can be done within the individual classroom. Another step schools can take is to talk about the schools progress as a whole and plan interventions based on the needs of the students'. The data can be collected as a whole using AIMSweb resources and charted to see which grade level and individual students are at risk. Using the data, grade levels can plan instruction and interventions for students who are at risk and those who already meet benchmark.

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