A. Delaware Educator Diagnostic: Analysis of the First State’s Workforce
Delaware Educator Diagnostic: An Analysis of The First State’s Workforce

www.gse.harvard.edu/sdp
MISSION

Transform the use of data in education to improve student achievement.
Core Strategies

1. Fellows
Place and support **data strategists** in agencies

who will influence policy at
the local, state, and
national levels.

2. Diagnostic Analyses
Create **policy- and management-relevant standardized analyses**
for districts and states.

3. Scale
Improve the way data is used in the education sector.

Achieve broad impact through wide dissemination of analytic tools, methods, and best practices.
The SDP Family
## Educator Diagnostic Pathway

<table>
<thead>
<tr>
<th>HUMAN CAPITAL DIAGNOSTIC PATHWAY</th>
<th>RECRUITMENT</th>
<th>PLACEMENT</th>
<th>DEVELOPMENT</th>
<th>EVALUATION</th>
<th>RETENTION/TURNOVER</th>
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[Diagram of the Educator Diagnostic Pathway with icons for each stage.]
**HUMAN CAPITAL DIAGNOSTIC PATHWAY**

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**RECRUITMENT**
More than a quarter of teachers have five or fewer years of teaching experience.

Notes: Sample includes teachers with teacher job codes in comprehensive, vocational, and magnet schools in the 2007-08 through 2011-12 school years, with 37,609 teacher years and 9,836 unique teachers. All data are from Delaware Department of Education records.
Fewer than one in twelve teachers are new hires each year.

Share of Teachers Who Are New Hires

- Experienced Teachers: 92.1%
- New Hires: 7.9%

Notes: Sample includes teachers with teacher job codes in comprehensive, vocational, and magnet schools in the 2007-08 through 2011-12 school years, with 38,487 teacher years and 10,140 unique teachers. All data are from Delaware Department of Education records.
High-poverty schools have larger shares of new hires than low-poverty schools
Teacher characteristics differ markedly between high- and low-poverty schools

### Teacher Characteristics by School Poverty Level

<table>
<thead>
<tr>
<th></th>
<th>State Average</th>
<th>Average for High-Poverty Schools (≥60% FRPL)</th>
<th>Average for Middle-Poverty Schools (30-59% FRPL)</th>
<th>Average for Low-Poverty Schools (&lt;30% FRPL)</th>
<th>Difference between High- and Low-Poverty Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Male</td>
<td>23.9</td>
<td>13.8</td>
<td>26.8</td>
<td>24.7</td>
<td>-11.0*</td>
</tr>
<tr>
<td>Percent African American</td>
<td>10.4</td>
<td>13.1</td>
<td>10.4</td>
<td>7.9</td>
<td>5.2*</td>
</tr>
<tr>
<td>Percent Hispanic</td>
<td>1.6</td>
<td>2.4</td>
<td>1.4</td>
<td>1.3</td>
<td>1.1*</td>
</tr>
<tr>
<td>Percent White</td>
<td>87.0</td>
<td>83.9</td>
<td>87.1</td>
<td>89.9</td>
<td>-6.0*</td>
</tr>
<tr>
<td>Percent Novice</td>
<td>3.9</td>
<td>4.9</td>
<td>3.8</td>
<td>3.3</td>
<td>1.6*</td>
</tr>
<tr>
<td>Average Years Experience</td>
<td>12.4</td>
<td>11.2</td>
<td>12.7</td>
<td>12.9</td>
<td>-1.7*</td>
</tr>
</tbody>
</table>

*Difference is statistically significant at the 95 percent confidence level.

Notes: Sample includes teachers with teacher job codes in comprehensive, vocational, and magnet schools in the 2007-08 through 2011-12 school years, with 38,280 teacher years and 10,088 unique teachers. High-/middle-/low-poverty schools category includes 44/104/33 unique schools. School free and reduced price lunch (FRPL) shares are calculated using pooled student data from the 2006-07 through 2011-12 school years. All data are from Delaware Department of Education records.
Teachers are less likely to be minority than students

Share of Teachers and Students by Race

- All Teachers
- Newly Hired Teachers
- Students

Notes: Sample includes teachers with teacher job codes and students at comprehensive, vocational, and magnet schools in the 2007-08 through 2011-12 school years, with 37,483 teacher years and 9,740 unique teachers, 580,147 student years and 180,418 unique students. All data are from Delaware Department of Education records.
PLACEMENT
The least academically prepared elementary students are more likely to be placed with the most inexperienced teachers.
This is also true when we look at student placement within elementary schools.

**Difference in Average Prior Math Performance**

of Students Assigned to Early-Career Teachers

Compared to Teachers with 11 or More Years of Teaching

Within Elementary Schools

<table>
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<tr>
<th>Year(s) of Teaching</th>
<th>Difference in Prior Year Test Scores</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>-0.16*</td>
</tr>
<tr>
<td>2-3</td>
<td>-0.07*</td>
</tr>
<tr>
<td>4-5</td>
<td>-0.06*</td>
</tr>
<tr>
<td>6-10</td>
<td>-0.02</td>
</tr>
</tbody>
</table>

*Significantly different from zero, at the 95 percent confidence level.

Notes: Sample includes comprehensive and magnet school teachers with teacher job codes and their students in grades 4 and 5 with prior year test scores in the 2006-07 through 2011-12 school years, with 3,576 teacher years, 76,169 student years, 1,162 unique teachers, and 50,712 unique students. Test scores are normalized to have an average of zero and a standard deviation of one, and are shown in standard deviation units. All data are from Delaware Department of Education records.
In middle schools, inexperienced teachers also have students with lower average prior test scores

*Significantly different from zero, at the 95 percent confidence level.
Notes: Sample includes comprehensive and magnet school teachers with teacher job codes and their students in grades 6 through 8 with prior year test scores in the 2006-07 through 2011-12 school years, with 1,824 teacher years, 108,302 student years, 980 unique teachers, and 58,974 unique students. Test scores are normalized to have an average of zero and a standard deviation of one, and are shown in standard deviation units. All data are from Delaware Department of Education records.
These differences also exist within middle schools

Difference in Average Prior Math Performance of Students Assigned to Early-Career Teachers Compared to Teachers with 11 or More Years of Teaching

Within Middle Schools

*Significantly different from zero, at the 95 percent confidence level.
Notes: Sample includes comprehensive and magnet school teachers with teacher job codes and their students in grades 6 through 8 with prior year test scores in the 2006-07 through 2011-12 school years, with 1,824 teacher years, 108,302 student years, 580 unique teachers, and 56,974 unique students. Test scores are normalized to have an average of zero and a standard deviation of one, and are shown in standard deviation units. All data are from Delaware Department of Education records.
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**DEVELOPMENT**
Teacher impact on student math achievement increases the most in the first few years of teaching.
There is little difference in impact on student achievement between teachers with and without masters degrees.

Math Teacher Impact of Teachers with an Advanced Degree Relative to Teachers with a Bachelor Degree Only

Notes: Sample includes teachers with teacher job codes and teacher impact estimates who are linked to students in schools in the 2006-07 to 2011-12 school years, with 5,346 teacher years and 1,655 unique teachers. Teachers with advanced degrees have masters degrees or higher. All data are from Delaware Department of Education records.
### Human Capital Diagnostic Pathway

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**EVALUATION**
Teacher impact on student achievement varies widely across the state

Note: Sample includes 1,759 comprehensive and magnet school teachers with teacher job codes and math students in grades 4 through 8 in school years 2006-07 to 2011-12. All data are from Delaware Department of Education records.

Putting standard deviations in context: The 2012 Delaware black-white test score gap was 0.6 standard deviations.
On average, a math teacher’s impact on student achievement is predictive of future impact.

Math Teacher Impact in Third Year
by Quartile Rank During Prior Two Years
Middle Schools

Prior Teacher Impact Quartile
Highest Impact

Current Average Teacher Impact (Standard deviations)

-0.15  -0.10  -0.05  0.00  0.05  0.10  0.15  0.20

*Significantly different from zero at the 95 percent confidence level.
Notes: Sample includes comprehensive and magnet school math teachers with teacher job codes and students in grades 6 through 8 with prior year test scores in the 2006-07 through 2011-12 school years, with 296 teachers. All data are from Delaware Department of Education records.
Nonetheless, there is movement between impact groups
In 2011-12, among teachers of tested subjects participating in Delaware’s new teacher evaluation system, more than two in five were rated “Exceeds Expectations”
### Human Capital Diagnostic Pathway

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**Retention/Turnover**
More than 15 percent of teachers do not continue teaching in the same school in the following year.

Notes: Sample includes teachers with teacher job codes in comprehensive, vocational, and magnet schools, with 38,159 teacher years and 10,045 unique teachers in the 2008-07 to 2010-11 school years. Retention analyses are based on one-year retention rates. All data are from Delaware Department of Education records.
A large share of newly hired teachers leave teaching in Delaware within four years.

Newly Hired Teacher Trajectory

- Still Teaching in Delaware
- Still Teaching at Same District
- Still Teaching at Same School

Notes: Sample includes 821 comprehensive, vocational, charter, and magnet school teachers with teacher job codes in the 2007-08 school year. All data are from Delaware Department of Education records.
Charter schools tend to have higher turnover than traditional schools

Average Teacher Turnover by County

- New Castle: 9.0% (8.4%, 7.8%) for Comprehensive, Vocational, and Magnet Schools, 5.8% (5.6%, 5.6%, 4.9%, 4.9%) for Charter Schools
- Kent: 4.9% (4.9%, 4.9%) for Comprehensive, Vocational, and Magnet Schools, 2.2% (2.2%, 2.2%, 2.2%) for Charter Schools
- Sussex: 5.6% (5.6%, 5.6%) for Comprehensive, Vocational, and Magnet Schools, 17.4% (17.4%, 17.4%) for Charter Schools

Transfer to a Regular School
Transfer to a Charter School
Leave Teaching in Delaware Schools

*Significantly different from traditional schools in same county value, at the 95 percent confidence level.

Notes: Sample includes teachers with teacher job codes in comprehensive, vocational, magnet, and charter schools, with 40,885 teacher years and 10,861 unique teachers in the 2006-07 to 2010-11 school years. Retention analysis is based on one-year retention rates. All data are from Delaware Department of Education records.
High-poverty schools have higher rates of teacher turnover

Average Teacher Turnover by School Poverty

- Transfer Within Districts
- Transfer Between Districts
- Leave Teaching in Delaware Schools

Percent of Teachers

Less Than 30% FRPL: 3.5%
    - Transfer Within Districts: 1.4%
    - Transfer Between Districts: 7.1%
    - Leave Teaching in Delaware Schools: 8.5%

At Least 60% FRPL: 8.3%
    - Transfer Within Districts: 2.1%
    - Transfer Between Districts: 8.5%

School Free and Reduced Price Lunch Category

Notes: Sample includes teachers with teacher job codes in comprehensive, vocational, and magnet schools, with 37,955 teacher years and 9,993 unique teachers in the 2008-07 to 2010-11 school years. Retention analysis is based on one-year retention rates. School free and reduced price lunch (FRPL) categories are calculated using pooled student data from the 2006-07 through 2011-12 school years. All data are from Delaware Department of Education records.
Retention trajectories are similar for newly hired teachers graduating from different programs