Educational Funding in The United States

TCNJ THE COLLEGE OF NEW JERSEY

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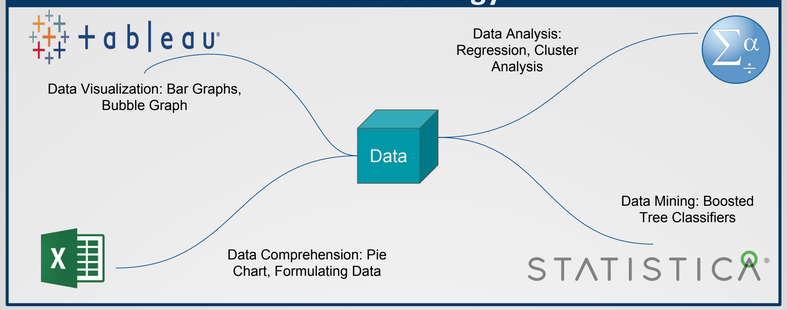
1. Introduction

In order to help Mr.Digits figure out how educational funding decisions are made for schools across the country, we looked at the federal funding data set from 2005-2009 and focused on the most recent year, 2009, for all of our analyses to make our conclusions. In addition we used socio-economic data for each state that includes population, personal income (in thousands), and per capita personal income.

Different states use different formulas when determining how much to allocate to a school district. The most common method, used by 23 states, is the Foundation Formula. States set a base-level amount spent per student that is then adjusted. Another method used by 12 states is the Modified Foundation Formula where base levels vary by district. 7 States use the Teacher Allocation Formula where funding is determined by student enrollment.There are other systems used that include allocating funds based on previous years 1.

2. Methodology



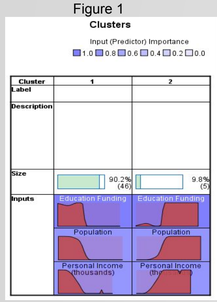
3. Research Questions

1. Does population affect total federal education spending on each state?
2. Does per capita income affect total federal education spending?

Comparing these results will help us understand government spending on education programs.

4. Cluster Analysis

Figure 1



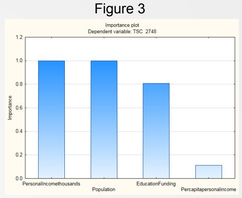
	Classification matrix (regressiondata (2).sta) Response: TSC_2748 All samples Number of trees: 7		
	Observed	Predicted 1	Predicted 2	Row Total
Number	46	0	46
Column Percentage	97.87%	0.00%	
Row Percentage	100.00%	0.00%	
Total Percentage	90.20%	0.00%	90.20%
Number	2	3	5
Column Percentage	2.13%	100.00%	
Row Percentage	20.00%	80.00%	
Total Percentage	1.96%	7.84%	9.80%
Count	All Groups	47	4	51
Total Percent		92.16%	7.84%	

Figure 2

In SPSS we conducted a Classification Analysis - TwoStep Cluster to see how states would be grouped together. Using the continuous variables: population, personal income, and education funding, SPSS split it into two clusters named 1 and 2, which can be seen in figure 1. The 'cluster quality' scale in figure 4 depicts that the set of indicators, or variables, are a good fit for clustering. The size of Cluster 1 is 90.2% which includes 46 states, including District of Columbia and Cluster 2 is 9.8% or 5 states. Analyzing the results, we found that cluster 2 included the most populated states such as California, Texas, New York, Florida, and Pennsylvania. As seen in the inputs section in figure 3, we were able conclude that 5 states comply of the majority of education funding, population, and personal income. We were able to come to this conclusion because the inputs in Cluster 2 is skewed left while those in Cluster 1 is skewed right.

Then in Statistica, we used a data mining tool called Boosted Trees for pattern recognition. The goal of this analysis is to build a prediction model for each of the states based on the several continuous predictor variables mentioned previously. The predictor importance is computed as the scaled average value of the predictor statistic over all trees so that the maximum value is equal to 1. These values reflect on the strength of the relationship between the predictors and the dependent variable of interest over the boosting steps. In our case, variables 'Personalincomethousands', 'Population', and 'EducationFunding' stand out as the most important predictors. We came to the conclusion that variable 'percapitapersonalincome' has minimal significance in determining which cluster a state would be grouped in. Conducting the Boosted Tree Analysis resulted in the corresponding classification matrix in figure 2. Comparing the actual clusters, figure 1, and the prediction model, Figure 2, we can see that our model is near perfect since it only misclassified one State.

Figure 3



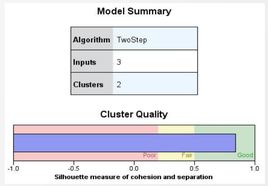
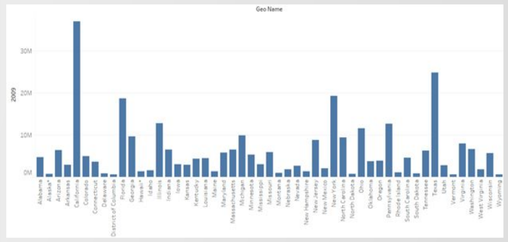


Figure 4

3.1 Population and Fed Education Spending

As seen in Figure 7, states with higher populations, like California and Texas, receive higher funding shown in Figure 8. States with more people need more money to fund educational programs. Based on Figure 6 in box 3.2 we can see the significance value .000, which allows us to conclude that population plays a major role in federal spending. .

Figure 7



Total Federal Expenditure by State over 4 years

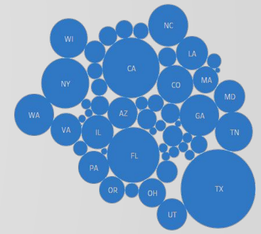
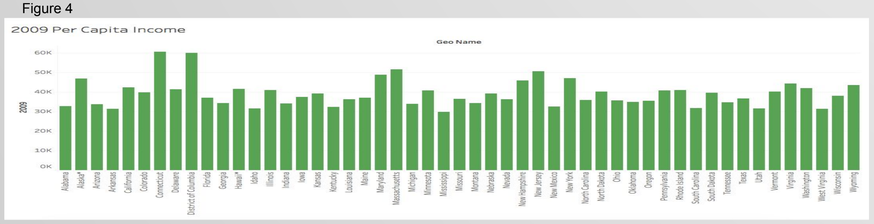


Figure 8

3.2 Per Capita Income By State and Federal Education Spending

Conducting a Regression Analysis on the Federal Funds data, our dependent variable was 'EducationFunding'. To only look at educational related programs, we set the filter of the CDFA to be greater than or equal to 84 and less than or equal to 85. Taking the Federal Funds data in SPSS, we filtered out 2005-2008 data. Then we sorted the file by state alphabetically and exported it to Excel. Lastly, we calculated the sum of amount of federal funding given to a program based on state. For our model, our predictors were 'per capita personal income', 'population', and 'TwoStep Cluster Number'. Our R square value is .788 meaning that 78.8 percent of of the Education Funding can be explained by the dependent variables. The significance of .000 under ANOVA proves that the model has predictive value. Most importantly under Coefficients in Figure 6, the variables 'TwoStep Cluster Number' and 'Population' are significant but 'per capita personal income' is insignificant because the sig value is above .05. Therefore, per capita income by state does not play an important role in the amount of funding a state receives. The bar graph below in Figure 4 shows that the highest incomes of states throughout the country are Connecticut and District of Columbia. However, Figure 5 indicates that Texas, Pennsylvania, and California are amongst the states with the highest total federal expenditures.

Figure 4



Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-20881.301	26550.173		-.786	.436		
	TwoStep Cluster Number	71691.842	20270.977	.406	3.537	.001	.342	2.925
	Population	.004	.001	.528	4.616	.000	.344	2.910
	Per capita personal income	-.297	.530	-.038	-.560	.578	.991	1.009

Figure 6

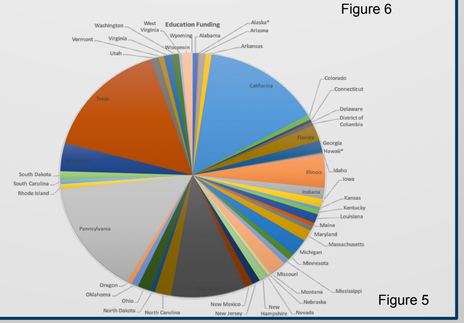


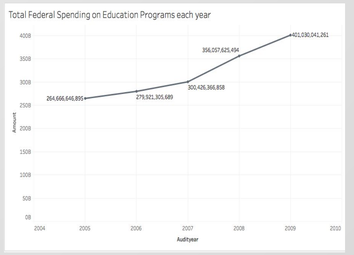
Figure 5

5. Overall Analysis and Further Research

As shown in Figure 9, federal education funding has been steadily increasing over the years. Despite the increase there is still inequality in funding between states due to population differences. Most educational programs are major programs across the country, as shown in Figure 10. Federal investment in education should continue to increase to ensure that programs can be implemented to their full potential to guarantee academic success for students across the country. States use different formulas to allocate money to districts but it may be more fair if one set formula was used across the country. We believe this is the technique that will ensure success and growth for the country, no matter where the student is from or how .

For a deeper analysis for the future we would look at the amount each state gives to each school district and compare this amount with their performance on standardized tests as well as their graduation rate.

Figure 9



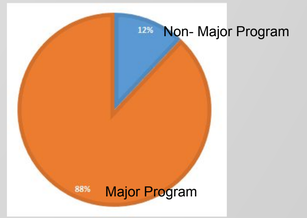


Figure 10

1: Checkley, Kathy. "Money Matters: A Primer on K–12 School Funding." *Money Matters: A Primer on K–12 School Funding.* Center for Public Education, 2 July 2008. Web. 08 May 2017. <http://www.centerforpubliceducation.org/Main-Menu/Policies/Money-matters-At-a-glance/Money-matters-A-primer-on-K12-school-funding.html>.