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Evaluating the Effectiveness of State's Education Policies

Data Sources:

Our project will rely on two primary sources of data. Information about each of them is provided below.

National Center for Education Statistics

The National Center for Education Statistics provides a wealth of quantitative information about the education landscape in America. This includes data on important educational outcome variables that policies are intended to improve. The first step of our project is to identify a set of variables, the data from which will be uploaded to a database we create. Our goal is to identify variables that those that interact with our program find meaningful and are likely to produce interesting results. This will include information on data related to schools' academic performance (standardized test scores, high school graduation rates, college completion rate), information on teachers (teacher retention rates, teacher pay), and other variables our team identifies as relevant. A requirement for this data is that we are only interested in tables that are disaggregated by state. Our ultimate goal is to present information about the policy outcomes within a given state, so we are constrained to data broken down by state.

National Center for Teaching Quality

The National Center for Teaching Quality provides qualitative "scores" on the quality of policies related to teaching in every state and DC. These scores encompass a wide array of policies related to how teachers are trained, how they are compensated, and how they are evaluated. These policies are meant to predict outcomes, and our tool will essentially state whether or not the NCTQ score matches up with the data. While their analysis is qualitative, the "scores" that they provide are trivial to convert to numbers which can be utilized for regression analysis.

Project Description Option 1:

Our main objective is to build a tool that evaluates educational policies by state. The program will take the name of a state as an input and return an overall score that reflects the effectiveness and successes of that state's policies. Our method to formulate these scores goes as follows:

First, we will translate the qualitative policy grades that each state receives from the National Center for Teaching Quality into a quantitative score. Then, based on these scores, we will run regressions to determine the impact of each policy on different metrics measuring educational outcomes. Based on the significance of each policy's contribution (computed by the R^2 value of each policy), we will weigh the grades that the NCTQ gives the state for each policy field and produce an overall score for that state. This score will give the policy reviews conducted by the NCTQ a quantitative basis and shed light on the empirical effects of good policy design.

Our tool will also have features that allow the user to focus on specific policies and examine their impact on a range of educational outcomes. By giving the user freedom in choosing the policies/outcomes that they want to examine up close, we will introduce an interactive element to the program.
Through this project, we hope to convey valuable information on the empirical effects of teaching policies and provide clues that might inform policy decisions in the future.

Project Description Option 2:

We are aiming to create a tool that will allow users to visualize educational outcomes on a per state basis and examine the validity of the qualitative score given by the NCTQ for that state and educational category. We want users to be able to pick 2 educational categories of data from the NCES, compare them, visualize them, and use our own method of turning quantitative results into qualitative scores for the state (how much does factor A correlate to factor B). Our own method of turning quantitative scores into qualitative grades will be based on regression and levels of correlation strength. Multiple datasets under factor A options would map to a qualitative category of which the NCTQ has analyzed and given a grade for. We then want to compare our scoring system to the grades of the NCTQ, which provides qualitative information on each state's policies and success.This will allow users to compare the results of the NCTQ scores, and see a more specific breakdown of state education data and its causes and correlations.
The application of this tool would be to allow users to see which factor Y may have contributed to a consistent/disagreeing grading between the NCTQ score and our grading system. If the correlation is weak or strong with a factor X, we can examine the policy that is associated with factor X and the implications of changing policies that are relevant to factor Y.

Tasks Timeline:

Week 4 - Week 5:

Selection and storage of educational policies and student outcomes data (by state):

- Webscraping
  - NCES databases are in excel downloadable format
  - NCTQ qualitative info crawling - get the relevant policy category and corresponding policy descriptions
- Normalizing data in tables
- Database building

Week 6- Week 7:

Regression analyses of the relationships between state policies (A) and educational outcomes (B) // or education outcome factor A and education outcome factor B

- Determination of independent (i.e. variable A) and dependent variables (i.e. variable B) for our model
- Write/utilize libraries for our regressions based on expected queries users can input

Week 8 - Week 9:

- Buildout of a function to handle user input on which variables to compare (such as A and B) and outputs visualization of the relationship between A and B
- Creation of user interface (may move beyond terminal-interactable format if time allows)

Week 10:

Final touches, prepare for presentation