“GIS Analysis of Dropout in Louisiana Public High Schools”

GIS Day Presentation
by Michael Stein
November 17, 2021

GIS Analyst
Department of Information Services
City of Baton Rouge, Parish of East Baton Rouge
Dropout – A Local and National Problem

• High school dropout is a critical problem of national and local importance.

• High school dropouts commit about 75% of crimes!

• Louisiana consistently has very high dropout rates.

• Roughly 1 in 9 will drop out. About 6,000 each year.

• Significant obstacle to our development.
Purpose of Project

• Extensive research has been done in other fields, but no GIS analysis.

• Surprising lack of research specific to Louisiana dropout.

• I wanted my project to fill a research gap for our state.
Research Questions

• Which specific factors correlate with dropout rates in Louisiana?

• Of the tested factors, are there variables that schools can act upon to reduce dropout rates?

• What is the spatial distribution of the dropout rates in the state?

• Which schools and school systems struggle with dropout the most?
Part I - Statistical Analysis of the Dataset

• Extensive records are kept on the LA State Dept of Education website
• Dropout rates and dozens of other variables
• All “normal” public high schools in the state from the 2014-15 to 2018-19 academic years are included in this study.
• Charter schools are included, but not private schools.
• I used the Pearson’s Correlation test to analyze the individual relationships between variables.
Part II - Mapping of the Dropout Rates
Summary of Findings – Correlation Tests

• Black and Hispanic students are significantly more likely than average to drop out of school, and tend to do so in the 9th and 10th grades.

• White students who drop out of school tend to do so in the 11th and 12th grades.

• Native Americans are less likely than average to drop out of school.
Summary of Findings – Correlation Tests

- Expense per student actually has a slight positive correlation with dropout rates.

- The disparity in dropout rates between Black students and White students is not related to funding. Also true for the disparity between male and female students.

- Class sizes of 20 or less students are shown to be ideal, and classes of 27 or more students should be kept to a minimum starting in the 8th grade.

<table>
<thead>
<tr>
<th></th>
<th>DRI_7_12</th>
<th>DRI_9_12</th>
<th>DRate_7</th>
<th>DRate_8</th>
<th>DRate_T9</th>
<th>DRate_9</th>
<th>DRate_10</th>
<th>DRate_11</th>
<th>DRate_12</th>
</tr>
</thead>
<tbody>
<tr>
<td>C51_20</td>
<td>-0.2229</td>
<td>-0.1967</td>
<td>-0.049</td>
<td>-0.0982</td>
<td>-0.0847</td>
<td>-0.0985</td>
<td>-0.1795</td>
<td>-0.1179</td>
<td>-0.1123</td>
</tr>
<tr>
<td>C521_26</td>
<td>0.0299</td>
<td>0.0256</td>
<td>0.0314</td>
<td>0.0058</td>
<td>0.0563</td>
<td>-0.0103</td>
<td>0.0358</td>
<td>0.0179</td>
<td>-0.0241</td>
</tr>
<tr>
<td>C527_33</td>
<td>0.2202</td>
<td>0.1889</td>
<td>0.0375</td>
<td>0.1596</td>
<td>0.0502</td>
<td>0.1115</td>
<td>0.1662</td>
<td>0.1053</td>
<td>0.1234</td>
</tr>
<tr>
<td>C534</td>
<td>0.2635</td>
<td>0.2456</td>
<td>0.0548</td>
<td>0.0656</td>
<td>0.0724</td>
<td>0.1327</td>
<td>0.2105</td>
<td>0.157</td>
<td>0.1803</td>
</tr>
</tbody>
</table>
Summary of Findings – Correlation Tests

- Starting grade has a significant positive correlation with high school dropout rate.
- Better to begin high school in the 7th grade, instead of the 8th or 9th grade.
- Some 9-12 high schools can become 7-12 high schools without much issue.

<table>
<thead>
<tr>
<th>St_Grade</th>
<th>DRT_7</th>
<th>DRT_9</th>
<th>DRate_7</th>
<th>DRate_8</th>
<th>DRate_T9</th>
<th>DRate_9</th>
<th>DRate_10</th>
<th>DRate_11</th>
<th>DRate_12</th>
</tr>
</thead>
<tbody>
<tr>
<td>St_Grade</td>
<td>0.2974</td>
<td>0.2316</td>
<td>0.0685</td>
<td>0.15</td>
<td>0.0857</td>
<td>0.1826</td>
<td>0.1822</td>
<td>0.1442</td>
<td>0.1496</td>
</tr>
<tr>
<td>Elmnt_Mid</td>
<td>0.1668</td>
<td>0.1439</td>
<td>0.0337</td>
<td>0.1122</td>
<td>0.0441</td>
<td>0.1216</td>
<td>0.0867</td>
<td>0.095</td>
<td>0.0736</td>
</tr>
<tr>
<td>St_6th</td>
<td>0.139</td>
<td>0.0997</td>
<td>0.0548</td>
<td>0.0988</td>
<td>0.0105</td>
<td>0.0724</td>
<td>0.0809</td>
<td>0.0568</td>
<td>0.1259</td>
</tr>
<tr>
<td>St_7th</td>
<td>0.1729</td>
<td>0.1102</td>
<td>N/A</td>
<td>0.2675</td>
<td>0.0578</td>
<td>0.1044</td>
<td>0.1076</td>
<td>0.0679</td>
<td>0.0461</td>
</tr>
<tr>
<td>St_8th</td>
<td>0.019</td>
<td>0.0151</td>
<td>N/A</td>
<td>N/A</td>
<td>0.066</td>
<td>0.0121</td>
<td>0.0288</td>
<td>0.0007</td>
<td>0.0302</td>
</tr>
</tbody>
</table>
Summary of Findings – Choropleth Maps

- Dropout is a problem overwhelmingly prevalent in the more populated, urban parts of the state.

- Rural schools tend to have below average dropout rates.

- Northeast Delta vs Northshore is great example.
Summary of Findings – Choropleth Maps

• East Baton Rouge Parish, Rapides Parish, Tangipahoa Parish, and Jefferson Parish struggle the most with dropout.

• Charter schools in New Orleans can be considered a remarkable success.
Conclusion

• Ultimately, I come away with a more optimistic view of the problem than when I started this project.

• There are some factors the schools can actually manage, such as class sizes, that could help in lowering their dropout rates.

• Funding and implementing such changes is another hurdle, but at least it is possible.
Conclusion

• Link to full report in the LSU Digital Commons: https://digitalcommons.lsu.edu/gradschool_theses/5387/

• Includes maps and link to master dataset

• Any questions?