How do we use data to inform future practice?  

Our primary question centers on how educational grant money is distributed to schools. We are also examining different ways success is measured and how we can use data analysis to inform future grant writing and management practices.

Our Team  
To begin to address the utility of our analysis, we convened an interdisciplinary team of data analysis and design researchers. The team includes educators and faculty members from Otterbein University and Columbus College of Art & Design through several grant programs. The team members are: Jacob Nathali, Styrian Redding, Dr. Michael Lewis, and Sarah Compton.

How Are Grants Distributed and Measured?  
Originally we were interested in how the federal education money flows distributed according to income levels. However, our analysis revealed that money categories and the number of state spending was enormous. Instead, the data demonstrated how a priority to give in research and development. While most states fund a broad variety of programs, it was clear that research and development grants were more prevalent and had a stronger emphasis in supporting a scholarly research agenda than the rest of the educational budget.

Our Methods  
We began our analysis by discussing the data set with subject experts to help frame and contextualize the research. We defined a subject matter expert as a person who possesses deep understanding and knowledge about the subject matter. A subject matter expert could provide insights into the processes and patterns of federal education spending and help us better understand the data. We also used secondary research data to inform our analysis.

Our Data  
The primary data set comes from the FFIS (Federal Financial Information System) database of the Department of Education. The data set is comprised of 10,000 entries, with each entry representing a state-by-state grant distribution. The data set contains variables for each state, including grant amount ($) and type (#) for each of the eight fiscal years. We assume that these variables represent the state of the grant distribution at the end of the fiscal year.

Data Analysis  
We then used a statistical sampling approach to analyze the data. We first analyzed the data set for outliers and then used a logistic regression model to determine the variables that are significant. The logistic regression model is used to determine the probability that an observation belongs to a given category. The model is based on a set of independent variables, and the observed outcome is a binary response variable, which is represented by 0 or 1.

Univariate Analysis of Variance  
This analysis helps us understand the impact of each variable on the outcome. We used the F-test to determine the significance of each variable. The F-test compares the variance explained by the model to the variance explained by the residual error. A p-value less than 0.05 indicates that the variable is significant.

Count of Category  
We also considered the count of each category to understand the distribution of grants. The count of each category is calculated by counting the number of times a particular category appears in the data set.

SUM of Amount of Major Program vs. R&D  
We then compared the sum of amount of major program vs. R&D to understand the distribution of funding. We calculated the sum of each category for the major program and R&D for each state and compared the total amount.

SUM of Total Federal Expenditures  
We also analyzed the total federal expenditures for each state and compared the sum of total federal expenditures.

Our Key Findings  
In our analysis, we found that there were differences in the distribution of grants and the way grants were measured. We identified several key findings that could inform future practice.

1. New categorization of grants is needed.  
2. Grants are not distributed based on income levels.
3. New insights are needed based on research.
4. Grants are not designed to measure research.
5. Grants are not designed to measure success.
6. Grants are not designed to measure return on investment.

Our Recommendations  
Based on our analysis, we recommend the following actions to improve the distribution and measurement of grants.

1. Implement a new categorization system to ensure that grants are distributed based on need and effectiveness.
2. Implement a new system to measure grants based on outcomes and impact.
3. Implement a new system to measure grants based on research and development.
4. Implement a new system to measure grants based on return on investment.
5. Implement a new system to measure grants based on collaboration and partnership.
6. Implement a new system to measure grants based on innovation and creativity.