

# Analysis of Utah's Pathways to Higher Education

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## Introduction

Demographic factors, rather than merit, often shape education pathways for students. Persistent race, class, and gender disparities in college access are well-documented threats to equitable educational pathways (Ovink et. al, 2014, Harper et. al, 2009, Goldin, et. al, 2006). This critical, quantitative project assesses college access, using Utah System of Higher Education (USHE) data, specifically examining the 2008 high school graduating cohort of Utah high school graduates. Effects of demographic factors (i.e. race, class, mobility, language, geography) and academic achievement (i.e. ACT scores, AP scores, GPA) are analyzed as predictors of an individual's success in higher education, as measured by semesters enrolled, GPA and graduation level. This project identifies college pipelines in Utah with considerable emphasis on equity-that is, documenting structures of privilege and oppression as influenced by race, class, mobility, language, and geography.

## Methods

Methods for analysis include Principal Components Analysis (PCA), Random Effects (RE) and Fixed Effects (FE) models, and Random Forest (RF) algorithms. PCA was used to choose variables of importance and model underlying factors. For large databases, PCA analysis can reduce the dimensionality, while retaining the majority of the variation within the data (Everitt & Hothorn, 2011). RE and FE models are appropriate when considering individuals nested within social structures such as high school districts (Bell & Jones, 2014). Finally, generating decision trees from random bootstrap samples, the RF model was used to describe variable importance and predictive power.

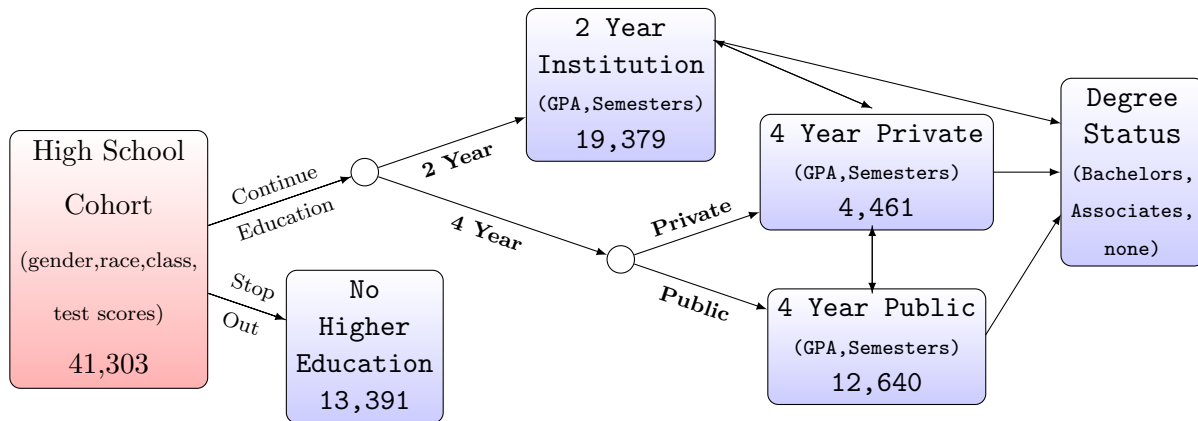


Figure 1: A summary of pathways to higher education for students in the state of Utah, the number of students enrolled in various institutions is indicated (students may transfer, and thus be counted in multiple institutions)

## Findings

Consistent with education literature, PCA models suggest that ACT Scores were the most important variable in describing college access data. ACT Composite, Math and Science scores consistently had the highest first component loadings, affirming educational findings that math and science scores are particularly important in the college-going process (Camara & Echternacht, 2000). Gender and Pell grant status appear to be important predictors in college success as well. Women were generally predicted to achieve highly in terms of GPA and graduation. However, men attain college degrees at higher rates than women in Utah (Utah Department of Workforce Services, 2014). This study is limited in that post-secondary data for the 2008 high school graduating cohort were only available through 2013. Five years of data may be inadequate to study the effect of Utah males who serve two year Latter Day Saint (LDS) missions and return to school (Jex, et. al, 1962). Low-income status was a negative predictor of college attainment and success, even after accounting for high school test scores and grades. This is an important finding, indicating inequitable college pathways for low-income students. Pell grant status was a positive, significant predictor, suggesting that Pell grant programs may compensate for some disadvantages faced by low-income students. URM students appear to have a strong negative association with bachelors attainment, indicating troublesome racial bias in college pathways throughout the state. Largely, pathways to higher education in Utah seem to be accurately predicted by students' ability to test well. It will be important to address the extent to which racial, gender, and class bias appear in standardized tests in Utah. Future research will involve examination of Pell grants as a policy tool to improve and sustain equitable access for low income groups.

## Data Sources

Unless otherwise indicated, data for this research were accessible through Utah's state longitudinal data system database administered by the Utah Data Alliance (UDA), which includes data supplied by UDA partners and the StudentTracker service from the National Student Clearinghouse. This research including the methods, results, and conclusions neither necessarily reflect the views nor are endorsed by the UDA partners. All errors are the responsibility of the author.

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