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ABSTRACT

The effects of portfolio assessment on mathematics students' attitudes about grades, their awareness of their mathematics strengths and weaknesses, and their abilities to set reasonable goals were studied for 12 fifth-grade students given a survey on attitudes about grading near the end of a 10-week term. Students also wrote about their strengths and weaknesses in mathematics and completed a goal sheet. Mathematics achievement of the six students in the control group was measured using traditional assessment, and mathematics achievement of the six students in the experimental group was measured using portfolios. No correlation was found between portfolio assessment and students' attitudes about grades. However, five of the six students receiving traditional assessment stated goals and weaknesses in vague generalizations, while all of the students in the portfolio group described their strengths and weaknesses in detail and provided task specific goals to overcome their weaknesses. Results suggest that portfolio assessment might help students see their strengths and weaknesses so that they are more able to link successes and failures to performance. Portfolio assessment might also facilitate goal setting for some students. Appendixes contain the survey, the questionnaire about strengths and weaknesses, and the form used in the goal setting interview. (SLD)

Effects of Portfolio Assessment on Students' Attitudes and Goal Setting Abilities in Mathematics

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Running Head: PORTFOLIO ASSESSMENT IN MATHEMATICS

Abstract

The first purpose of this paper is to investigate the effects that portfolio assessment has on math students' attitudes about grades and on their awareness levels of math strengths and weaknesses. The second purpose of this paper is to examine the effect of portfolio assessment on mathematic students' abilities to set reasonable goals. A sample of 12 fifth grade students was given a survey on attitudes about grading. They also wrote their strengths and weaknesses in mathematics and completed a goal sheet. The surveys and forms were all given near the end of a ten week term. The mathematic achievement of the six students in the control group had been measured using traditional assessment and the mathematic achievement of the six students in the treatment group had been measured using portfolio assessment. There was an equal representation in both groups of high, average and low achievers in mathematics. No correlation was found between portfolio assessment and students' attitudes about grades. However, five out of the six students who were exposed to traditional assessment methods stated goals and weaknesses in vague generalizations, while all of students involved in portfolio assessment described their strengths and weaknesses in detail and provided task specific goals to overcome their weaknesses.

Implications of the research are that portfolio assessment might help students to see their strengths and weaknesses so that they are more able to link their successes and failures to their performance. In addition, portfolio assessment might facilitate goal setting among students to motivate them to increase their performance.

Effects of Portfolio Assessment on Students' Attitudes and Goal Setting Abilities in Mathematics

Young students (grades 4-7), especially below average achievers, often attribute the grades they receive to external factors. They believe their grades are determined by luck rather than effort (Evans & Engelberg, 1988). Emerging issues in assessment suggest that students' attitudes toward grading practices need to be changed so that students will realize the part they play in their own achievement. The recommendation is that teachers provide students with opportunities to analyze their work and set goals to promote higher achievement (Frazier & Paulson, 1992). This means giving students a chance to evaluate themselves.

Students in Brandon Schools receive grades at least four times during a school year. Students often have little input when teachers are selecting the papers that will be graded and used to calculate the average and final grades representing their achievement. Students in this researcher's class have had little input when asked why they have received a certain grade, and accordingly, had few suggestions to contribute when discussing how a grade can be raised. Therefore, they could not devise a plan for improvement to achieve a certain goal. Bernabei, Gearheart

and Sund (cited in Piirto, 1987) have suggested that students lack the planning skills and self direction necessary to set goals. Current trends in education are suggesting that students must have the ability to specify their own capabilities and efforts in order to set and attain reasonable and challenging goals (Frazier & Paulson, 1992). Goal setting involves comparing one's present level of performance with some desired performance. When students have been given or have selected a goal, they may experience a sense of self-efficacy for attaining it (Schunk, 1984). Portfolio assessment may be the tool which will facilitate the student centered process of determining ability and effort and utilizing this information to set goals. This type of planning may lead to academic success (Piirto, 1987).

The answers to the following questions may help to determine whether portfolio assessment contributes to student success. Would portfolio assessment change students' attitudes about grading? Would portfolio assessment help students to see their strengths and weaknesses so that they might be able to link their successes and failures to their performance? Would portfolio assessment facilitate goal setting among students so that they might increase their performance?

Purpose

The first purpose of this paper is to investigate the effects that portfolio assessment have on mathematic students' attitudes about grades and on their awareness levels of mathematic strengths and weaknesses. The second purpose of this paper is to examine the effect of portfolio assessment on mathematic students' abilities to set reasonable goals.

Research on Grading Attitudes

Several researchers have described students' attitudes on grades. In a study using 304 male and female students from grades 4-11, Evans and Engelberg (1988) found that younger and especially lower achieving students had a poor understanding of grading concepts. Students were also more likely to attribute grades to external and uncontrollable factors. In addition, the authors found that dissatisfaction and cynicism related to grading practices increased with age.

When students receive little information about why they get a certain grade, they do not know how to improve a grade. Grading criteria may seem arbitrary and useless to students and may be considered a "function of teacher taste rather than a representation of inherent and tangible standards" (Jongsma, 1991,

p.318). It has been stated that traditional grading practices do little to inspire students to learn. Furthermore, most high achieving students work toward a high grade rather than for the benefit of learning (Stenmark, 1989). Proponents of alternative methods of assessment question the traditional grading practices, contending that traditional grading
usually required by school districts does not lend itself to reflection and goal setting. Routman (1991) believes that at best, grading is a narrow measuring system that promotes competition, discourages cooperation and does little to describe a student's abilities.

Research on Goal Setting

Schunk (1984) studied the effects of goal setting and concluded that goals that include specific standards of performance are more likely to increase motivation and to encourage students to self-evaluate. These specific goals activate students more than general goals, such as "Do your best". In a study done on 30 fourth grade mathematic students, five of the thirty boys who had low mathematic diagnostic test scores, lacked focus, concentration and organizational skills were targeted for study. Results revealed that the specific goals of increasing mathematics achievement with these five low achievers

was not met. Only one out of five of the targeted students showed improvement in test scores. The participation in goal setting did, however, appear to motivate the students to become responsible for their learning (Piirto, 1987). Gaa (as cited in Schunk, in press) investigated the effects of proximal goals in the context of goal setting conferences. The students who participated in the goal setting had more accurate perceptions of their abilities. Research is inconclusive as to whether the goals students set themselves are better than assigned goals. However, students may be more likely to commit themselves to a goal if they perceive it to be their own (Schunk, in press). When describing goals set by students who developed literacy portfolios, Hansen (1992) states, "The goals that students set for their portfolios show they can shed their passive school posture. They no longer sit and wait for the teacher to give the next assignment and then grudgingly do it-- or not. They make their own plans" (p. 68). Hansen believes portfolios give students the opportunity to show proof of goal attainment. They may also indicate that a goal has not been met. Frazier (1992) comments on how well the students' goals corresponded with the various artifacts included in their portfolios. Students who selected skill oriented goals, included writing checklists and punctuation guides. Others who wanted to

improve in different areas, wrote narrative statements to explain how a goal was met. Frazier explained that goal setting becomes specific and individualized and students become invested in their portfolios.

Research on Portfolio Assessment

Portfolio assessment is described as being a student-centered form of assessment in several articles. Jay Simmons' (1990) research team pilot-tested portfolios as an alternative to the traditional timed test in writing. They had 27 fifth graders select their best three pieces of writing. Results indicated that self-selected portfolios of their best work are significantly better than timed tests in estimating students' writing abilities. Simmons' research concluded that portfolio assessment gives more descriptive information about student performance.

It has been stated that "portfolios give teachers insights into their students' growth not possible through traditional assessment measures" (Reif, 1990, p.29). It has also been suggested that mathematical power comes with knowing how much we know, and what we need to understand to know more (Stenmark, 1989). The advantages of portfolio assessment in mathematics were explained stating that portfolios give students and teachers a clear and understandable picture, instead of a mysterious test

score number or grade. Also students assume active roles when selecting and assessing their work. They are able to self-report what is learned and/or what is yet to be learned when the portfolio approach is used (Stenmark, 1989).

Adams and Hamm (1992) stress that a portfolio is a representation of carefully selected student accomplishments. Routman (1991) argues that portfolios might, however, become an added chore to some teachers. Routman believes that, depending on an individual teacher's approach to the technique, portfolio assessment is likely to become a mere folder in which to store samples of student work. She states that teachers must be ready to implement this approach by giving up some of their power so students may gain ownership of their learning and evaluation. Routman also believes that pedagogical practices must be changed to create the unique blend of teaching and assessment that portfolio assessment has to offer. Portfolio assessment is considered a "work-sample approach" which will better coordinate assessment and instruction (Perrone, 1991). It is described as being a better indicator of student learning where the attention is drawn to the child's interest and learning style, instead of a prescribed set of standards which students are expected to conform to. Hebert (1992) describes portfolio assessment as a type of

assessment tool that "develops the metacognitive process in students and heightens their awareness and commitment to a critical assessment of their learning" (p. 61).

There is a paucity of empirical research on the affective contributions that portfolio assessment may have on students. However, several teachers and researchers have observed positive changes in students' self-esteem and confidence when involved in portfolio assessment. One teacher-researcher team believes that portfolio assessment encourages ownership, pride and high self-esteem (Frazier and Paulson, 1992). Frazier, a fourth grade teacher who utilized portfolio assessment in her classroom, noticed students' increased awareness of writing strengths and weaknesses. Students who, in the fall, were vague when conveying their writing abilities, became articulate, specific and persuasive after using portfolios.

After using a new reporting form augmented by student portfolios, teachers and parents in Wennetka, Illinois have noticed even the youngest of students demonstrating leadership and independence when assessing their own portfolios (Hebert, 1992).

Hypotheses

It is hypothesized that as a result of being involved in portfolio assessment, mathematic students will attribute their

grades to internal factors. It is also hypothesized that mathematic students using portfolio assessment will become more adept at targeting their strengths and weaknesses and will become more proficient at setting reasonable, meaning attainable yet challenging, goals as a result of being involved in portfolio assessment.

Methodology

Subjects

The sample for this study consisted of 12 fifth grade students attending an elementary school in a rural town in southeast Michigan. Students were chosen based on their ability levels in mathematics. Students from each of three different classrooms represented an equal number of above average, average and below average abilities in mathematics. Each student's achievement in the control group was measured using traditional assessment. Each student's achievement in the treatment group was measured using portfolio assessment. Matched pairs of traditional assessment (TA) students and portfolio assessment (PA) students were categorized according to ability levels as measured by the tests in the Scott, Foresman Invitation to Mathematics textbook, and confirmed by teacher observation. For example, two above average TA students were compared with two above average PA

students. A sample of 5 boys and 7 girls was chosen. There were no minority students.

Procedure

All members of the sample took a grading attitudes survey, wrote their strengths and weaknesses in mathematics and completed a goal sheet near the end of spring term of their fifth grade year. The purpose of the survey was to determine whether students attributed their grades to external or internal factors. The attitude survey consisted of six questions pertaining to students' attitudes about their own grades (see Appendix A). A questionnaire (See Appendix B) was given and required students to list their strengths and weaknesses in mathematics. All students were asked to write their strengths and weaknesses to show proof of what they had learned and/or misunderstood in mathematics. On the goal sheets, students were asked to suggest a goal that they might strive for in mathematics (see Appendix C). Students were allowed to use the questionnaire to aid them in proposing a goal.

TA Classroom Procedures

The students in the control group were in classrooms where traditional assessment measures took place. These students' completed assignments, and mathematic tests were averaged to

calculate their final grades. Zeros given for incomplete assignments were also averaged with the other grades.

PA Classroom Procedures

The students in the treatment group were involved in portfolio assessment. Each student had been collecting graded and nongraded mathematic papers throughout the term in a student portfolio. These papers included math tests, math dittos, class responses to mathematic questions such as, "Explain what a fraction is," and "Why do you need to know how to find area?" Not all papers were formally graded. Some were read by the teacher and discussed, others were given a star, and some were given a grade based on a percentage scale. At the end of each week, students were given time to go through their portfolios and reflect on their mathematic performance. They were encouraged to write notes on each assignment or response, giving reasons why they felt they did well or poorly on it. At the end of the term, students were asked to choose three representative papers from their portfolios that displayed high performance. They were also asked to choose three papers that they felt were examples of mathematic concepts they still didn't understand or were examples of poor performance. The students were given additional time to reflect on their mathematic performance. They could add to their

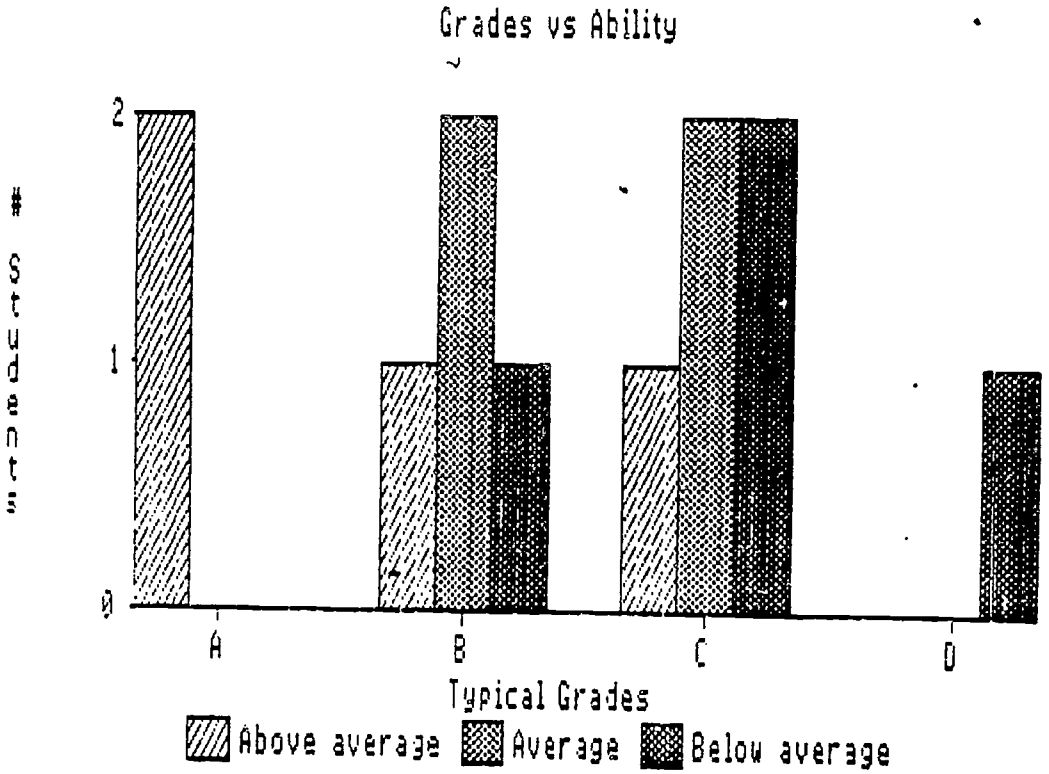
notes to explain whether they still didn't understand a concept. They could also write what helped them to finally understand a mathematic concept. The students were then given the survey. They understood that their comments about their strengths and weaknesses would be considered during a student-teacher conference. The students were then given the mathematic section of a report card. They were required to put a mathematic grade on the card. They also had to mark a 1, 2, 3, or 4 on the three categories which were: A) Understands concepts B) Knows basic facts and C) Puts forth effort. A 1 indicated an outstanding, a 2 indicated a satisfactory, a 3 indicated improvement in that area, and a 4 meant that the student needed improvement. The teacher then read the selected work and read each student's notes, strengths and weaknesses questionnaire and report card during a student-teacher conference. Both the teacher and student discussed their concerns. Grades and numbers on some students' report cards were changed after the discussion, but only with the student's knowledge.

Results

Question one of the survey asked students what grades they usually received. The four above average students responses were in the A, B, C range. The average students' responses were in the

B. C range and the below average students' responses were in the B.C. D range (See Figure 1).

Figure 1. Grades students reported that they typically received versus the above average. average and below average achievement categories they were assigned for the study.

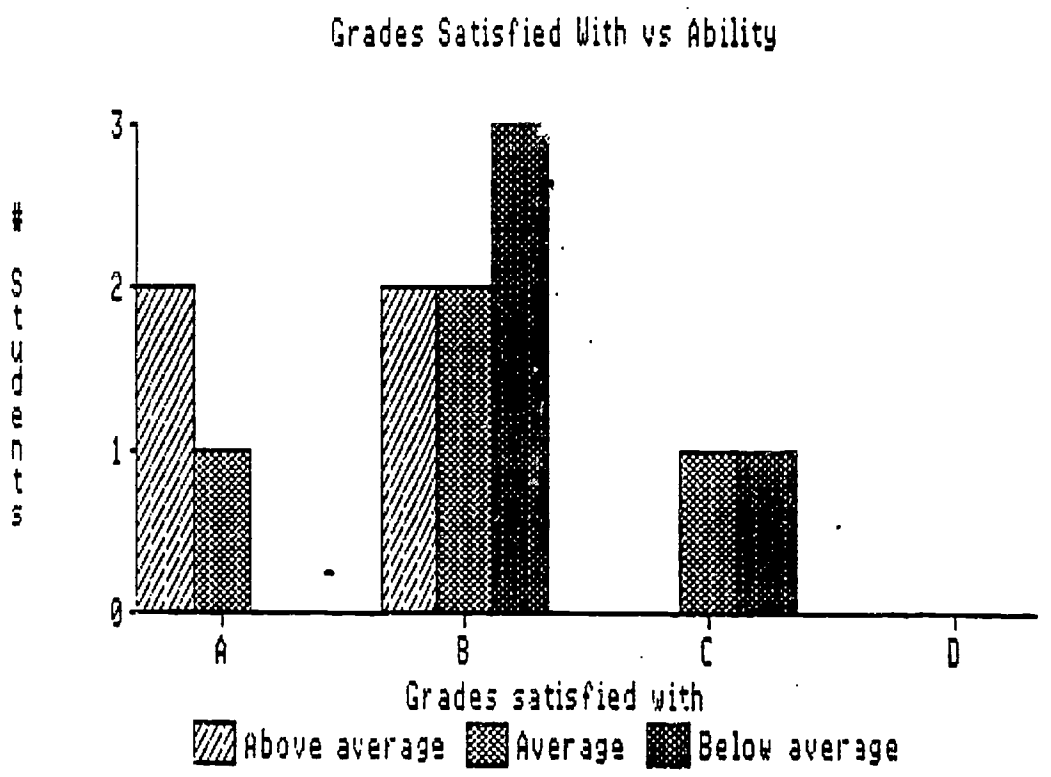


The results from question one legitimize the ability grouping for this research.

Question two asked students to indicate the grade that they were satisfied with. As shown in Figure 2. two above average

students chose A's and two chose B's, one average student chose A's, two chose B's and one chose C's. Three below average students chose B's and one chose C's. The results from question two show that all of the students in the study are unsatisfied with a grade lower than a C.

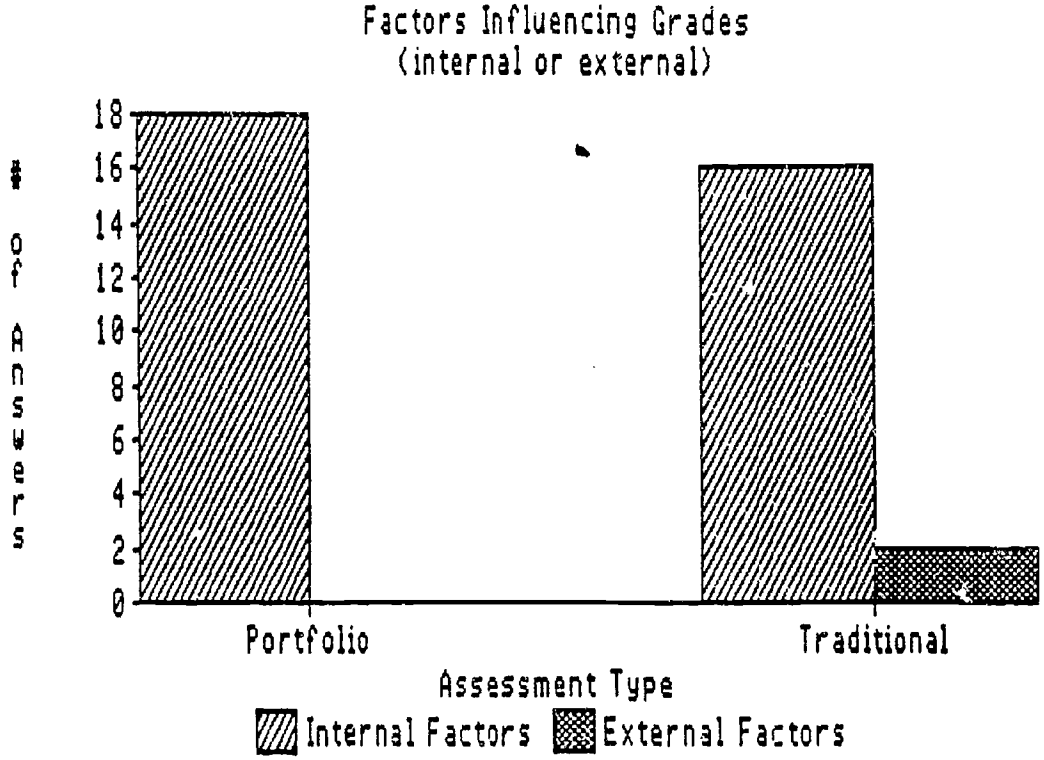
Figure 2. Grades students reported being satisfied with versus their above average, average and below average ability grouping.



The results from questions four, five and six of the attitude survey showed that only one of the below average achievers

attributed her grades to external factors by indicating that she gets good mathematic grades because she is lucky and because the teacher likes her on questions four and five of the survey (See Figure 3).

Figure 3. Factors students reported as influencing their grades.



This student is from a TA class. All of the other students believed they received good grades because they worked hard and they received poor grades because they didn't work hard enough.

Five students who attributed good grades to internal factors also wrote that they enjoyed mathematics.

The results of the questionnaire showed that many students from the two classrooms using traditional assessment (TA) were vague when listing their strengths and weaknesses. The number of specific statements regarding personal strengths and weaknesses was tabulated for TA and PA students. The TA students wrote ten specific statements altogether. The PA students wrote 28 specific statements altogether. Only one out of six TA students wrote a goal congruous to a weakness. All of the PA students wrote goals congruous to their weaknesses. It is also important to note that three of the TA students wrote that their weakness was forgetting to do homework or forgetting to study. These statements were considered to be specific. However, five of the six PA students listed specific concepts and/or tasks in math that were difficult for them as weaknesses. It is important to make this distinction, since the more focused a goal, the more likely a person will be motivated to achieve it (Schunk, 1984).

High Achieving TA Students

The following examples were taken from each student's strengths and weaknesses questionnaire. One high achieving student from a TA class wrote as his one and only strength, "I

have the ability to do it." The high achieving student from the other TA class wrote his three strengths were "My ability to understand what I am working on, that I work hard, that I am a smart student." Many of the TA students had difficulty commiting their weaknesses to writing. The two high achieving students from the TA classes wrote their weaknesses were sometimes forgetting to do homework. One of them added that he didn't study hard enough. Their goals were respectively to remember to do homework and to get better grades.

High Achieving PA Students

One high achieving student from the PA class wrote "I am good in division. I know how to bring down numbers and know my facts. I am good with seeing which fraction is bigger because its easy to put them in lowest terms. I am good at adding, subtracting, multiplying and decimals because I do them a lot and remember how." The other high achieving student from the PA class wrote her strengths were, "I check my work twice before turning it in because I know if I do this I will get less wrong. If I understand something, I can write it out on paper and that makes me understand better. I know how to divide well because I worked on my division at home." These two students from the PA class were much more specific when writing their weaknesses. One

student wrote, "I am not that good at doing a division mixed fraction story problem because it is very confusing. I am not good at the least common denominator. I forget how to see which is bigger. Sometimes I have trouble with a problem like this:

16 lbs. 8 oz.
- 4 lbs.10 oz.

and you borrow from the next problem because I forget its a foot and it may say 10 inches because you have to change 1 foot into inches. I forget to put 12 inches. Instead of 12 inches I put 10 inches for a foot. I am not good at least common denominator. I forget how to see which is bigger." His goal was to learn how to see which fraction is bigger. The other high achieving student from the PA class wrote, "Sometimes I think an answer is right but it isn't. I do it over and over again but I still can't find the right answer." Her goal was to work hard and make sure the answer is right. These PA students included other weaknesses as well, but for the sake of brevity, they will not be included.

Average TA Students

One of the average students from the TA class wrote that his strengths are "adding and subtracting, telling time and projects". The other average TA student wrote her strengths are multiplying fractions and that she liked to do most of the things in

mathematics. The first TA student wrote her weakness was comparing fractions and her goal was to get all A's or a B+. The second TA student wrote that his weaknesses are double division and some multiplication and his goal was to get good grades and work harder on tests.

Average PA Students

One average student from the PA class wrote her strengths are "Multiplication because I know most of them up to 12. I study all the time. Comparing fractions. I know how to find the largest fraction out of fractions without the same denominator. Feet and inches. I know how to add and take away inches from feet." The other PA student wrote "One strength in math is dividing. Dividing is easy for me because I have practiced my higher numbers at school. I have learned a lot. Another strength is adding and subtracting customary measures. I learned how to put so many feet into inches and I knew how to explain it is my class response and I got a A. Another strength is quotients as mixed numbers. I knew the division part very well and I knew what a mixed fraction was." The first PA student wrote her weaknesses are "finding least common denominator. I don't understand how to find them and how there can be more than one. Finding the whole number from a decimal. What I don't understand is how many zeros to put down

say if it is 1000 x .40. Finding equal fractions. I understand it but I need help with my multiplying." Her goal is to be able to know how to find equal fractions by June 10th, 1992. The second PA student wrote "I am not the best at explaining why a problem is wrong or right." His goal is to explain things in his own words. The specificity of the PA students' remarks would be very insightful for the teacher. Specific questions are asked and examples are given which help the teacher to zero in on any problems a student might be having. Whereas five of the TA students' goals were to get better grades, all of the PA students' goals directly correlate with one weakness.

Below Average TA Students

The first below average TA student didn't write any strengths. Her weaknesses are "I do not understand some of the math. I do not like to do my math homework so I get a zero." Her goal is to get better grades in math. The second below average TA student wrote her strengths are "I listen, I do my best in multiplication, addition and subtraction and I like to take math tests because I know what I am doing." Her weaknesses are "I don't try my hardest, I'm not good at division and I don't know what I'm doing." Her goal is to be a good worker and get good grades. In this researcher's opinion, if these below average students were

better able to pinpoint exactly what they don't understand in math perhaps their attitudes about their math abilities would change. The fact that one student believed she had no strengths points out that she does not feel she is progressing in any area of mathematics. Perhaps a portfolio would display her strengths better than a series of papers with poor grades marked on them. The second TA student states that she doesn't know what she is doing and seems to believe her efforts are futile. If she were able to determine the step in division where she makes errors, her teacher might be able to help her in that specific area or watch for errors at that particular point. Her goal might be to do three division problems a week. This illustrates that portfolios require self reflection from students that encourages them to seek out exactly what they don't understand. This not only empowers students but it also aids the teacher.

Below Average PA Students

The PA students had positive, specific strengths and focused, articulate weaknesses written on their surveys. One below average PA student wrote her strengths are "I'm good in fractions because I understood how to make a fraction, get the same denominator in lowest terms and use <, > or = with fractions. I understood how to do fractions between inches like 1/4 and 1/8 and 1/16. I'm

good with dividing one number into two numbers because its easier for me to find a number multiplied by the divisor to get the answer." She wrote her weaknesses in detailed sentences. "I have a hard time dividing with more than two numbers in the bracket. I don't understand how to multiply with decimals. Its kinda hard for me to find equal fractions because I know how to find common denominators but I don't know if I have to use a common denominator or not." Her goal is to do ten division problems a week. The other below average PA student wrote her strengths are understanding some things and being able to explain them. She also wrote "I'm good at the dividing problem where you have the remainder and make a fraction." Her weaknesses are "Not memorizing multiplication tables. I'm not quick on my facts. If you ask me 4x8 it will take me awhile." Her goal is to memorize her multiplication facts.

Discussion

Hypotheses

The results do not seem to support this researcher's first hypothesis: students from the PA class were no more prone to attribute their grades to internal factors than were the students from the TA classes. However, the results from the strengths and weaknesses questionnaire and goal sheet seem to support the second

hypothesis: students involved in portfolio assessment were more proficient at targeting individual strengths and weaknesses and developing reasonable goals than their traditional assessment counterparts.

Specificity was a key element in the PA students' questionnaires and goals. As cited earlier, Hebert (1992) believes through the use of portfolio assessment, metacognitive processes are developed. The PA students' detailed statements are proof of heightened awareness and metacognition. These findings suggest that students aware of their capabilities have higher self concepts and the self image they portray is a more positive one. This increased self-esteem can only boost their performance in mathematics. Stenmark (1989) as cited in the introduction, has suggested that mathematical power comes with knowing how much we know and what we need to understand to know more. The PA students are empowered by their self reflections. Their goals were congruous to their weaknesses and they discovered ways to improve their mathematic performance. The TA students wanted to get good grades in mathematics, but didn't know exactly what it was they didn't understand. Therefore, most of them had difficulty in devising a specific goal to help them in mathematics.

The PA students' achievements became real and their accomplishments were not merely transformed into an average grade but were displayed by portfolios that showed goal attainment and true learning. The findings corroborate with Stenmark's (1989) beliefs that portfolios give students and teachers a clear and understandable picture rather than a mysterious grade. The PA students' responses given about individual weaknesses were detailed and descriptive and designated certain steps and/or concepts that students were struggling with. These details are extremely helpful in giving the teacher a clear and understandable picture, since often it is a challenge to pinpoint where a student is not achieving. In addition, teachers working with thirty or more mathematic students may have difficulties keeping track of each student's individual progress. Portfolios create a natural system to assist teachers in keeping abreast of each student's development. As goals are met, teachers and students can celebrate and develop new goals. Portfolio assessment has the potential to create a new generation of independent learners and facilitative teachers who can work together to target problem areas and overcome them. This student-centered form of assessment could, in turn, lead to academic success as suggested by Pirrto (1987). A poor grade might be met as a challenge rather than

leading to feelings of inadequacy and helplessness. This researcher believes that feelings of determination, empowerment and confidence will predominate when students are involved in portfolio assessment.

Concerns for Classroom Teachers

However, these findings reveal some concerns for classroom teachers. Most notable is the general lack of understanding that students have about their ow

n capabilities. If students have not been taught to analyze their work and propose ways to improve upon it, they may become passive learners who apathetically accept the grades they receive. Students' beliefs that they have little influence, other than to 'work harder" or "study more", destroys many of the possible positive effects that evaluation could have on a student. Perhaps if teachers allowed students the time to reflect upon their work, verbalize their strengths and devise plans to combat their weaknesses, evaluation would serve it's true purpose-- to communicate with and to motivate students. The findings suggest that portfolio assessment is the vehicle in which to bring about this clear communication between teacher and student during evaluations.

Need for Further Study

This researcher realizes that the results from the survey may have been influenced by the different pedagogical practices of the three teachers. Also, the strengths and weaknesses questionnaire meant more to the PA students since they were using it to assess themselves in order to arrive at an appropriate mathematic grade. Also, students' various writing abilities could have affected the results in the questionnaires. However, it seems important for classroom teachers to further investigate portfolio assessment. Perhaps this type of assessment will increase students' sense of control over their evaluations while motivating them to achieve in the classroom. Research must continue to explore the efficacy of different evaluation practices. More specifically, research should investigate effects of portfolio assessment on students of various ages. Does portfolio assessment heighten parents' awareness levels of their child's abilities? Do below average achievers become average or above average achievers when portfolio assessment is used at each grade level on a consistent basis? If portfolio assessment encourages goal setting and goal attainment, will this affect other aspects of a students' school life? It is necessary for

researchers to investigate these and other questions in order to substantiate the valuable effects of portfolio assessment.

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Appendix A

ATTITUDE SURVEY ON GRADES

Name
Teacher

PLEASE BE HONEST. DO NOT WRITE WHAT YOU THINK SOMEONE ELSE LIKE YOUR PARENTS OR YOUR TEACHER WOULD LIKE YOU TO WRITE. WRITE WHAT YOU TRULY THINK.

1. WHAT KINDS OF MATH GRADES DO YOU USUALLY GET? (circle one or two)

A B C D E

2. WHAT MATH GRADE ARE *YOU* SATISFIED WITH? (Not what grade your *parents* are satisfied with, or what grade your *teacher* is satisfied with, but the math grade *you* are satisfied with.)

A B C D E

3. IF YOU ARE SATISFIED WITH THAT GRADE, WOULD YOU WORK HARDER TO GET A BETTER ONE?

a. yes
b. no
c. it depends (please explain what it depends on)

4. WHY DO YOU THINK YOU GET THE MATH GRADES YOU GET? (circle one or two that apply to you)

I work hard in math./ I don't work hard in math.
I have the talent and ability to do well in math./ I don't have the talent and ability to do well in math.
I like math./ I don't like math.
The teacher likes me./ The teacher does'nt like me.
I'm lucky./ I'm unlucky.
other (please explain below)

5. IF YOU GET A GOOD GRADE, DO YOU KNOW WHY? (circle one or two that apply to you)

Because I worked really hard.
Because I just had the ability to understand it.
Because I liked what we were working on for that assignment or test.

Because the teacher favors me. I got a good grade.
Because I am lucky when it comes to math.
Because

6. IF YOU GET A BAD GRADE, DO YOU KNOW WHY? (circle one or two that apply to you)
Because I didn't work hard enough or study hard enough.
Because I just didn't have the ability to understand it.
Because I didn't like what we were working on for that assignment or test.
Because the teacher doesn't like me. I got a bad grade.
Because I am unlucky when it comes to math.
Because

Appendix B

MATH QUESTIONNAIRE

NAME
TEACHER

MY STRENGTHS IN MATH ARE...

1.

2.

3.

MY WEAKNESSES IN MATH ARE...

1.

2.

3.

Appendix C

GOAL SETTING FOR ACTION

NAME

GOAL SETTING FOR TEACHER

AFTER YOU HAVE FILLED OUT YOUR STRENGTHS AND WEAKNESSES QUESTIONNAIRE, YOU WILL BE GOING THROUGH A GOAL SETTING INTERVIEW WITH ME. GOALS HELP YOU TO IMPROVE YOUR LEARNING BECAUSE YOU TAKE ACTIONS TO MEET YOUR GOALS. REMEMBER THESE GUIDELINES WHEN YOU ARE IN YOUR GOAL SETTING INTERVIEW:

1. YOU MUST BE ABLE TO PUT YOUR GOAL INTO WORDS.
2. YOU SHOULD CONSIDER YOUR STRENGTHS AND WEAKNESSES WHEN YOU ARE MAKING UP YOUR GOAL. IT SHOULDN'T BE TOO HARD OR TOO EASY.
3. YOU SHOULD ONLY DEAL WITH ONE GOAL AT A TIME.
4. THE GOAL SHOULD NOT HARM YOU OR OTHERS.

A. MY GOAL WILL BE

B. HOW IMPORTANT IS IT TO YOU TO REACH THIS GOAL? WHY?

C. WHAT WOULD HAPPEN IF YOU REACHED THIS GOAL?

D. WHAT WOULD HAPPEN IF YOU DID NOT REACH THIS GOAL?

E. WHAT STRENGTHS AND RESOURCES DO YOU HAVE THAT WILL HELP YOU REACH THIS GOAL?

F. WHAT WILL KEEP YOU FROM REACHING YOUR GOAL?