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Abstract

In this research study, I focused on the correlation between per pupil expenditures of three school systems - a low funded suburban school, a moderately funded suburban school, and a well-funded urban school - and the scores students received on their fifth grade state standardized test for science (MCAS). These three school systems have different demographics, and varying levels of both state aid and average family income. As a result, each school system spends different amounts on their science programs and on each individual student's education for the school year. Previous research has found that school size and per pupil expenditure had no impact on student performance on the STAAR Biology exams, while socio-economic status, student mobility rate, and percentage of non-white students all had negative effects on student exam scores (Barton 2015). However, similar studies have never looked at the science MCAS test results for elementary students in Massachusetts. This study first examined the success of students on the fifth grade science MCAS from the last ten years. It compared this to changes in the overall budget for each school district from the last decade. Finally, it explored the budgets of each school system, including how the budget is determined for each district, through interviews with administrators. The hypothesis was that the more money allocated to each individual student and overall science budget, the higher the collective results of the fifth grade students' science MCAS scores. Instead, this study found the three school districts moved towards having fewer students scoring on the highest or lowest categories, with students scoring in middle ranges regardless of if budgets increased. Alternately, it seems that school culture and socioeconomic status of

families from the school districts may be factors contributing to the varying levels of student performance on the fifth grade science MCAS.

Introduction

There have been numerous studies that have attempted to determine the exact factor that contributes to causing achievement gaps between student populations. One such factor that is continuously debated in regards to its effect on student performance is the amount of money that school districts spend on each individual student. This number is a representation of the overall school budget that is a reflection of both local income and state funding. Contradictory studies have shown that there is both a correlation and no correlation between the amount that school systems spent per student and student test score results. This paper examines this contradictory idea in regards to science achievement gaps on the Massachusetts Standardized test (MCAS) for fifth grade science scores across three districts. It takes into account the median income and per pupil expenditures for three districts in southeast Massachusetts. These districts were selected for their varied per pupil expenditure rates, particularly as they compare to the state average, and to show a range of urban to suburban school districts. From the list of Massachusetts school districts, three were chosen: a large, heavily-funded urban school district (district 1), a moderately funded suburban school district (district 2), and a low funded suburban school district (district 3). In this study, the test scores of these three school districts were compared to their per pupil expenditure rates to gather if there is a correlation between the two data sets. In addition, administrators

in two of the districts were interviewed to find out additional information about the district budgets and science curriculum.

Literature Review

Standardized Tests

According to Alocer (2015) The precursor to today's standardized tests can be traced as far back as the early 1900s, when Alfred Binet began his work to develop a standard measure for intelligence testing. This work has led to the standard I.Q. test. Then, more standardized intelligence tests were developed during World War I, to evaluate incoming servicemen and assign them jobs. In 1925, the U.S. Bureau of Education continued to increasingly use standardized intelligence testing to classify students in schools. By 1926, there were vast strides in standardized education testing, with the College Board and World Book having published many intelligence tests. In this year, students sat for the first SATs Between 1925 and 1965, the way that standardized tests were given and scored was streamlined. The multiple-choice test was invented, as well as a specific electronic device to scan and score multiple-choice tests. In 1965, the Elementary and Secondary Education Act allowed for another growth in standardized testing. In the 21st century, standardized tests such as the SAT and ACT exist to further evaluate students before they enter college. Along with these tests geared towards older students, the No Child Left Behind education reform of 2001 pushed for state-mandated standardized testing to evaluate student learning. Due to this reform, in most states students are evaluated in each grade.

The Massachusetts Comprehensive Assessment System, or MCAS, was created as part of the Massachusetts Education Reform Act passed in 1993. This reform act was meant to establish a new wave of standards for learning and teaching for Massachusetts, and along with these new frameworks and standards, the MCAS was created to assess students on these new standards (Massachusetts Department of Elementary and Secondary Education (MA DESE)). Massachusetts was the first state to institute statewide learning standards that outlined specifically what students should learn in each grade, regardless of which district they were taught in. Massachusetts's students have increased dramatically in academic achievement since this reform was put in place.

The MCAS test is taken in the spring for grades 3-10. These students are evaluated based on their answers to a series of multiple-choice and open response questions. There are three MCAS tests that Massachusetts's students take each year, the ELA and Math tests (DOE- Massachusetts Comprehensive Assessment System 2013). A science test is also administered in both the 5th and 8th grades. Based on how the students answer the questions of the MCAS, they are scored and sorted into four graded performance levels: Warning/Failing, Needs Improvement, Proficient, and Advanced. The Warning/Failing level is administered to students who receive a score of 200-219, the Needs Improvement students score 220-239, Proficient students score between 240-259, and students who score at the Advanced level score a 260-280.

History of Education and Budget Reform in MA

Since 1982, the amount of general local aid to public works systems in Massachusetts that fund such entities as the fire, police, and school departments has decreased by 58% (MassBudget 2011). MassBudget (2016) reports The school districts of Massachusetts are funded by the Chapter 70 formula. The purpose of the Chapter 70 formula is to provide adequate education to all students in Massachusetts, and it takes into account what each district gets from local taxes. The Chapter 70 formula works in three steps, first the foundation budget is calculated by, "multiplying the number of students at each grade level and demographic group (e.g., low-income and limited English proficiency students) by a set of education spending categories (e.g., teacher compensation, professional development, building maintenance), and then adding together those total dollar amounts" (www.massbudget.org/chapter70 2016 page #?). After the foundation budget is calculated the state calculates what a reasonable contribution is for each town based on their tax base. Once both of these figures are calculated, the state fills in the gap between a district's expected local contribution and the calculated foundation budget with Chapter 70 aid. After the Chapter 70 aid is administered, local towns can contribute more money to their school system as they see fit. Chapter 70 was reformed in 1993 to provide more assistance and aid to K-12 education, and it is how school budgets are determined for each school district in Massachusetts.

Per Pupil Expenditures and Student Performance

There have been many studies that support the idea that money matters to school performance, and alternatively that there is no correlation between resources and student performance (Burtless, 1996). The issue that constantly

arises for policymakers is not to spend nothing or an infinite amount of money on schools, but how to get the most improvement in student performance with a limited amount of money added to the district. The findings according to Burtless (1996) after a multitude of studies is that it is not necessarily how much money is spent, but what types of resources the money is spent on. One issue with correlating money spent with academic performance is that there is no incentive for staff in school districts for student performance to increase. There is no change in staffing or career progression depending on improvement in student scores (Burtless, 1996). If policies are created that provide incentives to school staff based on student improvement, this could lead to more effective teaching practices employed in school districts, even those with limited money.

There has been scientific research done on school finances to help legislators and policy makers determine exactly how much money is necessary to give a school system to provide adequate education for students. The problem with determining a dollar amount needed to show student improvement is that budgets are fixed and when money from a school budget is allocated to fix a specific problem, that money is taken away from another area (Hanushek, 2009). According to Hanuchek (2009) for example, due to budgetary restrictions a school system has to choose to either decrease class sizes and lose the ability to hire a higher quality teacher, or hire a higher quality teacher and pay them more but have larger class sizes. School systems are faced with determining what is more beneficial to student achievement and which option would have a bigger impact on education. This issue seems straight forward, but there are other issues besides just what a school system

spends on education that determines student success. Other issues, such as poverty, affect the quality of student life have an impact on students in the classroom.

As stated by Hanushek (200) hundreds of studies have shown that the dollar amount that school systems spend on students does not have a correlation to student success, but rather how districts spend money is what affects student achievement. There have been four types of case studies to determine how money can be spent and how effective it is at improving student achievement. The first type of study is the professional judgment approach, where a panel of school experts is assembled and they identify the effective practices that the schools in model districts use. With this approach, the board of experts is given free reign to buy programs, determine class size, and manage staff. The problem with this approach is that it is based on the decisions of a small group of experts. The possibility of free reign often overwhelms these experts and they end up spending money on programs that are not proven to be effective just because they have access to money and the power to decide. The second type of case study is the evidence-based approach. This approach works when a district selects specific evidence-based services or programs to test to improve their school. The problem with this method is, similar to the professional judgment approach, it is reliant on the opinions of a small group of people. In this case, it is hard to determine if the program they choose is the best option because there are usually a number of programs that could have been chosen to improve student achievement. The third type of case study is the successful schools approach. The successful schools approach is when a successful school is identified and studied to find out why the school is achieving so

well. The problem with this method is that while we can learn some things about best practices from successful schools, these best practices are not always transferable to other districts. These practices may not be universal because of cultural differences between school systems. The fourth type of case study is the cost function approach, which "relies on current spending and achievement patterns across all schools in a state to predict optimum spending solutions," (p 191). The problem with this method is that the amount of money that it would take to make a significant impact on student improvement would be so high that it is unrealistic (Hanushek 2009. These methods of research also help determine the policies of how the money that school districts get from the state are calculated. These methods also help how the school districts spend the money they are given.

Some studies have already been conducted related to per pupil expenditures and student performance. Barton (2015) conducted a study based on the standardized test scores from third grade on of 607 of the 613 districts in Ohio. The study looked at certain variables that the school districts were spending money on, including "administration, building operations, instruction, pupil support, and staff support for each of the three academic levels (highest, continuous improvement, and lowest)," (p 83) and tried to find a correlation between these variables and student test scores. Experts recommended that school systems spend 65% of their budget on instruction, and in the Ohio study, it was found that the schools with the highest test scores spent the highest percentages of their budget on pupil support. This district also only spent 56% of their budget on instruction. The only variable that the Ohio study did not factor in was the income level of the residents of the

studied districts and how that variable may have affected test scores. Barton also did a study in Texas and the results from this study show that there was a strong correlation between those school districts who spent more than 60% of their budgets on instruction and a high student performance on state standardized tests. They also found that there was a significantly negative difference between those districts who spent less than 60% on student instruction and those districts that spent more than 60%.

In the research done by Barton (2015) there was also a study done in Texas in 2010 that sorted school districts into three groups: "schools that spent below 60% on instructional expenditures, schools that spent between 60 and 64.99% on instructional expenditures, and lastly schools that spent over 65% on instructional expenditures" (p 42). Both the Ohio study and the Texas study show that spending more on student instruction led to better test scores on their state standardized tests.

District Backgrounds

I have chosen three districts from southeast Massachusetts to represent three distinct cultural and socio-economic backgrounds. I first chose a small suburban town with a small per pupil expenditure that I was familiar with. I decided then to compare this small district to a medium sized regional school district with moderate funding, and to a third large urban school district with per pupil expenditures well above the state average. I gained access to the stats on these three districts and all of the districts of Massachusetts on the state's department of education (DOE) website.

To conduct my research, I have been in contact with the curriculum administrators in each district to find out more about their science budget. Part of the towns' taxes goes to the schools. These taxes are then supplemented by the state based on need. The school committee of the towns and smaller subcommittees then meet to decide how the money they have from the state and taxes gets divided into budgets to run the school departments, including building and grounds upkeep, athletics, and curriculum. The figure of how the state determines a district's per pupil expenditure average is the total budget of the school system divided by the number of students the school district serves.

Specifically, science budgets are part of the overall curriculum budget for each district that I profiled. It is up to the curriculum coordinator to assess the needs of the district and determine how the budget is allocated to each specific subject. This means that if some districts are trying to overhaul a reading program, they will spend the majority of the budget on that improvement for many years in a row. So, it is possible in each district to allocate little to no money to a particular subject for years at a time if aid is needed elsewhere. When districts do spend budget money on their science curriculum, it is used toward instructional programs for teachers, lab materials, and science outreach programs.

After talking with the curriculum administrators in each district, I have found that science budgets are often overlooked or severely restricted. Science has not been as high of a priority as other subjects that have yearly standardized tests for elementary students, such as reading and math. Because of this lack of emphasis on science, students often have lower quality science materials and textbooks, thereby

working with outdated facts and materials. Over the past few years, with the creation of new national and state science standards, emphasis is swinging back to instructing children in science, science is becoming a higher priority, and science budgets are increasing.

Methodology

This study this is mixed method research because there is a combination of methods in this study..

Quantitative research is a survey of a population who answer questions that the researchers then turn into numerical data based on the responses and their correlation to the proportion of the population questioned (Creswell, 1994). Quantitative research has five components that are typical to the survey method plan, including: the survey design process, population and sample selection and gathering, instrumentation, assigning variables in the study, and data analysis (Creswell, 1994). In this study, I have surveyed three school districts in Massachusetts. From the Massachusetts Department of Education website, I obtained the MCAS score for fifth grade science from 2005 to 2015. The scores for this period were separated into how many students in each district scored in each of the four levels of MCAS: advanced, proficient, needs improvement, or warning. This data was then analyzed for trends over the ten-year period. These trends were then compared to the changes that occurred in each district's per pupil expenditure rate over the same ten-year period. Analysis was then done on the comparison for these two sets of data for each of the three districts surveyed.

Qualitative research is another type of research method. Qualitative research is a broader collection of data, such as interviews and observations, that the researcher then interprets for themselves (Creswell, 1994). In this study, I created a series of questions to ask school administrators to gauge their district's science budgets and curriculum. Based on the responses to these questions, I am then taking the responses and using them as possible causes for test score changes from year to year in each district.

Since there is a mixture of the two types of research in this study, this research can be considered mixed method research. The benefit to mixed method research is that by using both research types the study can benefit from the strengths of both types of research (Check & Shutt, 2012). The mixture of both research types also allows for a more complete interpretation of human opinions and raw numerical data, and the overall investigation benefits from the combination of methods more than it would if a single method of research was used. For this reason mixed method research was ideal for this study.

Methods

In this study, I have focused on the results of science MCAS from three school districts in southeast Massachusetts. I chose these districts because I wanted to highlight data from districts that I knew would be different from one another in both finances and demographics and that I would have access to. I am from one of the districts and knew the proper administrators in there so I was confident that I could receive cooperation from that district. I also knew that my advisor had contact in both of the two other districts so I chose these districts to study as well. I collected

data of the MCAS test results for the three districts from the Massachusetts DOE website starting from the Spring 2005 results and culminating with the results from Spring 2015. I chose these years as 2005 was one of the first years that Massachusetts implemented a state wide fifth grade science test, and I believed that I would have sufficient data from ten years of test results and budget reports.

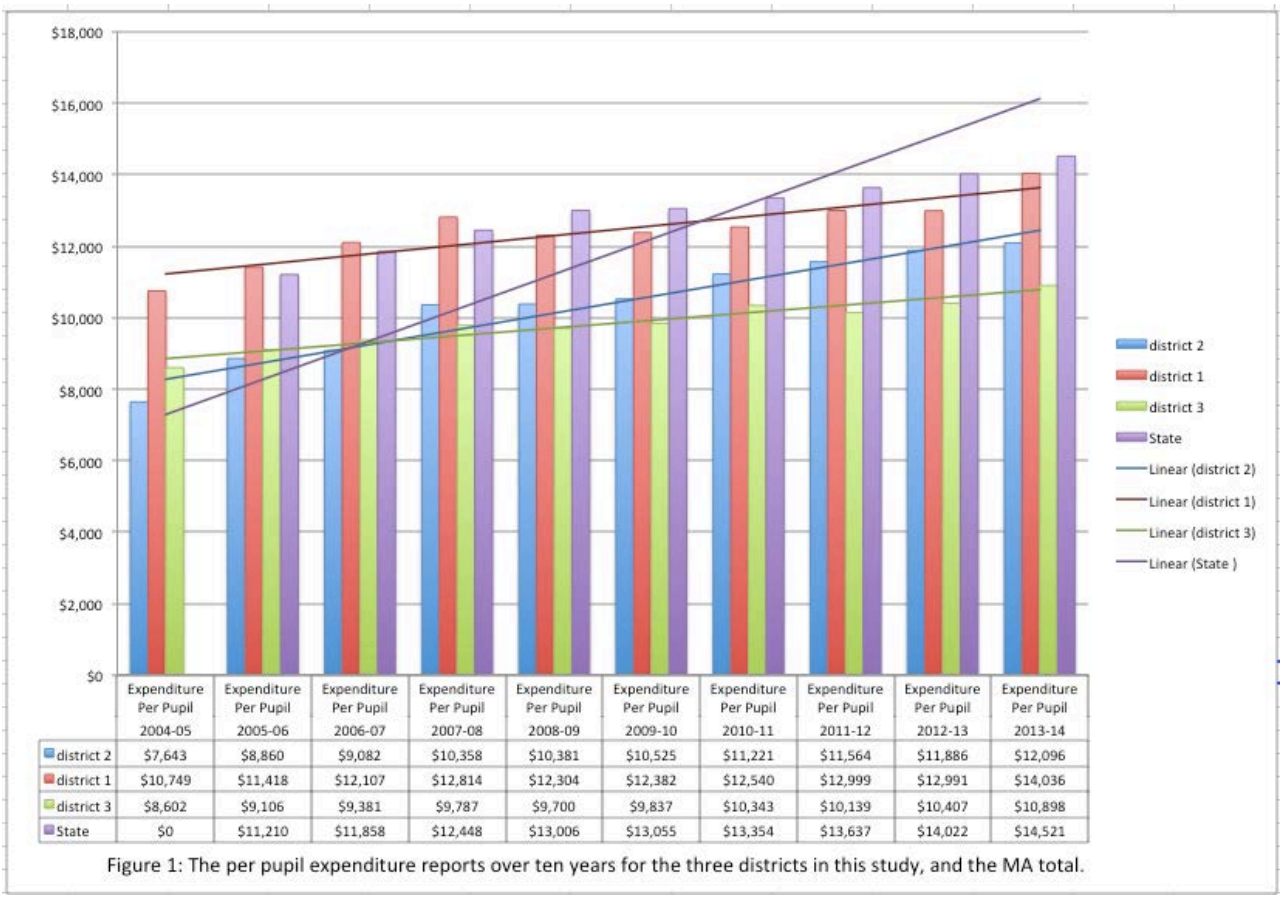
The focus of this MCAS research is on fifth grade science MCAS scores. I also collected the three districts' MCAS expenditure reports from the Massachusetts DOE website, starting from the 2004-2005 school year and ending with the reports from the 2013-2014 school year. I analyzed these results by taking the mean number of advanced, proficient, and needs improvement scores from the MCAS results over the ten highlighted years for each district. I then compared these results to the per pupil expenditure average from each year to the MCAS results of that year.

I also spoke with administrators from two of the districts to further qualify how each individual district allocates their budget to their elementary schools, and particularly to science. In order to speak with these individuals, I filled an IRB report with Bridgewater State University. This report allowed me to conduct research with the use of human involvement, and allowed me to interview and correspond with the administrators that I needed to. I met with administrators from these three districts both in person and through email correspondence. The first district I met and talked with administrators in person about their curriculum and budget. The second I connected with through email. The third district I continually contacted but never heard back from the particular administrator that I needed to speak with. I used the same set of questions with each of them to gather the same information.

Furthermore, in my conversations with these administrators I inquired about the break down of how the elementary schools spend their budgets on science education with regards to both science equipment and funds spent on outreach such as science related field trips. For each district, I also took into account which science curriculum each district uses and how that curriculum relates to the core standards and the science MCAS. I also explored how many elementary teachers in the district were qualified with science degrees to see if this had any correlation to science MCAS scores for fifth graders.

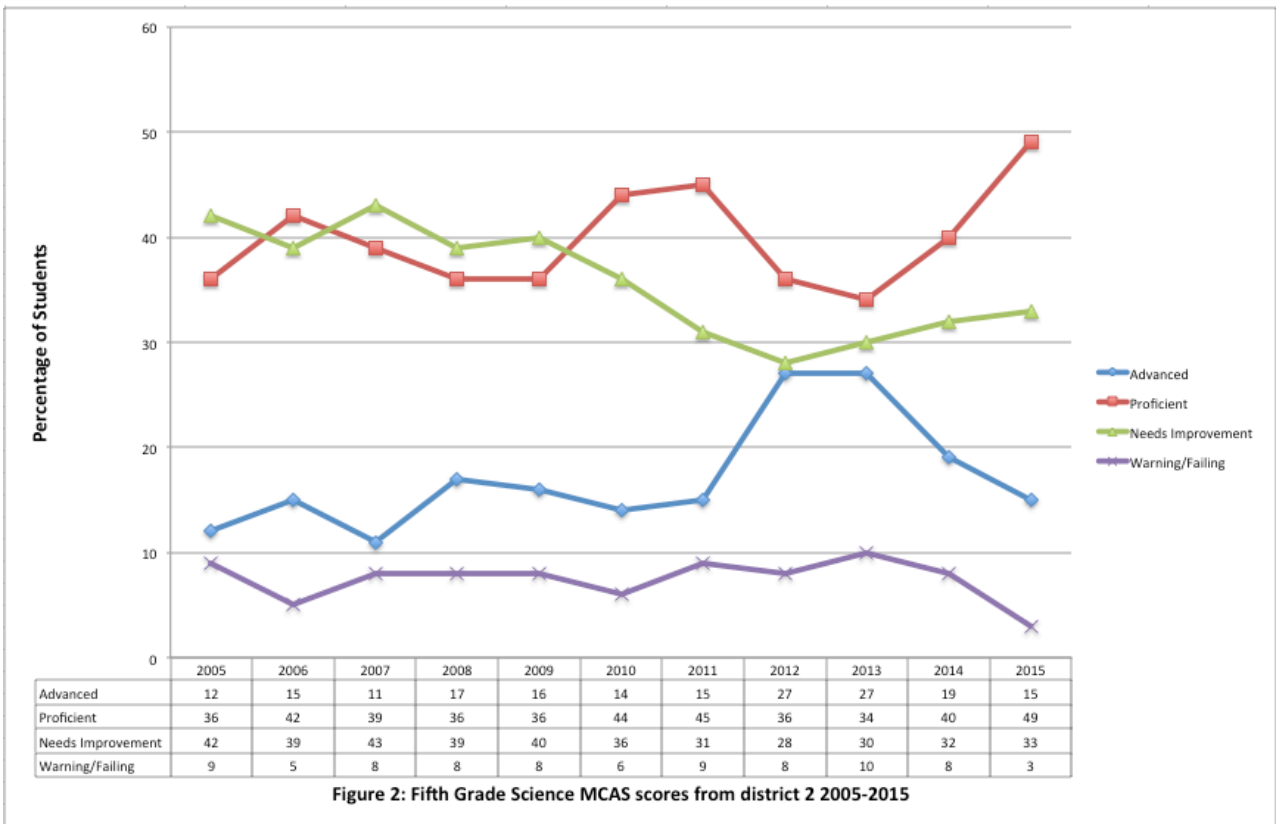
Results

Below are the results from the quantitative data analysis. Figure 1 shows the per pupil expenditure reports for the three districts over ten years, and includes the Massachusetts average for per pupil expenditures for this time period as well. Figure 2 shows the percentage of students who scored advanced, proficient, needs improvement, and warning/failing for District 2 from 2005 to 2015. Figure 3 shows the percentage of students who scored advanced, proficient, needs improvement, and warning/failing for District 3 from 2005 to 2015. Figure 4 shows the percentage of students who scored advanced, proficient, needs improvement, and warning/failing for District 1 from 2005 to 2015. Figure 5 shows the average median household income for the three districts between 2011 and 2015.



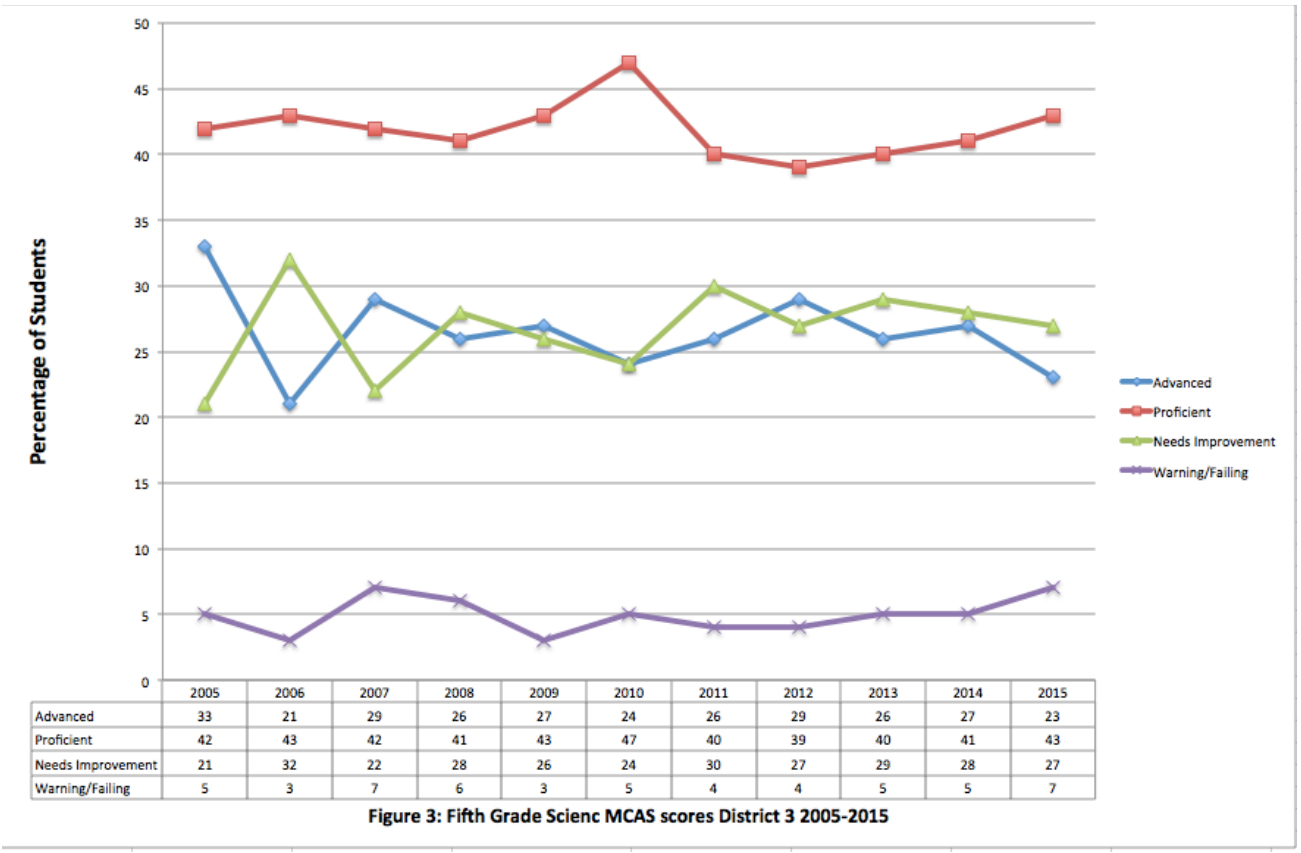
	Expenditure Per Pupil 2004-05	Expenditure Per Pupil 2005-06	Expenditure Per Pupil 2006-07	Expenditure Per Pupil 2007-08	Expenditure Per Pupil 2008-09	Expenditure Per Pupil 2009-10	Expenditure Per Pupil 2010-11	Expenditure Per Pupil 2011-12	Expenditure Per Pupil 2012-13	Expenditure Per Pupil 2013-14
district 2	$7,643	$8,860	$9,082	$10,358	$10,381	$10,525	$11,221	$11,564	$11,886	$12,096
district 1	$10,749	$11,418	$12,107	$12,814	$12,304	$12,382	$12,540	$12,999	$12,991	$14,036
district 3	$8,602	$9,106	$9,381	$9,787	$9,700	$9,837	$10,343	$10,139	$10,407	$10,898
State	$0	$11,210	$11,858	$12,448	$13,006	$13,055	$13,354	$13,637	$14,022	$14,521

Figure 1: The per pupil expenditure reports over ten years for the three districts in this study, and the MA total.



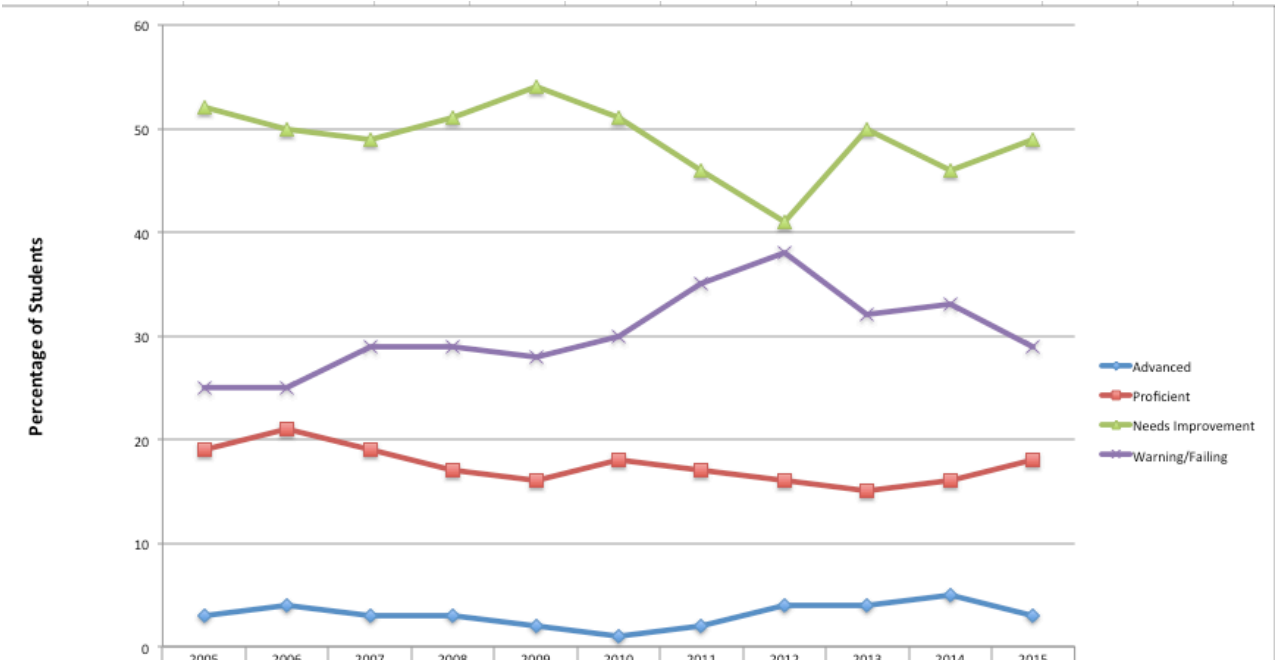
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Advanced	12	15	11	17	16	14	15	27	27	19	15
Proficient	36	42	39	36	36	44	45	36	34	40	49
Needs Improvement	42	39	43	39	40	36	31	28	30	32	33
Warning/Failing	9	5	8	8	8	6	9	8	10	8	3

Figure 2: Fifth Grade Science MCAS scores from district 2 2005-2015



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Advanced	33	21	29	26	27	24	26	29	26	27	23
Proficient	42	43	42	41	43	47	40	39	40	41	43
Needs Improvement	21	32	22	28	26	24	30	27	29	28	27
Warning/Failing	5	3	7	6	3	5	4	4	5	5	7

Figure 3: Fifth Grade Scienc MCAS scores District 3 2005-2015



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Advanced	3	4	3	3	2	1	2	4	4	5	3
Proficient	19	21	19	17	16	18	17	16	15	16	18
Needs Improvement	52	50	49	51	54	51	46	41	50	46	49
Warning/Failing	25	25	29	29	28	30	35	38	32	33	29

Figure 4: Fifth Grade Science MCAS Scores District 1 2005-2015

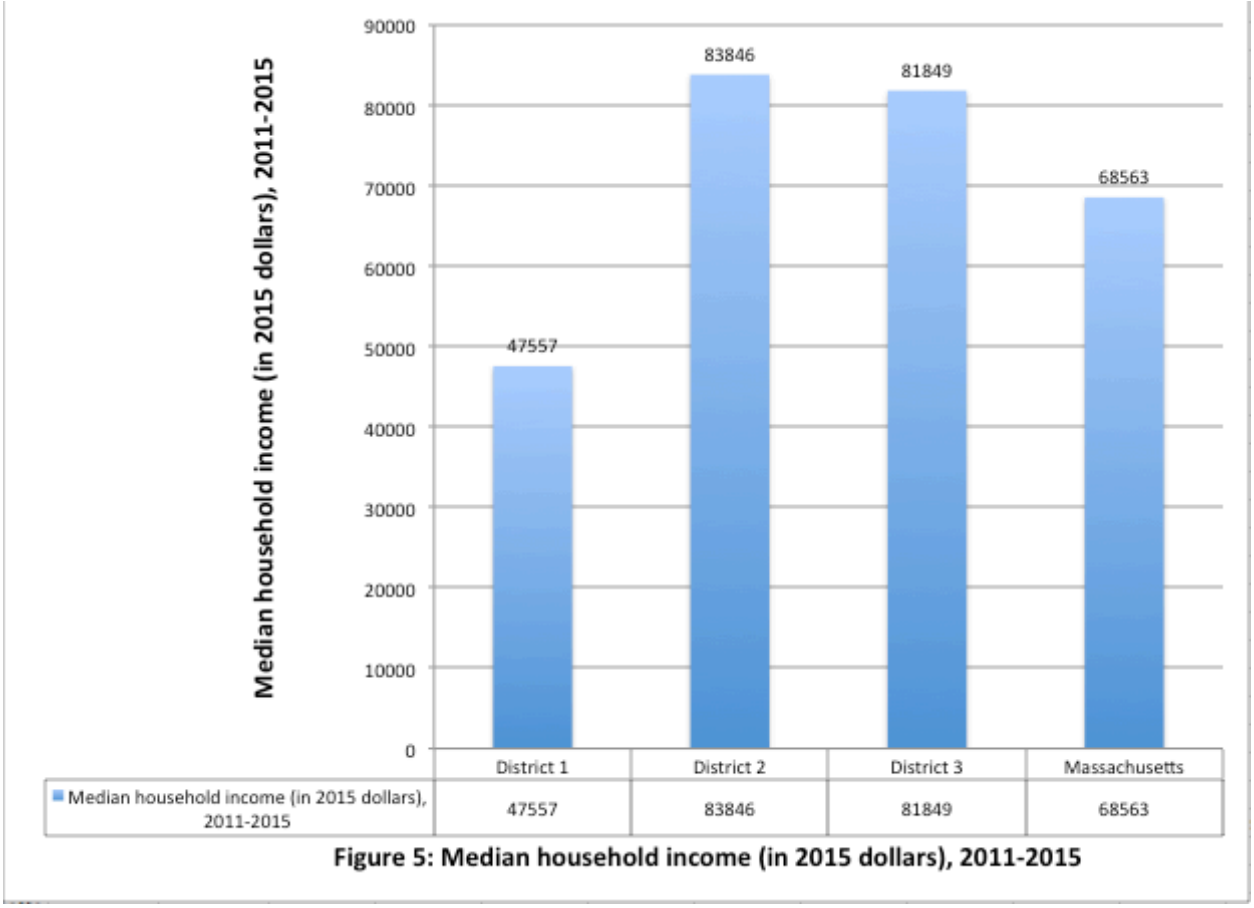


Figure 5: Median household income (in 2015 dollars), 2011-2015

District 1:

Over the ten-year time span, district 1 has continually gained money into their overall budget; however this does not seem to be significant to changing MCAS scores in the district (Figure 1). The results of the scores stayed the same: that most students fell in the range of needs improvement and warning over the ten years. The number of students who scored advanced increased slightly from 2005 to 2015, the number of students who scored proficient and needs improvement decreased, and the number of students who scored warning increased dramatically, then has been decreasing again in recent years (Figure 4).

When I reached out to administrators for this district, I received permission to study this district, but no communication back about this specific topic from the administrators that I contacted.

District 2:

Over the ten-year time span, district 2 has continually gained money into their overall budget; however this does not seem to be significant to changing MCAS scores in the district (Figure 1). During this ten years, there has been an overall dramatic increase in proficient scores. Along with this increase of money spent there was also a dramatic increase of advanced scores that began in 2011, then a slow decline, resulting in an overall increase in advanced scores for the district (Figure 2). Both the amount of students that scored needs improvement or warning decreased over the ten-year timeframe (Figure 2).

I communicated my questions about science budget and per pupil expenditures to administrators in this district and corresponded with them through email about my questions.

District 3:

Over the ten-year time span, district 3 has only gained some money into their overall budget; however this does not seem to be significant to changing MCAS scores in the district (Figure 1). The per pupil expenditure did not increase very much over the ten years of this study (Figure 1). Additionally, unlike the other

districts, there is no dramatic change in the number of students for each score in this district (Figure 3). Of interest for this district is that the number of students in each category is different than the other districts. District 3 had very low numbers of students who scored needs improvement and warning as compared to school 1 and 2. Also, school 3 had a higher proportion of students who scored advanced and proficient in science than the other districts.

For district 3 I contacted administrators about my questions about science budget and per pupil expenditures and met with the science curriculum coordinator and assistant superintendent about this topic.

Based on this data, there seems to be no significant correlation between the change in per pupil expenditure and the scores that the students of each district are achieving on the fifth grade science MCAS. The scores seem to rise and fall independently of the change in money of the district.

Figure 5 shows the median annual income for people living in the school districts from 2011-2015 in school districts 1-3.

Discussion

All of the districts had a trend in science MCAS test results that was independent of how money was added to or taken away from each district. All of the school districts moved towards having less students scoring advanced and failing, but more students scoring needs improvement and proficient. These changes were more significant for the middle funded suburban district; a more drastic change occurred with students receiving needs improvement and proficient scores. Less change to the science MCAS scores occurred in the low funded suburban district

throughout years, and the scores in the highly state funded urban district has stayed relatively the same throughout years. Based on this data, there seems to be no significant correlation between the change in per pupil expenditure and the scores that the students of the district are achieving on the fifth grade science MCAS scores.

Based on these results, there must be factors other than per pupil expenditure that contribute toward student achievement on the MCAS. One factor may still be related to the school budget. According to the Department of Elementary and Secondary Education in Massachusetts, the budgetary system dictated by Chapter 70, and the goal of Chapter 70 is, "to ensure that every district has sufficient resources to meet its foundation budget spending level, through an equitable combination of local property taxes and state aid." (DOE - The Massachusetts Foundation Budget 2016). This budgetary system evaluates how many students are served in each district and determines what baseline budget the school district needs to be at to run. After this foundation budget number is calculated, the state makes the foundation budgets available for all districts. The premise is that these budgets should be used in local funding meetings to determine the local budget for districts each fiscal year. The state suggests that the foundation budget should help to determine the taxes of the city or town to support each school district. After the local taxes are determined by the local governments and the difference between the local tax allocations for schools and the foundation budget determined by the state, Chapter 70 funding is given to each district.

Each district operates on this budget system in Massachusetts. The problem that sometimes occurs is that what the local taxes allocate to a district and what the

state wants to give in aid to the district is different. The state sometimes determines that a city or town should be able to give more money in taxes to schools based on the average income and property value within the city or town than the local government wants to give (Schuster, 2011). When this happens, the state gives the aid to the school district based on what number it feels the local government should be allocating to the district in taxes. Because of this, there is sometimes a gap in funding between what the state feels the town can contribute and what it actually does (Schuster 2011). When this occurs districts operate with a lower budget than they could be because they are not supported by their local taxes.

Based on what I have observed both analyzing test scores and budget information and talking to administrators, every school seems to operate at or very close to the foundation budget that they originally receive from the state even though they do not always receive the local aid that the state mandates that they can contribute. The administrators that I spoke with stated that their districts operate at or around the original foundation budget given out by the state of Massachusetts because of the donations of individual families and district staff. The actual budgets of these districts were then very difficult to keep track of because these donations are not factored into the district budgets and therefore the per pupil expenditures for these districts. Based on my conversations with administrators in these districts, they could not give me a specific dollar amount that the district spent on science. The shocking thing that I found through this research was how little these districts know about what they spend on science, as they spend the remainder of their budget on science after more heavily tested subjects, like English language arts and

math, have been accounted for. Even though some schools do not get what is determined as 'enough' money from the state, they are still surviving based on their test scores.

However, where they are getting money from is the difference. The urban school district seems to have a lot of money, but their money does not come from the same places as the suburban schools; they are largely supplemented by state and federal grants that cater to low-income urban areas. In 2015 District 1 received 10 million more dollars in grants compared to the other two districts (DESE - State and Federal Entitlement And Allocation Grants by District) Suburban schools tend to have more financial support for schools from families and taxes, having a higher tax base in suburban areas . However, the suburban area with a low budget and low tax base has equally high test scores despite their low per pupil expenditure.

I believe that district 3 is getting the money from a different place as well, they are not receiving money from the state or grant money from the state or federal government. I believe that the money and resources are provided for this district directly by the teachers and parents that work and live in this district. This money is not documented or formally given to the school so it does not show in the per pupil expenditure data. Instead of the school providing necessary supplies and tools for learning, in district 3 the students enter the school with these necessities, having paid for them themselves. In this low budget suburban district all of the test results had same trend regardless if money was lost or gained in the official budget. This district didn't get as much money from state for several years (Figure 1), and I expected test scores to drop, but they didn't change much (Figure 3).

From speaking to administrators in District 3, I was told that the materials to instruct science have not been up to date until this year, school year 2016-17. Yet, students have still been performing on par on the science MCAS with other suburban districts who have higher per pupil expenditures. Some teachers are passionate about teaching science and bring in other resources to their classrooms. Also, parents are the backbone of this district and are needed to help bring the district along even though they have had no resources. In this district, to make up for their lack of resources and money, the education of the students is a community effort, including families, administration, teachers, and students. The support that the whole community gives to education, aside from local and state budget needs, that is equally as important as money when determining how successful a district's test scores will be. The effort the community gives toward education is the difference: when the intrinsic value of education in homes is high, the state test results will also be high.

There are achievement gaps in our country between students who come from urban versus suburban communities. One of the ways that the country has tried to combat these achievement gaps is by giving additional money to urban communities that underperform. However, doing so often overlooks the family lives urban students are coming from when they come to schools to learn (Barton, 2015). These grant programs do not take into account the culture that these urban students grow up in; a culture that sometimes does not have the opportunity to provide additional educational resources or that has parents sometimes do not have the background or education themselves to understand or know how to extend their

children's learning at school into the home. Instead of adding more money to a system that is not achieving as well as its suburban counterpart, urban schools should consider funding programs to increase the knowledge of educational opportunity in urban communities. Classrooms that are more connected and have better communication with the community show students that are more invested in their education and have a more positive attitude and behavior in school (Love, 2016). The responsibility to connect classrooms with the community lies with both the teachers and community members to communicate more effectively to support their students. Even if these parents are not English speakers it is essential for the parents and teachers to find a way to connect with one another, using technology or translators to support their students'. Better community communication can help create a school culture that puts an emphasis on improving oneself through education. The difference between most highly functioning suburban communities, even when they are low funded, and highly funded urban communities is that the suburban schools often have a high level of community involvement.

In communities where there is a an achievement gap in science specifically, there is a direct correlation between how much opportunity a student is given to be taught by a qualified science teacher (a teacher with a degree in a science field) and student science test scores (Zhang, 2013). The students with qualified science teachers scored better on science tests than those students without highly qualified teachers. As well as improving community involvement to improve students test scores, the schools need to improve its access to science knowledge by hiring more highly qualified science teachers. This can also help students become more

interested in and value science, which can also improve test scores. If you have a culture where science is valued then test scores may be better than schools and districts where science is not valued.

Conclusion

In conclusion, there is not a significant correlation between the amount of money that a district spends per pupil and on there science budgets and their fifth grade science MCAS scores. The money that is spent on education evens out across districts to be around where the state thinks the foundation budget for each district should be when factoring in state aid, local taxes, federal and state grants, and money given directly from the community. School systems that receive less money from the state can still have good standardized test scores because the community has an immeasurable support for education that is lacking in some urban communities. This leads to a school and community culture that provides more opportunities for students to improve their education, including science. Districts such as these continue to have high science test scores even with low per pupil expenditures.

A positive school culture toward science can serve as a model for other school systems that are not doing as well on science standardized tests. Instead of only adding money to districts who are not doing well, the money should be invested in specific programs that bring positive experiences with science education to the community. In those struggling districts, they can increase the community's emphasis on science education by bringing science activities and programs to the community to show the benefits of science education. Engineering and science after-

school and parent involvement programs can be developed in these communities to increase the idea that science education is important.

I think that further research can be done on how the money is used in districts can effect student MCAS scores. There needs to be more information collected about science budgets specifically that shows how the students are supported in their science education. I think that if the districts traditional science curriculum cannot effectively support and improve science test scores, then there need to be programs created to supplement this science education. Research also needs to be done to find out what is the factor that causes some places to naturally develop an active school culture that emphasizes students' growth through education, specifically science education, and those districts that lack a strong school culture.

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