



## **Seattle kids: changing demographics and the implications for public schools**

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## **Background**

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Explosive population growth  
and expensive real estate

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Urban Centers and Villages  
development plan

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Debates over children and  
families in urban environments

# Problem statement

What role does density  
play in the distribution  
of children in Seattle's  
Urban Centers and  
Villages?

What role do Urban  
Centers and Villages  
play in changing  
enrollments in Seattle  
Public Schools?

Can we model  
enrollment using  
current population data  
alone?

# Data Collection



Census data  
aggregated by UCV  
and by region

Source: City of  
Seattle  
Format: CSV files



Enrollment data by  
individual school

Source: Seattle  
Public Schools  
Format: pdf reports



Geographical  
correspondence

Source: Created by  
comparing maps  
from city and  
schools  
Format : Excel file

# Data Dashboards

- [Click me \(I'm not sketchy at all!\)](#)

# Exploratory Data Analysis: Key Findings



Centrally located UCVs  
are experiencing the  
steepest rise in child  
population

Very urban, essentially  
no single-family  
housing



Inconsistencies in UCV  
boundaries leads to  
interesting density trends

Downtown, SLU, Cap  
Hill, Uptown have low  
density  
Highest density: Othello



UCVs split to balance  
school enrollments

Othello split between 6  
elementary schools  
Schools do not serve  
them as a whole

# Modeling: predicting enrollment



Enrollment Data

By school, grade



Population Data

Local (UCV) and  
citywide  
Time lags



Annual Timescale

Forecasting?  
Standard  
modeling?

# Challenges

01

Reworked school boundaries with UCVs split across schools

02

Different reporting frequencies

03

Aggregated by age:  
Over/Under 18 only



# Challenges

Feasible approach:  
Model total enrollment using  
interpolated population data

01

Reworked school  
boundaries with  
UCVs split across  
schools

02

Different reporting  
frequencies

03

Aggregated by age:  
Over/Under 18 only

# Forecast: can the population data help?

## Simple Linear Regression

- Total and grade level enrollment
- Population data

## Multiple Linear Regression

- Total and grade level enrollment
- Population data
- Time lagged population data

## Null Model

- Enrollment average

# Results: how much variation can our model(s) explain?



Metric: R2 score



Best total enrollment model:  
total enrollment  
population and 5-year lag

Training: 99%  
Testing: 91.3%



Best grade level model:  
middle school enrollment  
population and 10-year lag

Training: 99%  
Testing: 98.5%

# Recommendations

- Re-examine how we define school districts in relation to urban centers and villages, particularly Othello and Lake City
- Consider the rising population of children in urban centers and villages when determining how to manage facilities

# Next steps

## Housing and \$

### Housing and economic indicators

- ACS data, needs to be aggregated by UCV

## Age breakdown

### More detailed information on age distribution

- Get data on ages not just aggregated as child/adult
- By census tract, then aggregate to get UCV data
- Grade-level analysis

## Distance

### Distance data

- How long do students commute?
- What does the commute look like based on neighborhood?

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