Final Project

DAT 520: Decision Methods and Modeling

August 20, 2014

By

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**Topic**

The project will involve looking at the Texas Education Agency SAT data for the campus level. The scenario for the project is: Conroe Independent School District wants to improve their SAT scores. They have limited funding to allocate to SAT improvement. The district task one of the educational coaches with improving the SAT scores. The educational coach is provided with the SAT data and asked to determine where the SAT score can be most improved. The district is going to look at the schools in the district broken down by the SAT categories (Math, Critical Reading and Writing) further broken down by gender (male/female). (TEA)

**Research Question**

The question being researched is “Based on the data, which SAT area (Math, Critical Reading, or Writing) should be targeted for improvement?”

**Data Collection**

The data used in this report is secondary data. The data is from the Texas Education Agency (TEA) website. The data is SAT data at the campus level for the year of 2011. In 2011, the SAT was divided into three categories: Math, Critical Reading, and Writing. Each section has a possible point total of 800 (satscores). When analyzing the data to answer the research question, not all the data was in the file was used. The data which was used were the schools in the Conroe Independent School District, the subtotal of the scores for the Math, Critical Reading and Writing, the scores for the females and males and the Grads\_Mskd. The Grads\_\_Mskd column shows the number of students taking the test for each section shown. When making the decision tree, the economic breakdowns were not used and the ethnic breakdowns were also not used. All Conroe ISD schools listed in the table were used expect for Hauke Alternative Education School since there were no SAT scores provided for the school.

Table : Formatted 2011 SAT data for Conroe ISD



Source: SAT scores campus level 2011. Retrieved from TEA website.

**Decision Tree**

The decision tree for the project is inserted below. Due to the size of the tree, the tree was copied and pasted in sections. The excel file for the decision tree is attached with the project. The decision tree is broken down by school in the district (Conroe High School, The Woodlands High School, Oak Ridge High School, New Caney High School, and College Park High School), further broken down by the SAT categories (Math, Critical Reading, Writing), and the last split is by gender (Male and Female). The eight hundred on the tree shows the max possible score for the SAT category. The SAT scores for the categories were pulled from the data table. The numbers for the Math, Critical Reading and Writing Category were the average scores for all students in the category per the data table. The amounts listed under the male and female branches were the average score for male or female per the SAT category. The percents used were based on the percent of female and percent of male students taking the test. The values to calculate the percents were pulled from the Grads\_Mskd column. When looking at the decision tree, the lower Expected Values shows which areas need the most improvement. The smaller numbers reflect the scores are lower for the average student and the male and female average scores, and could therefore use the most improvement.







**Weakness or Limitation in Model**

The model reflects how many students took the test, but does not reflect the number of students eligible to take the SAT test. The model does not take into discuss the extent of SAT prep which was already occurring at the schools, or how high the participation was for the SAT prep classes. A third weakness is that the data is only shown for 2011. It does not show the most recent years, or compare to show if the averages were higher or lower in 2011 compared to other years.

**Bias and Confounding**

“The difference between bias and confounding: Bias creates an association that is not true, but confounding describes an association that is true, but potentially misleading” (Paneth). The SAT data is taken from the TEA website. An example of Bias which could occur in the analysis of the data, is the data may not be reflective of the entire student population. The data only shows the students who took the test, but does not show what amount that is of the total population or the grade level of the students taking the test. A confounding factor may be the classes taken in the subject area by the students; such as, being enrolled in advanced placement classes or grades in the subject area. Another factor, may be that the school has previously implemented SAT prep at certain schools or in certain subject areas, or how many students enrolled in private SAT prep classes.

**Conclusion**

In conclusion, based on the decision tree two options can be presented to the administration at Conroe Independent School District. From the data, the educational coach can advise overall students at schools in the district need to improve the writing section of the test. If the district wished to focus on schools, the two schools which would benefit from SAT prep would be Caney Creek High School and Conroe High School.

The model may encourage future research for the school district. The school may wish to look at the scores based on economic breakdown. The district may wish to research why some schools are performing at different rates in the district. The district could look at class selection, enrollment, economic breakdown and attendance to see if there were any factors which stood out as possible reasons for the differences in the scores.

**References**

College Admissions Testing (SAT and ACT).  SAT campus-level data.  Retrieved from <http://www.tea.state.tx.us/acctres/sat_act_index.html>

What are the average SAT scores? Satscores. Retrieved from <http://www.satscores.us/faq/what_is_the_average_sat_score.asp>

Paneth, Nigel. Bias and Confounding. University of Pittsburgh Power point. Retrieved from [www.pitt.edu/~super7/18011-19001/18951.ppt](http://www.pitt.edu/~super7/18011-19001/18951.ppt)