

**Beating the Odds:
A Study of Delaware Schools**

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Executive Summary

This study was designed to identify K-12 schools in Delaware that are beating the odds, that is, outperforming expectations given the composition of their student body, and to learn what actions they are taking to achieve their success. This first stage documents the identification process and the schools that were identified. It relied on cluster analyses of Delaware public and charter schools' percentages of white students and students from low-income families.

- Three clusters were identified at the elementary, middle, and high school levels:
 - a high cluster that includes high percentages of white students and low percentages of students from low-income families,
 - a middle cluster that includes moderate percentages of both, and,
 - a low cluster that includes low percentages of white students and high percentages of students from low-income families.

- DSTP reading and mathematics NCE (normal curve equivalent) scores were used to calculate means for each cluster of schools at each level; schools that scored 3 or 4 NCEs higher than their respective means were identified as *exceeding expectations*.

- Twenty-nine (29) schools were identified as a result of this process
 - Sixteen (16) elementary schools,
 - Six middle schools, and,
 - Seven high schools.

Only the Indian River School District had schools in all three elementary clusters as well as schools at the middle and high school levels. The next stage of the study will focus on what actions elementary schools in Indian River are taking to contribute to their higher than expected level of student performance.

Introduction

This report documents the first stage of *Beating the Odds: A Study of Delaware Schools*. It was designed to identify public and charter K-12 schools in Delaware that are beating the odds, that is, outperforming expectations given the composition of their student bodies, and to learn what actions they are taking to achieve their success. Two research questions were identified to guide the study:

1. What Delaware schools are performing at a higher level on the Delaware State Testing Program (DSTP) than would be expected given their student demographic characteristics?
2. What actions are these schools taking that contribute to their higher level of student performance?

Answering the first research question will identify which schools are doing better than expected; some of these schools will make up the sample of schools to be studied to address research question two. Answering the second question will help us learn what actions these schools have taken that contributed to their success. Taken together, these answers will help Delaware schools focus and strengthen their improvement efforts. This report answers the first research question.

Methodology and Findings

This stage of the study relied on data available from the Delaware Department of Education public web site (<http://www.doe.K12.de.us>). The following information was downloaded: race/ethnicity and low income percentages for each of the 192 schools in the state as well as their 2006 Delaware Student Testing Program grade-level normal curve equivalents in English/language arts and mathematics for grades 3-5 in elementary schools, grades 6-8 in middle schools, and grades 9-10 in high schools.

The first task was to identify demographic variables on which to group schools. Other states (e.g., Georgia, New Jersey, and Texas) cluster schools by student or family demographic characteristics in order to provide more equitable comparisons of test scores among schools. By clustering, a school with students from less privileged backgrounds is compared with other schools with students from similar backgrounds and not with schools with students from more privileged backgrounds. Attempts to create clusters of schools by percentages of minority populations (i.e., African American and Hispanic) proved futile because of the small number of Hispanics enrolled in schools and the marked variability of their enrollment across schools. A second strategy proved more successful, creating clusters by the percentages of white students versus students from low-income families. Using statistical software for cluster analysis (SPSS, 2003, V.11.0), the two percentages (i.e., the percentage of white students versus the percentage of students from low-income families) were analyzed to sort schools into multiple clusters at each school level (i.e., elementary, middle, and high).

Three clusters were identified at each school level (see Appendix A). As might be expected, the three resulting clusters loosely reflected traditional SES pairings. That is, one cluster was comprised of high percentages of white students and modest percentages of low-income students (labeled high); a second cluster was made up of moderate percentages of white students and low-income students (labeled middle); and a third cluster include low percentages of white students and high percentages of students from low-income families (labeled low). Table 1 presents the number of schools in each school level cluster as well as the range and mean of white and low-income percentages for each.

Table 1. Percentage of White and Minority Students at Each Grade Level

School Level/ Cluster	Number of Schools	White Percentage		Low-Income Percentage	
		Range	Mean	Range	Mean
Elementary					
High	31	61.4-90.4	74.8	2.9-39.4	22.8
Middle	41	31.8-75.7	52.8	25.3-66.3	48.2
Low	25	0-35.5	19.4	51.5-84.0	65.1
Middle					
High	13	63.6-88.5	73.3	5.7-29.8	19.6
Middle	23	31.9-78.5	53.6	33.3-59.0	46.2
Low	5	0.4-29.4	9.7	69.6-84.0	75.9
Secondary					
High	9	64.8-81.5	74.3	0-26.8	14.8
Middle	16	56.2-80	66.3	22.9-47.3	33.4
Low	8	35.2-50.1	41.9	36.2-41.0	39.1

For example, the high elementary cluster contains 31 schools. These schools have a high percentage of white students (ranging from a low of 61.4 percent to a high of 90.4 percent) with a mean of 74.8 percent. Similarly, the high cluster schools have a low percentage of students from low-income families (ranging from a low of 2.9 percent to a high of 39.4 percent) with a mean of 22.8 percent.

As the table illustrates, the size (i.e., number of schools) and range of the three clusters varied from one school level to the next. The middle cluster was always the largest in size and almost always the largest in range. The three high clusters were greater in number than the three low clusters for all school levels. The three middle school clusters were more skewed to the higher end than either the elementary or secondary school clusters. The range of scores was most restricted for the secondary school cluster; this may be attributed to the reluctance of high school students to report eligibility for free lunch as well as the dropout rate for low-income students in high school.

Once the above clusters (or comparison bands) were established, each cluster's performance on the DSTP in English/language arts and mathematics was established for

each school level. Rather than determine the percentage that reached proficiency or percentiles, these analyses calculated the mean normal curve equivalents (NCEs). Mean NCEs were selected because they provide a more complete measure of the entire grade's performance than the percentage (that reached proficiency that does not reveal anything about those students that did not reach proficiency). NCEs, unlike percentiles, are an equal-interval scale and so can be directly compared. In Title I evaluations (which rely heavily on analyses of NCEs), differences of 3 to 4 NCEs were commonly accepted as significant. Table 2 reports the mean NCEs for reading and mathematics for each cluster by school level.

Table 2. Mean DSTP Reading and Mathematics NCEs by Cluster and School Level

School Level/ Cluster	Mean Reading NCE			Mean Math NCE		
	High	Middle	Low	High	Middle	Low
Elementary						
2nd	55.93	56.89	49.89	54.23	52.22	45.48
3rd	59.01	59.51	54.36	58.96	58.27	52.32
4th	n/a ^a	n/a ^a	n/a ^a	63.01	59.47	56.43
5th	61.27	61.64	56.67	57.39	58.73	54.33
Middle						
6th	57.09	53.24	51.92	53.99	51.65	48.99
7th	60.33	57.59	56.30	55.30	50.38	49.56
8th	58.39	55.97	55.32	53.78	52.60	52.08
Secondary						
9th	62.60	56.22	53.84	65.05	58.83	57.08
10th	57.76	56.00	53.37	60.85	55.89	52.42

^a The DOE web site did not report reading scores for this school year.

Each row of the table represents a different grade level. To illustrate, the mean reading NCEs for the sixth grade decreased from the high cluster (57.09) to the middle cluster (53.24) to the low cluster (51.92). The sixth grade mean math NCEs showed a similar pattern decreasing from the high cluster (53.99) to the middle cluster (51.65) to the low cluster (48.99). Similar to the sixth grade reading and math NCE averages, the mean DSTP NCE scores decreased from the high cluster to the middle cluster to the low cluster for all of the grades tested with three exceptions. Elementary reading scores at the second, third, and fifth grades were consistently close between the high and middle clusters.

The next step was to identify schools that scored 3 or 4 NCEs higher than the mean NCE for their particular cluster in a majority of the grades tested at that particular school. Gains of this magnitude are generally considered significant and noteworthy. The number of schools varied by school level (see Table 3 below).

Table 3. Number of Schools That Outperformed Expectations

School Level	Scored 3 or 4 NCEs Above Mean	
	Number ^a	Percent
Elementary	16	16.5
Middle	6	14.6
Secondary	7	21.2
Total	29	171

^aThe number of schools is based on the number with K-5 enrollments, 6-8 enrollments, and 9-12 enrollments. Schools were counted more than once if they had enrollments across these grade ranges.

There were 16 schools at the elementary level that outperformed expectations, six at the middle school level, and seven at the secondary level. There were more than twice as many elementary schools that scored 3 or 4 NCEs above the mean than middle or high schools. As students grow older, the number of outliers decreased.

Tables 4, 5, and 6 present the scores of Delaware elementary, middle, and senior high schools that outscored the mean NCEs of their particular cluster. Each table is organized by cluster. The first row for each cluster lists the mean reading (R) and mathematics (M) NCE scores at each grade level; these numbers are shaded green. Individual school data for each cluster are summarized in subsequent rows. The table also indicates the percentages of white students (W) and the percentages of students from low-income families (L) for each school; these percentages are shaded yellow. For example, for the high elementary cluster for second grade, the mean NCE for reading is 55.93 and 54.23 for math. Lord Baltimore Elementary in Indian River School District, a school in the high cluster, has 90 percent white students and 21.9 percent students from low-income families. Second grade students at this school scored 61.01 in reading and 65.00 in math, both much higher than the mean for their cluster. Appendix B lists all of the schools by school level and cluster.

Table 4. Elementary NCE Comparison

School	District	W/L	2R	3R	5R	2M	3M	4M	5M
Mean-High			55.93	59.01	61.27	54.23	58.96	63.01	57.39
Lord Baltimore	Indian River	90/21.9	61.01	64.89	61.21	65.00	66.37	76.36	62.49
Forest Oak	Red Clay	70.6/35.3	59.89	65.19	67.39	61.96	67.90	65.16	63.05
Simpson	Caesar Rodney	70.1/31.5	55.19	61.75	64.68	49.7	64.95	66.88	61.19
Mean - Mid			56.89	59.51	61.64	52.22	58.27	59.47	58.73
Gallaher	Christina	50.1/41.3	57.76	63.93		56.41	64.86	67.69	
Marshall	Christina	48.9/25.3	59.33	67.28		57.03	64.44		
McVey	Christina	61.3/47.3	59.51	68.58		59.09	61.46	66.77	
East Millsboro	Indian River	60.1/51.4	62.52	67.27	68.60	58.79	70.90	67.96	69.26
Long Neck	Indian River	71.7/48.6	62.56	64.35	67.46	63.98	64.94	67.80	66.57
Blades	Seaford	55.1/59.8	60.92	65.42	62.77	56.86	63.33	54.55	56.90
Seaford Central	Seaford	50.6/55.9	61.19	61.56	64.34	57.74	61.47	57.48	58.68
Mean-Low			49.89	54.36	56.67	45.48	52.32	56.43	54.33
Towne Point	Capital	33.8/55.4	56.86	58.96		49.95	55.43	58.18	
Booker T. Washington	Capital	30.9/57.3	56.14	60.97		52.20	57.71	64.10	
East Dover	Capital	33.1/59.2	54.09	60.96		42.32	62.60	55.65	
South Dover	Capital	26.2/67.5	58.80	58.76		50.53	54.78	60.41	
Frankford	Indian River	33.6/75.8	61.30	66.99	62.87	59.2	68.54	74.79	68.74
Lewis Dual Language	Red Clay	0.6/82.5	53.86	53.64	61.14	50.37	58.82	59.22	57.79

As noted in Table 3, 16 elementary schools across the state outperformed their cluster means in the majority of grades tested in the school. At the elementary school level, three schools were “beating the odds” in the high cluster, seven in the middle cluster, and six in the low cluster. The Capital School District and Indian River School District tied both had four schools which could be described as “beating the odds.” The Christina School District had three, and Red Clay School District and Seaford School District each had two. The Indian River School District was the only district to have schools in all three clusters to outscore expectations.

Table 5. Middle School NCE Comparisons

School ^a	District	W/L	6R	7R	8R	6M	7M	8M
Mean-High			57.09	60.33	58.39	53.99	55.30	53.78
Dover AFB	Caesar Rodney	67.8/ 17.2		65.47			57.47	
Sussex Academy	Charter	88.5/ 14.0	67.23			66.88		
Mean-Mid			53.24	57.59	55.97	51.65	50.38	52.60
Fifer	Caesar Rodney	61.8/ 36.0	51.29	64.14	60.47	48.81	55.14	57.34
Delmar Middle	Delmar	78.5/ 38.1	53.43	61.44	60.21	55.02	57.45	54.37
Selbyville Middle	Indian River	70.0/ 40.7	56.72	62.37	59.24	56.04	58.09	57.21
Sussex Central	Indian River	62.3/ 46.2	56.30	63.95	56.51	57.18	57.49	56.30

^aNo middle schools scored 3 or 4 NCEs above the mean.

Table 5 above indicates that only six middle schools scored 3 or 4 NCEs above their respective cluster means. Dover AFB and Sussex Academy outscored the mean in the high cluster and Fifer, Delmar Middle, Selbyville Middle, and Sussex Central in the middle cluster. No schools met the criteria in the low cluster. Two of the schools are in the Indian River School District. Sussex Academy, the only charter to outperform expectations, also draws students from the Indian River School District. Caesar Rodney also had two schools in the middle school cluster.

Table 6. High School NCE Comparisons

School	District	W/L	9R	10R	9R	9M
Mean - High			62.60	57.76	65.05	60.85
Cab Calloway	Red Clay	76.2/ 14.8	70.06		70.43	
Sussex Technical	Sussex Tech	71.4/ 22.8	64.77	62.65	66.86	67.96
Mean-Mid			56.22	56.00	58.83	55.89
Caesar Rodney	Caesar Rodney	65.2/ 25.5	57.94	60.71	58.71	60.33
Cape Henlopen	Cape Henlopen	74.8/ 29.5	59.99		63.40	60.19
Delmar	Delmar	80.2/ 32.4	62.93	57.70	62.83	58.32
Indian River	Indian River	74.8/ 29.6	62.21	56.72	64.35	61.62
Mean - Low			53.84	53.37	57.08	52.42
Howard High School of Technology	NCCVT	35.2/39.9	61.77	53.98	62.56	52.30

Seven high schools exceeded expectations. Two schools outperformed in the high cluster, four in the middle cluster, and one in the low cluster. The seven high schools represent different districts, though Sussex Technical and Indian River High School both draw from the same area in the state. Two of the schools were from vocational- technical school districts. No charter schools were identified as outperforming expectations.

As noted above, only one district had schools at all three school levels as well as all three demographic clusters, Indian River. This rural district in southern Delaware had four elementary schools that outperformed their respective averages across the three elementary clusters, two middle schools in one cluster, and one senior high in its cluster. Other districts had schools that scored higher than the cluster average in multiple levels (e.g., Caesar Rodney, Capital, and Red Clay) or in multiple clusters at the same school level (e.g., Red Clay); none performed well across school levels and clusters.

Next Steps

The second stage of this study will examine more closely the educational programs in Indian River School District. We will survey the administrators and faculty assigned to the four elementary schools and conduct in-depth interviews within several of the elementary schools. We also will examine information collected by the Strategic Support Team as part of the district’s participation in the University of Virginia Balanced Scorecard program. All of these data will help us answer the second question, “What

actions are these schools taking that contribute to their higher level of student performance?” In particular, how does the district systematically modify its educational program to meet the needs of different student demographic groups? The answers to this question will help us guide other districts interested in learning from Indian River’s success. We expect to focus on the three middle and high schools during the coming academic year.

References

George, D. & Mallery, P. (2003). *SPSS for Windows Step By Step, 11.0 Update*. Boston, MA: Pearson Education.

Appendix A
Cluster Analyses

Figure 1
Elementary School Cluster

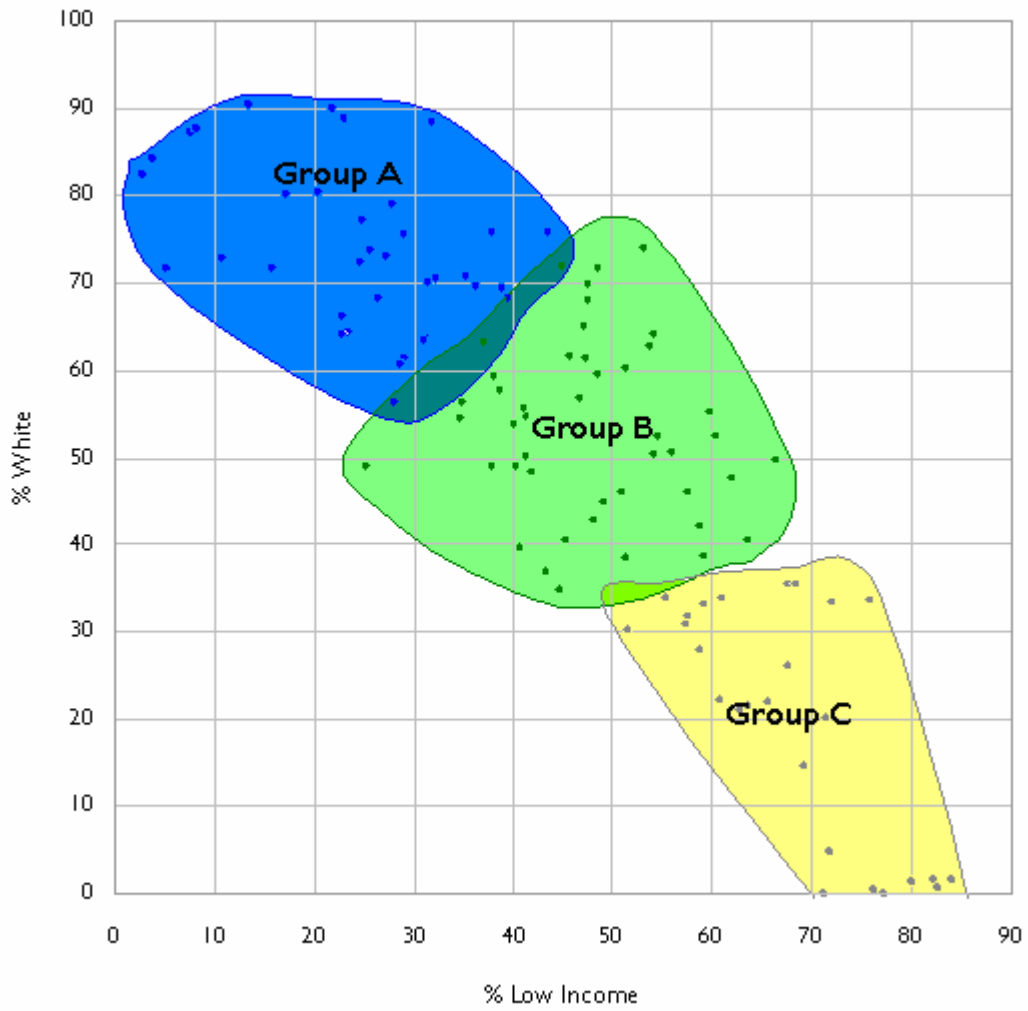


Figure 2
Middle School Cluster

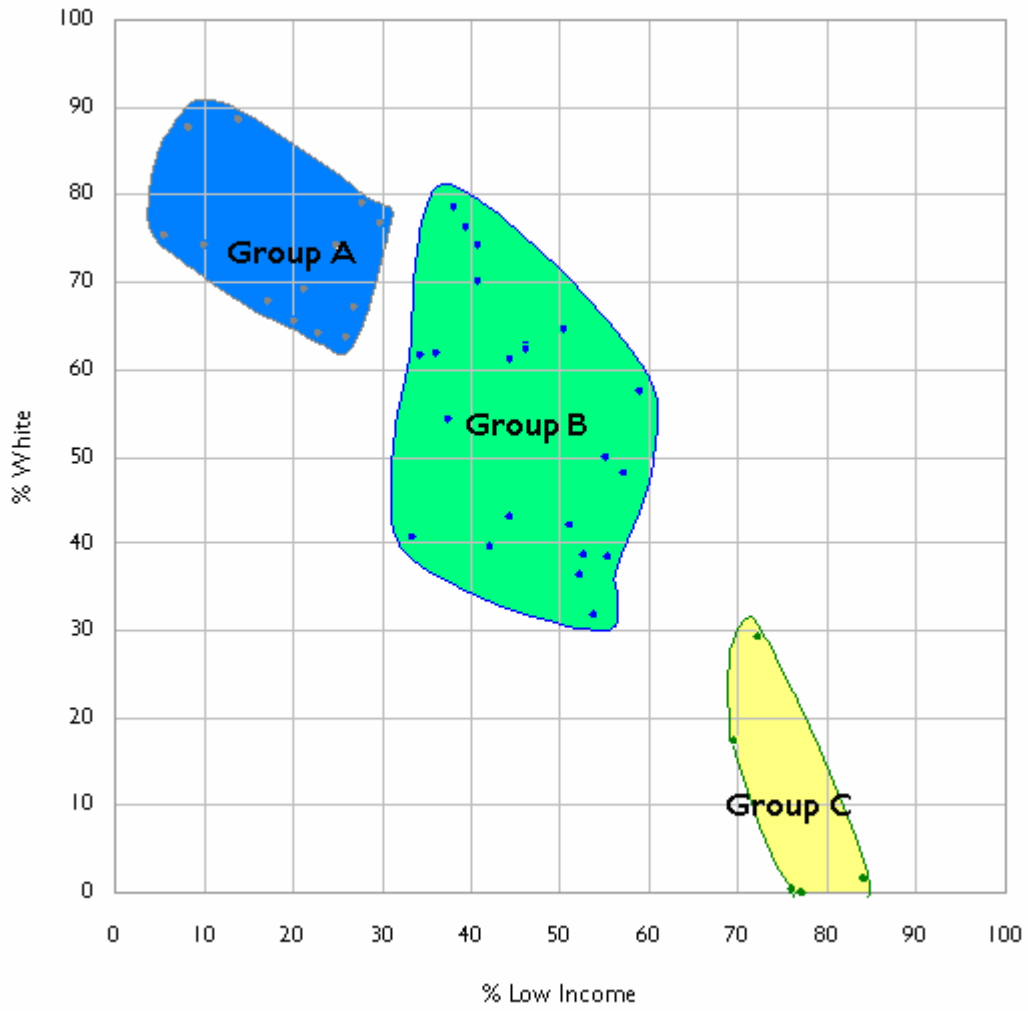
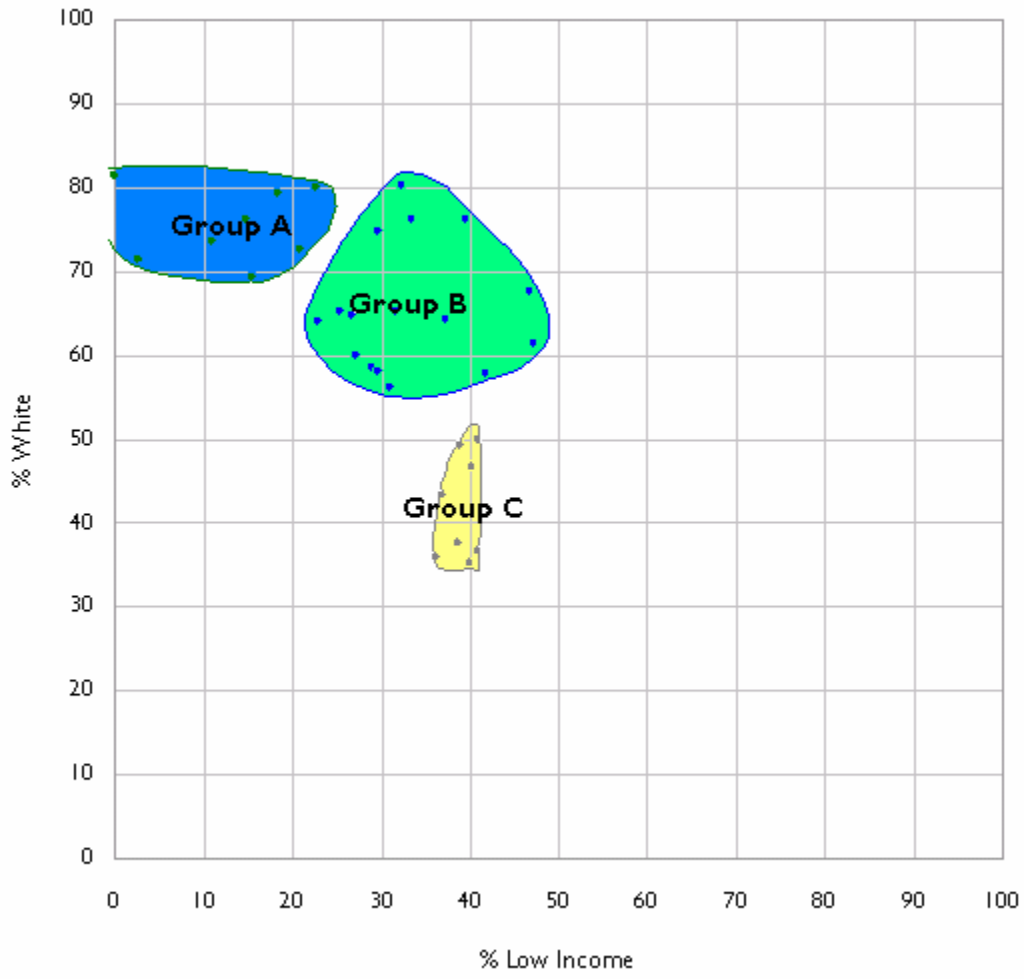


Figure 3
High School Cluster



Appendix B
School Levels and Clusters

Elementary Schools

District	High	Middle	Low
Appoquinimink	Brick Mill	Silver Lake	
	Cedar Lane		
	Loss		
	Townsend		
Brandywine		Claymont	
		duPont	
		Harlan	
Caesar Rodney	Simpson	Brown	
	Star Hill	Frear	
	Stokes		
	Welch		
Cape Henlopen	Milton	Brittingham	
	Rehoboth		
	Shields		
Capital	Hartley	Fairview	East Dover
		North Dover	South Dover
			Towne Point
			Washington
Christina	Downes	Brader	Bancroft
	Maclary	Brookside	Bayard
	Smith	Gallaher	Elbert-Palmer
	West Park Place	Keene	Jones
		Leasure	Stubbs
		Marshall	
		McVey	
		Pulaski	
Colonial	Southern	Castle Hills	Colwyck
		Downie	Eisenberg
		Pleasantville	McCullough
		Wilmington Manor	
Delmar			
Indian River	Lord Baltimore	East Millsboro	Frankford
	Southern Delaware School of the Arts	Georgetown	
		Long Neck	
		N. Georgetown	
		Showell	
Lake Forest		Lake Forest Central	
		Lake Forest East	
		Lake Forest North	

		Lake Forest South	
Laurel		Laurel Intermediate	
		North Laurel	
Milford		Banneker	
		Ross	
Red Clay	Brandywine Springs	Marbrook	Baltz
	Forest Oak		Highlands
	Heritage		Lewis Magnet
	Linden Hill		Mote
	North Star		Richardson Park
	Richey		Shortlidge
			Warner
Seaford		Blades	
		Douglass	
		Seaford Central	
		West Seaford	
Smyrna	Clayton		
	N. Smyrna		
	Smyrna		
Woodbridge		Woodbridge	
Charters	Campus Community		Academy of Dover
	MOT Charter		East Side
	Providence Creek Academy		Kuumba Academy
			Marion T. Academy
			Thomas Edison

Note: Schools with only grades 3 and below or only a single grade with test scores are not included in these analyses.

Middle Schools

District	High	Middle	Low
Appoquinimink	Meredith		
	Redding		
Brandywine		Hanby	
		Springer	
		Talley	
Caesar Rodney	Dover AF Base	Fifer	
	Postlethwait		
Cape Henlopen	Beacon	Mariner	
Capital		Central	
		Henry	
Christina		Gauger-Cobbs	
		Kirk	
		Shue-Medill	
Colonial		Bedford	
		New Castle	
		Read	
Delmar		Delmar	
Indian River		Selbyville	
		Sussex Central	
Lake Forest		Chipman	
Laurel		Laurel Central	
Milford		Milford	
Red Clay	HB duPont	Stanton	Alexis I. duPont
	Skyline		Conrad
Seaford		Seaford	
Smyrna	Smyrna		
Woodbridge		Wheatley	
Charters	Campus Community	Positive Outcomes	East Side
	MOT Charter		Marion T. Academy
	Newark Charter		Thomas Edison
	Providence Creek		
	Sussex Academy of Arts & Sciences		

High Schools

District	High	Middle	Low
Appoquinimink	Middletown		
Brandywine		Brandywine Concord	Mount Pleasant
Caesar Rodney		Caesar Rodney	
Cape Henlopen		Cape Henlopen	
Capitol			Dover
Christina		Newark	Christiana Glasgow
Colonial			William Penn
Delmar		Delmar	
Indian River		Indian River Sussex Central	
Lake Forest		Lake Forest	
Laurel		Laurel	
Milford		Milford	
NCC Vo-Tech	Delcastle Hodgson		Howard
Polytech	Polytech		
Red Clay	Calloway	Alexis I duPont	Dickinson McKean
Seaford		Seaford	
Smyrna	Smyrna		
Sussex Tech	Sussex Tech		
Woodbridge		Woodbridge	
Charter	Delaware Military Academy	Campus Community Positive Outcomes	