

Action Research Plan

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Introduction and Math Questions

There is a reoccurring theme that I hear from students and parents alike when it comes to assessments; "I don't know why my child/I do so poorly on tests. I am just a poor test taker." I have so many students who perform well on informal assessments and content mastery in the classroom every single day. They are contentious students who are on task in class, do their homework, and they even go the extra mile when it comes to seeking after school help. Most show the desire to perform well.

Let's face it. Standardized tests and formal assessments play a big role in assessing student content knowledge on a school, district, county, and state level. The push for using data on common assessments is utilized heavily in my district. The American College Testing exam is now part of the Michigan Merit Exam given to our eleventh graders to assess schools on how they are fulfilling the No Child Left Behind Act of 2001. The score of this test is often a requirement to get into certain colleges and universities.

Regardless of opinions about standards-based assessments, it is clear that our students need the skills necessary to perform well on such assessments. I worry about my students who can communicate their content mastery in a non-assessment environment, but freeze up when it comes down to a test.

What is it that makes these students so anxious when they are testing? And what is it that I can do as their teacher to help them perform to the best of their abilities on formal assessments and ease their signs of anxiety?

Literature Review

There are many factors that contribute to test-taking abilities and can affect the performance on these summative assessments.

First, we can consider test anxiety. Before we can measure test anxiety in students we need a clear definition and something to be measured. Test anxiety is worry of suffering a reduction in one's self image and self-efficacy, particularly its reflection in the eye's of significant others, concurrently with obstruction of cognitive processes and outstanding physical and mental discomfort. (Friedman & Bendas-Jacob, 1997, p. 12) There are many facets and questions that will need to be included in the student survey about test anxiety including fear or worrying, emotional symptoms, concern for self-image or self-efficacy due to failure, and social status changes due to performance.

Research also indicates problems with assessment data as an indicator of student knowledge due to motivation. We make the assumption that all test takers want to perform to the best of their abilities and achieve high marks, when in reality, that is not the case. This foundational assumption rests on the notion of an *ideal test taker*, not a *real test taker*. (Ryan et. al, 2007, p. 11) Research also points to motivation and its effect on performance. This may be something to consider with students who are not making improvement with different techniques as the study progresses. Utility and interest can also play a role in performance on assessment. Does the student find value in taking the assessment? Do they find interest in mathematics at all? Do they see that mathematics skills are needed for something in their life?

Self-perception on math assessment grades show that there is a general disconnect between perceived understanding and assessment grades. (Smith, 2002, p. 39) Students were not able to accurately judge their performance on a test that was just given. (Smith, 2002, p. 39) This information leads me to believe there is not a need for a student perception survey. The data would not prove helpful.

There is evidence suggesting exercises building test-taking confidence in the classroom may have a positive effect on test performance. (Smith, 2002, p. 37) Providing students with an opportunity to become familiar with test-like items in a non-threatening environment will in turn help their confidence on the actual exam. Confidence will help relieve some test anxiety as well. However it is important to note that false confidence can become an issue. Students can feel over confident and incorrectly answer problems. To help this issue, I would not provide students with similar problems, only similar formats of problems. If problems seem too similar, a student may fall back on memorization of a numerical answer versus actually answering the problem by using the context given.

Finally, the research also shows that students given well-defined problems that draw upon prior knowledge are doing much more than simply memorizing algorithmic procedures. They are developing the procedural fluency and understanding that are so essential to mathematics. (Garellick, 2009, p.16). In order to assist students to become better prepared for assessments and mathematics beyond my classroom, lessons need to be structured in a precise way in order to build on prior knowledge, but let students have a meaningful discovery of properties and material.

Data Collection

Why do students appear to underperform on final, summative assessments? More specifically, how does test anxiety play a role and how can I help those students find more success on such assessments?

Data Collection Methods and Purposes:

1. Concept mastery in non-assessment form
 Concept mastery will be collected as data in non-summative assessment formats (e.g. class work, activities, presentations, homework, etc) It will be represented by their grade as a percentage for that unit.
2. Concept mastery in summative assessment form
 Concept mastery will be collected as data in a summative assessment format. This would be an average of the assessments for that unit.
3. Test Anxiety Survey
 This tool will help me identify students who have test anxiety. They must show that they are “suffering a reduction in one’s self image and self-efficacy, particularly its reflection in the eye’s of significant others, concurrently with obstruction of cognitive processes and outstanding physical and mental discomfort. “ (Friedman & Bendas-Jacob, p. 12) The survey that Friedman and Bendas-Jacob provided will identify these issues by question. I adjusted some words to be better fitted for my students understanding. I also added in questions pertaining to the way they prepared for the assessment so that I can vary that to help find what methods will help the students.

Instrument	Description
1. Concept mastery in non-assessment form	Each student’s classroom grade will be collected and reported as a percentage per unit.
2. Concept mastery in summative assessment form	Each student’s assessment grade will be collected and reported as a percentage per unit.
3. Test Anxiety Survey	The survey will be given to students to identify which students have symptoms of test anxiety.

Instrument	Purpose:
1. Concept mastery in non-assessment form	This data will represent a student's performance in a non-summative assessment environment. The average grade (without assessments) will represent the percentage of material mastered in the classroom setting.
2. Concept mastery in summative assessment form	This data will represent a student's performance in a non-summative assessment environment. The average grade of assessments each unit will represent the percentage of material mastered from a summative assessment point of view.
3. Test Anxiety Survey	The test anxiety survey (see appendices) will be given to all students to identify which students suffer from test anxiety and be a constant indicator of whether or not students are showing improvement with their test anxiety symptoms.

I chose one of my geometry classes to look at specifically. In order to make sure other factors of under performing on assessments is at a minimum, I chose a class that has essentially no behavior issues (possibly a distraction to other students), and a class that is very diverse (advanced students, at-risk students, and students who receive special education services). I feel this class would best represent a student population and give me the most accurate picture of how discovery lessons might influence those that have test anxiety.

Data Analysis

The following table represents the data pieces that were collected. The student identifiers are listed in the first column. In order to identify students who underperformed, I used the students' concept mastery in non-assessment form as their unit grade represented in the second column. The next piece of data needed was the average of the unit assessments for the same unit, represented as percents in the third column. Finally, what was the difference in the percentages when it came to concept mastery in non-assessment versus assessment forms? This is represented in the fourth column.

In order to identify students who had a significant, negative change, I sorted the data and calculated the mean (-7.72%), median (-6.5%), and mode (+1%). I decided to investigate all students who made a negative change by an entire grade (-10%), which was thirteen out of twenty-nine students in the class.

Each student was given the Test Anxiety Survey (see appendix) in order to see if the students had symptoms of test anxiety. All students did indicate such symptoms.

I made notes indicating if students belong to any specific sub-group that our district widely recognizes (ex. special education, at-risk, etc.) I also indicated one student who stated that they did not prepare for the assessment on their test anxiety survey.

After strategically using discovery-based learning activities for the following unit of instruction (quadrilaterals), I took the same data from those students who underperformed in the first unit. The results are in the last columns of the table.

Seven of the thirteen students showed improvement from the discrepancies between non-assessment concept mastery versus assessment concept mastery. One student showed no change, four students showed a slight negative change, and one student with a significant negative change.

It was very interesting to see that for the most part, the students closed the gap between the grades on non-assessments and assessments. The mean difference went from -19.5% to -16.9% within this group of students. I also think it is important to notice that the average non-assessment grades went from a mean of 82.4% to 80.3%. Geometry is constantly building upon prior knowledge and vocabulary (which was the first unit of instruction). These students had to overcome their deficiencies from the first unit and the second in order to score this way. I think that is something to take into consideration, but cannot necessarily be seen in the data.

Study habits were something that was very interesting on the student surveys. Students were not very detailed in accounting for their assessment preparation. Is that because they did not study much? When we say “study” what does that really mean? The indication of test preparation became insignificant. There was no way to ensure the students were being truthful or to know what studying was meaningful and not meaningful.

	Classwork/ Homework M1 (percent)	Tests M1 (percent)	Change (percent)	test anxiety survey	Notes:	Classwork/Ho mework M2 (percent)	Tests M2 (percent)	Change (percent)	Change in assessment difference
2-22	76	41	-35	yes		74	50	-24	11
2-11	80	50	-30	yes	spec. ed	76	52	-24	6
2-4	87	60	-27	yes		82	74	-8	19
2-3	85	60	-25	yes	spec. ed	86	72	-14	11
2-20	87	63	-24	yes	no prep	85	50	-35	-11
2-6	80	61	-19	yes	spec. ed	79	60	-19	0
2-16	81	62	-19	yes		81	59	-22	-3
2-1	86	69	-17	yes		86	73	-13	4
2-15	67	53	-14	yes		66	58	-8	6
2-14	84	72	-12	yes	at risk	81	65	-16	-4
2-9	82	71	-11	yes		75	63	-12	-1
2-10	97	86	-11	yes		94	85	-9	2
2-8	80	70	-10	yes	spec. ed	80	64	-16	-6
2-2	92	83	-9						
2-7	93	84	-9						
2-29	76	72	-4						
2-13	96	93	-3						
2-12	89	90	1						
2-23	94	95	1						
2-24	89	90	1						
2-28	77	78	1						
2-17	72	74	2						
2-25	96	99	3						
2-21	94	98	4						
2-26	93	97	4						
2-19	86	91	5						
2-27	77	87	10						
2-18	59	70	11						
2-5	77	89	12						

Reflection

Conducting this action research was very helpful in the classroom. I was able to target students who seemed to underperform on summative assessments with the possibility of anxiety playing a role.

Test anxiety became something that is easily identified, but solutions to test anxiety come with preparing students to become familiar with the test format and learning better test taking strategies. It was extremely difficult to track the preparation other than what was done in the classroom. Student surveys ended up being a poor measure of test preparation and provided little to no information for me, other than the student who was honest enough to say they “did nothing.” There was not a measure to meaningful test preparation.

I think in order to relieve test anxiety, and have a way to measure it, is to focus on techniques to ease anxiety while test taking versus how to better prepare them. That data proved itself to be very difficult to assess and collect accurately. I did find it extremely interesting that all of my students receiving special education services and my at-risk student who is concurrently enrolled in a geometry support class all fell under the significantly underperforming category. There are a few immediate observations about that result. The special education students that are mainstreamed into the general education classes for mathematics have reading disabilities, all of which refuse the assessment reading service provided for them. Geometry, especially the first units, is very language based and has an extensive amount of vocabulary that go with them. An “at-risk” student is a student who typically fails mathematics courses and scored low on standardized test, meaning they are identified as doing poorly on such summative assessments.

This study has brought up new questions for me to ask. What would the data look like for the rest of the student population that did not underperform on the first assessment? Did they still show improvement with the discovery-based lessons? Would all students show some sort of test anxiety? Could test anxiety be better addressed with classroom habits and behaviors that we could practice as a class before such assessments?

References

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Appendices
SURVEY

Rate each of the following questions with a number 1-5 representing the following scale:

- 1- Strongly disagree
- 2- Disagree
- 3- Neutral
- 4- Agree
- 5- Strongly Agree

1. If I fail a test I am afraid I shall be rated as stupid by my friends. _____
2. If I fail a test I am afraid people will consider me worthless. _____
3. If I fail a test I am afraid my teachers will criticize me. _____
4. If I fail a test I am afraid my teachers will believe I am hopelessly dumb. _____
5. I am very worried about what my teacher will think or do if I fail his/her test. _____
6. I am worried that my friends will get high scores in the test and only I won't. _____
7. I am worried that failure in tests will embarrass me in front of others. _____
8. I am worried that if I fail a test my parents will not like it. _____
9. During a test my thoughts are clear and I neatly answer all questions. _____
10. During a test I feel I'm in good shape and that I'm organized. _____
11. I feel my chances are good to think and perform well in tests. _____
12. I usually function well in tests. _____
13. I feel I just can't do well on tests. _____
14. In a test I feel like my head is empty, as if I have forgotten all I have learned. _____
15. During a test it is hard for me to organize what's in my head in an orderly fashion. _____
16. I feel it is useless for me to sit for an exam; I will fail no matter what. _____
17. Before a test it is clear to me I will fail no matter how prepared I am. _____
18. I am very tense before a test, even if I am well prepared. _____
19. While I am sitting in a test, I feel my heart pounds strongly. _____
20. During a test my whole body is tense. _____
21. I am terribly scared of tests. _____
22. During a test I keep moving uneasily in my chair. _____
23. I arrive at a test with no serious tension or nervousness. _____
24. I feel I am always prepared for my tests. _____
25. I perform well in class and understand the material presented. _____

What did I do to prepare for this exam? (Include date and approximate time lengths.

Friedman, I. A., & Bendas-Jacob, O. (1997).