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Paper 2

Do Teachers Change Their Mathematics Instruction and Curriculum Because of High Stakes
Testing?

Introduction

I chose this topic in hope to find research on how or if teachers must change their mathematics instruction in their classrooms because of high stakes testing. Too many times I have heard the phrase “teach to the test” being used when talking about instruction. This always seems to have a negative connotation associated with it, but is this always the case when it comes to a teacher’s instruction?

There seems to be such a huge push currently in mathematics education to move away from teacher centered learning and towards student centered instruction. Going along with this theme is a movement away from procedural knowledge in mathematics and towards more open ended problem solving. Memorizing procedures to solve problems with a single answer using only one solution method is seen as “traditional.” There is a greater push for problems that are not as procedural and can be solved in more ways than one. Can teachers do this with high stakes testing still being a large part of our education system?

At first, I was going to focus my research paper on how high stakes testing affected students, but quickly changed my mind. I thought it would be more beneficial to do research on

how high stakes tests affect teachers. Even more specifically, I wanted to know how the tests may change, if at all, a teacher's instruction and curriculum. It seemed to me that it would be more beneficial to research the effects from a teacher's perspective rather than a student's because in my near future, I will be the teacher rather than the student. I wanted to become more aware of how high stakes testing may affect my instruction and know what to expect. Also, I found that some articles about the effects on students were driven too much by psychology. Not that this was a bad thing, but it was not what I wanted to focus on because it was lacking the educational connections.

Personal Experience

Unfortunately, I have no experience being a teacher yet. This makes it difficult to form a valid opinion about the effect of high stakes testing on instruction and curriculum from a teacher's perspective. I think I would have a better and more thorough understanding of the research if I had experience as a teacher who had to plan my own instruction and curriculum.

However, I was, and still am, a student faced with high stakes testing who is aware of how my teachers have taught. In my past experience, it has been evident that most of my mathematics teachers were teaching a certain way in order to prepare us for some kind of upcoming high stakes test. At some point throughout the school year, if a high stakes test was on the horizon, the teacher would almost always take time out of mathematics instruction to talk about what we as students can expect from the test, go over test taking strategies, and do practice test problems.

More times than not, from what I can remember even back to elementary school, practice questions for high stakes tests such as the CRCT were always intertwined in my teachers'

curriculums somehow. In a lot of the school text books, there would be questions in a problem set that were geared towards the test, usually at the end of a chapter or unit. These questions served as a review, as well as a preparation tool for the upcoming high stakes test. I also found that as a high stakes test approached, a lot of my teachers would start to take instructional days to work on practice problems or talk about test taking strategies and what to expect. Also, a commonly heard phrase throughout a school year from the majority of my teachers was, “Pay extra close attention to this important concept/problem because this will be on the test.”

Any test, or mathematics portion of some high stakes test, that wasn't administered by my mathematics teacher was always multiple choice. The only exception to this was the AP Calculus examination I took my senior year of high school. The examination consisted of a multiple choice section and a free response section. Therefore, when I hear about high stakes tests, my first thought is always multiple choice test questions and standardized tests. This is my only experience, so it is hard for me to think that high stakes tests can be formatted in other ways. However, it is not even necessarily true that the AP Calculus examination, or any AP examination, is to be considered high stakes. For some students, it may not even be required for them to take it. Some, as I did, may find it high stakes because doing well will exempt you from taking certain courses in college. Teachers may consider the AP examinations high stakes because they want the results to show that they prepared their students to do well on it throughout the year.

However, the research I have done has opened up my mind to what “high stakes test” means. Not all state testing has to be just multiple choice. Although I did not have a chance to take these types of tests as a student, I hope that I will be able to experience differently formatted high stakes tests as a teacher.

What is a (High Stakes) Test?

I will first start with the definition of a test, and then what it means for a test to be high stakes. A test is defined to be a sample of questions, which are referred to as items, which come from a content domain. In this case, content domain refers to a body of knowledge, skills, or abilities that are clearly defined so that teachers can decide if certain pieces of knowledge or particular skills are part of the domain. When students are tested, for the most part, the reason is because teachers are interested in a student's performance in terms of a certain domain (Madaus, 1988). There are three ways to characterize a test: it focuses on a particular domain, is a sample of behavior or performance from that domain, and is used to make an inferences regarding performance (Madaus, Russell & Higgins, 2009).

Before discussing what it means to be high stakes, there is another important concept to understand about a test: its validity. When making inferences about a student's domain, test validity is related to these inferences. There must evidence that the sample of questions, meaning the test, represents the content, skills, or behaviors in the domain. To determine whether or not a test is valid, you must consider what it is valid for measuring (Madaus, 1988). Validity is related to high stakes testing because test developers and programs use evidence about test content to make claims about the test validity (Madaus, Russell, & Higgins, 2009).

A test is high stakes when its results are used to make important decisions that affect students, teachers, administrators, communities, schools and districts (Au, 2007). Tests that are high stakes for teachers are ones that are used to make decisions about a teacher's job or salary (Blazer, 2011). Oftentimes for a high stakes test, state standards or curriculum frameworks define the specific domain of interest for students (Madaus, Russell & Higgins, 2009). Although the discussion above is about the students' domain and teachers are not the ones being tested, it

is important for the teachers to understand the purpose of the high stakes testing. Their students are the one taking the tests, so the teachers must know all the stakes associated with the test, not just their own stakes.

As briefly discussed earlier, high stakes tests are not always tests that consist of only multiple choice items. This will be especially important to remember when considering both the positives and negatives associated with high stakes tests. It seems that more negativity is linked to high stakes testing that is strictly multiple choice questions, so this common misconception about the format of the tests needs to be diffused.

Form and Content of the Test

Before discussing how a high stakes test can affect how a teacher runs their classroom and chooses their instruction, first consider the actual form and content of the test. The way a high stakes test is formatted can affect the instruction. If the test is well designed, then teaching to the test is not always a bad thing. More than likely, whatever is being tested is what will be taught in a classroom. Therefore, the types of items on tests will probably be similar to the mathematics problems and activities that students will receive in class during instructional time (Schorr, Firestone & Monfils, 2003). For example, if there are open ended problems on the high stakes test, teachers will be more likely to give their students these types of problems for practice in class or even on assessments they design themselves. Test construction matters when it comes to how teachers plan and change their curriculum in response to the form and content (Au, 2007). As will be discussed later, the form of a test can narrow instruction and learning, especially in regard to multiple choice (Madaus, 1988).

Instruction and Curriculum

When interviewed, teachers reported that they made changes in their instruction because they wanted to use materials similar to those on a state test (Schorr, Firestone & Monfils, 2003). However, further in Schorr's findings, his researchers who observed teacher practices reported that teachers incorporated certain activities without changing their basic approach to teaching. Teachers were still giving mathematical tasks similar to ones that they had given in the past. It is interesting that there were differences found between what the teachers reported and what the researchers found in their observations.

Most research has found that high stakes testing does in fact encourage teachers to align their curriculum with the tests (Au, 2007). In one study, the argument is that when given the choice between a certain set of objectives just focused on curriculum versus other objectives based on the tests, the test always wins over the curriculum (Madaus, 1988). This leads nicely into a negative idea that is often times associated with high stakes testing and instruction.

I think most educators would agree that it is essential to have instructional approaches that encourage higher order mathematics skills. However, high stakes testing can sometimes cause teachers to focus their curriculum and instruction on procedural skills instead (Cankoy & Tut, 2005). This encourages students to memorize procedures and takes away from multiple methods to find an answer. Teaching students standard procedures does not help them learn how to solve problems (Cankoy & Tut, 2005).

The worrisome part here is that if a test is too specific, it can narrow instruction and learning. Studies have found that the greater the stakes of a test are, the more likely is it that narrowing of curriculum will occur (Blazer, 2011). This means that teachers may find themselves having instruction that only focuses on the things the test measures (Madaus, 1988). Whatever is being tested, is what will be taught. This usually means that untested material gets

left out of the curriculum (Schorr, Firestone & Monfils, 2003). This is what is meant when narrowing instruction is discussed. Teachers would usually narrow their curriculum to only what they knew would show up on the high stakes test in order to prepare their students rather than also focusing on the larger learning goals of the curriculum (Supovitz, 2009).

The article written by Blazer identifies four general categories in reference to curriculum narrowing. The first is exclusion of non-tested subject areas such as art, foreign language, physical education and music. Curriculum narrowing may also decrease amount of time spent on other activities that are good learning opportunities such as research projects or field trips. The second category is exclusion of non-tested topics within subject areas which encourage breadth of coverage instead of depth. This can lead to teachers having a low level basic skills curriculum so that the focus is only to help students score high on the tests. The third category is that teachers will adapt a teaching style to fit the testing format, and therefore students may only solve types of mathematics problems that are seen on the test. The final category for curriculum narrowing is excessive test preparation, which is discussed in more detail in the next section (Blazer, 2011).

In his research, Au focuses on three themes in reference to instruction and curriculum: whether teachers aligned their classroom content to the high stakes tests, whether high stakes tests affected curricular knowledge forms, and teachers' pedagogy in response to high stakes testing. Still speaking negatively about the effects of high stakes testing, it was evident that a lot of teacher centered instruction was practiced. Also, the content was taught in isolated pieces rather than making connections amongst different concepts throughout the year. Also, students tended to only learn in the context of the tests (Au, 2007). We can conclude that high stakes testing does motivate teachers to change their practices. However, these changes usually are

more superficial adjustments in content coverage and test preparation activities instead of changes or instruction that promotes a deeper improvement in instructional practice (Supovitz, 2009).

Not everything in reference to high stakes testing and curriculum or instruction is negative though. Some people who are for high stakes testing think that the tests provide a good type of pressure on teachers that causes them to adopt more effective practices in their classrooms. For example, a more effective teacher practice may be better alignment of instruction with state content standards. Also, teachers started to use the test results in their teaching practices to plan instruction and choose certain instructional materials (Blazer, 2011). If curriculum and standards are being aligned with the high stakes tests, this could potentially create a more coherent education system (Supovitz 2009). When state standards, curriculum, and tests are all well aligned, students will learn and be tested on content and skills they are expected to know (Blazer, 2011).

In some cases, research shows an association between high stakes testing and different aspects in the classroom such as student centered learning, content integration, and subject matter expansion. Also, teachers reported that if the tests themselves were well designed, meaning they do not promote drill or memorization, then their pedagogy was not negatively affected by high stakes testing (Au, 2007).

With high stakes testing, another positive aspect for teachers is that it can lead to better focused professional development. It has been found that in places where stakes on tests were lower was linked to no professional development related to test preparation, interpretation and using test results. Teachers with more support from professional development were more likely

to think that high stakes tests had a positive influence on their ability to use effective teaching methods (Blazer, 2011).

An interesting side note in regards to instruction and curriculum is that studies have found that teachers in low performing, minority, or low income schools tend to narrow their instruction more often than other teachers. Most likely, the reason for this is because these schools are under the greatest amount of pressure to improve their test scores (Blazer, 2011).

Test Taking Skills in Instruction and Curriculum

It has been found that often times, when tests are high stakes, this was directly linked to teachers taking time in class to go over test taking skills. Time spent on test taking skills encompasses many different types of instruction. Sometimes this means that students would work on test questions from a current or previous test and were given questions as drill. It could also mean that teachers taught their students procedures and strategies for answering multiple choice and memorizing rules about test taking (Cankoy & Tut, 2005). This is a very dangerous practice because it could cause students to be labeled as high performing based on their results of the high stakes test. However, this is not because of their actual achievement level, but rather because the teacher engaged in excessive amounts of test preparation (Blazer, 2011).

There are many reasons that teachers may find it necessary to teach test taking skills as part of their classroom instruction even though it is unrelated to mathematics knowledge and understanding. Test taking strategies may be taught to help students become familiar with test format, scoring rules, guessing strategies, and even ways to reduce test anxiety (Madaus, 1988). However, it seems to me that this can take away from other useful instructional time and may not be worth it even if it is possible that this could help students raise their scores. A large focus on

test preparation activities can distract from bigger educational goals that are not necessarily so objective. Students may not become as well rounded in learning more complex skills and habits that will allow them to be more competitive in the global economy (Supovitz, 2009).

Teaching to the Test

Teaching to the test is a tricky aspect of how high stakes testing can affect a teacher's instruction. The idea of teaching to the test is an umbrella with a lot of topics and factors falling under it. It can mean practicing similar test items, discussing expectations of the test, teaching test taking strategies, and so much more. The types of items or format of the high stakes tests is also a huge factor in determining whether teaching to the test is a good or bad thing. One source found that two thirds of the public interviewed responded that high stakes testing encouraged teacher to teach to the test and seventy five percent of these respondents thought this was a bad thing (Supovitz, 2009). The tricky part about teaching to the test though is it may not be such a bad thing if the test is well aligned with the curriculum. Because there are so many factors that go into how a teacher intertwines the test and their instruction, it is hard to say whether teaching to the test is a good or bad thing. It completely depends on the situation and the extent to which the teacher is teaching to the test.

Early research implies that teaching to the test is common in instruction, but current research is a little more conflicted (Au, 2007). It seems for the most part that the reason teachers want to "teach to the test" is because the tests are high stakes, and therefore, the scores are important. If the test is being emphasized as important, teachers will teach to it (Madaus, 1988).

Teaching to the test can in fact raise test scores because it is so directly related and modeled after the test. However, just because scores increase, this does not necessarily mean

that student knowledge, understanding, or mathematical skills have also increased (Cankoy & Tut, 2005). This is an easy trap for teachers to fall under. Teaching to the test is comfortable and allows students to more easily pass the tests (Madaus, 1988).

A large part of teaching to the test is when teachers use past tests to steer their instruction and curriculum. When students can master material from past tests, it becomes very likely that they will do well on the upcoming high stakes test they have. Teachers tend to pay attention to previous test questions from past years' high stakes tests and the forms that these questions usually take (Madaus, 1988). They adjust their instruction accordingly, which is why we call it "teaching to the test".

However, even if high stakes testing is necessary and required, teachers can at least change how they teach to the test. They can teach important knowledge, skills and concepts. If teachers are teaching to the test, they should tie in the standards so that their instruction and curriculum addresses all of the standards while teaching to the test as well. Teachers may also find it helpful to use data from tests to know what to focus on for weaker areas for their students (Conkoy & Tut, 2005). However, we must also be careful here because even though information provided by these high stakes tests can be useful, they can still be limiting in respect to instruction (Supovitz, 2009).

Why Should Teachers Care?

It is important for teachers to understand state policies. This will inform them on how much they are being held accountable for with high stakes testing (Schorr, Firestone, & Monfils, 2003). Instruction is most greatly affected by testing when the tests are believed to make important decisions that directly affect students, teachers, administrators, parents or even the

general public. Sometimes, test related pressure can negatively affect a teacher's classroom performance (Blazer, 2011).

There is also an interesting correspondence between high stakes testing and a teacher's perception of the test. Teachers caring about high stakes testing can be completely dependent on perceptions and beliefs. The idea of a test being "high stakes" could be self-inflicted. Therefore, the test results now have unintended important consequences. Perceptions about a test having high stakes and what this means or entails is what can cause teachers to change their instruction (Madaus, 1988).

Studies have even shown that high stakes testing can negatively affect teacher morale. Teachers argue that the accountability they feel associated with high stakes testing does not allow them to feel professionally worthy. When instructional decisions are increasingly based on what is likely to appear on the tests, teachers are given less opportunities to use their professional judgment and expertise (Blazer, 2011).

Where Do We Go from Here?

Testing has grown and changed a lot just in the past fifty to sixty years. A lot of these changes are because of new legislation and state level programs or policies (Madaus, 1988). Policy makers have to consider the past when thinking about the limitations and challenges of high stakes testing. Not only has testing evolved regarding policy, but also the format of tests. There was much debate and trouble regarding the rise of short answer questions because of their subjectivity. It was not until 1914 that Frederick J. Kelly introduced the multiple choice test item question so that it became more efficient to test in large numbers. Technology in reference to testing is also a widely growing area. There are implications with technology about scoring tests

as well as more currently, how they are taken. Efficiency of test taking is now increasing even more with the use of computers. A huge factor related to the use of computers rather than pencil and paper for taking a test is that it is now easier for test creators to give students different sets of items (Madaus, Russell, & Higgins, 2009).

With this being said, it is hard to say where high stakes testing will go from here and what research on the effects of high stakes testing will show. There are many unanswered questions in regards to high stakes testing and its effect on teachers and curriculum. For example, through research we know that having accountability associated with testing motivates teachers to change. However, we still do not know what we want to motivate teachers to do (Supovitz, 2009). Also, comparative research needs to be done that takes into effect the various combinations of different types of state tests and what the incentives and policies are (Schorr, Firestone, & Monfils, 2003).

Since there are always some limiting factors of previous studies that have been done, something to consider is whether or not high stakes testing was affecting the curriculum all year long or just during certain time periods throughout the school year (Au, 2007). Some research has found that teachers organized their instruction around the timing of the high stakes tests (Supovitz, 2009), in other words, during what time of the school year the high stakes test was to take place.

Final Thoughts from Research

Whether or not you are considering high stakes testing to have positive or negative effects on teachers and their instruction or curriculum, it is important to remember something. It is not necessarily the test that causes people to form opinions, but rather the stakes that are

associated with it that drive teachers to behave in ways that result in unintended outcomes (Madaus, Russell & Higgins). This, amongst many other things, makes high stakes testing and its effects a very controversial topic in education.

As I have learned through this research and observed personally, it seems that most of the time, the negative effects of high stakes testing on instruction and curriculum is what seems to be prevalent. This negativity can oftentimes overshadow some of the positives that come from high stakes testing. With this being a very heated and opinionated topic, it is hard to take one side. There are also a lot of factors to consider about how or why high stakes testing is a positive or negative aspect of the education system.

With all of this being said, I think it is easy to answer my research question. Yes, teachers absolutely do change their instruction and curriculum because of high stakes testing. However, as easy as this was to answer, it seems nearly impossible to answer how, why, and whether the changes teachers make are positive or negative. This is a topic that is still being studied greatly. I believe the depth of answering something like this could go on forever because of all the factors that go into the research behind high stakes testing.

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