

2013 School District Typology Methodology

The Ohio Department of Education (ODE) created a typology for public school districts in 1996 as a response to requests for a consistent way to stratify districts for research purposes. This analysis drew from several data sources to group like districts together. The typology was subsequently revised in 2007 to make use of the available 2000 census data. With the availability of more recent census data and an increasing demand for analytic uses, ODE has again revised the typology to reflect the current variability in district composition. One goal of the update is to create a typology that provides continuity with the 2007 classification system.

Data Sources & School Districts

The update takes advantage of the most recent data available. This analysis uses the latest figures from the 2010 census, as well as Ohio Department of Taxation and ODE statistical reports current as of December 2012. The eight data series that were used, and their sources, include:

1. Percent management, professional, and related occupations
 - American Community Survey, 2009
2. District median income
 - Ohio Department of Taxation, tax year 2010
3. Percent of adult population with bachelors or more
 - American Community Survey, 2009
4. Population density
 - Census Bureau, 2010
5. Total Average Daily Membership (ADM)
 - Ohio Department of Education (EMIS), school year 2011-2012
6. Percent of ADM flagged as Economically Disadvantaged
 - Ohio Department of Education (EMIS), school year 2011-2012
7. Nonagricultural assessed value percentage of total
 - Ohio Department of Taxation, tax year 2011
8. Minority ADM as a percent of total ADM
 - Ohio Department of Education (EMIS), school year 2011-2012

The data were checked for inconsistency and errors. Two districts reported figures that were unlikely to be true, likely due to an input error. For instances where the 2011-2012 school year data is likely incorrect, the 2010-2011 school year figure is used instead. The following table outlines the districts and data that were changed:

Average Daily Membership (ADM)					
IRN	District	2011-2012	2010-2011	Change	3-Year Average
048512	Eastern Local	1,343	835	60.8%	867
046011	Union Local	4,824	1,536	214.1%	1,493

Note: The three-year average includes data only from 2008-2009, 2009-2010, 2010-2011 school years.

Once the data were updated and corrected, the following districts with special circumstances and insufficient data were removed from the analysis and given a separate designation of Type “0”:

1. College Corner Local School District
2. Kelley’s Island Local School District
3. Middle Bass Local School District
4. North Bass Local School District
5. Put-In-Bay Local School District

With the data collected and cleaned, the analysis included a total of 609 public school districts.

Measures and Dimensions

Data for each of these schools are used to create six dimensions for the actual analysis. As with the prior analyses, these data elements and dimensions are chosen because they each provide an insight into the characteristics that might best describe the make-up of a school district population and/or its community.

These dimensions, which are the same used in the 2007 analysis, are a mixture of composite scores and measures containing transformed and raw data. The composite scores contain several measures that offer different “views” of specific characteristics. For example, income, occupation, and educational attainment measures are used to create a socioeconomic composite. Each of these measures is standardized using z-scores and then averaged to create the final composite value.

The correlations between these dimensions are listed below. The table on the next page outlines each dimension, its measures, a description of the characteristic it represents and any transformations or calculations used to create the dimension values.

Correlations of Typology Update Dimensions						
	<i>District Size</i>	<i>School Poverty</i>	<i>Socio-economic Composite</i>	<i>Location Composite</i>	<i>Race & Ethnicity</i>	<i>Tax Capacity</i>
<i>District Size</i>	-	0.0415	0.3929	0.7594	0.4867	0.4476
<i>School Poverty</i>	0.0415	-	-0.6787	0.1743	0.3418	-0.0543
<i>Socioeconomic Composite</i>	0.3929	-0.6787	-	0.3641	0.1645	0.3285
<i>Location Composite</i>	0.7594	0.1743	0.3641	-	0.6453	0.5033
<i>Race & Ethnicity</i>	0.4867	0.3418	0.1645	0.6453	-	0.4732
<i>Tax Capacity</i>	0.4476	-0.0543	0.3285	0.5033	0.4732	-

Note: In January 2015, a revision was made to recode Canton City and Youngstown City from type 7 to type 8 in the 2013 typology, to reflect the student populations served in these districts. The change is not reflected in table, *Final Cluster Centers for Typology 2013*, in this document.

Dimension	Measure(s)	Description
<i>District Size</i>	<ul style="list-style-type: none"> Average Daily Membership (ADM) 	ADM measures the number of students served by a school district and the scale of the educational enterprise. These data were transformed by taking log (base 10).
<i>School Poverty</i>	<ul style="list-style-type: none"> Percentage of students flagged as economically disadvantaged 	This measures the poverty rate of students actually attending the school district. These data were not transformed.
<i>Socioeconomic Composite</i>	<ul style="list-style-type: none"> Median income of the district Percentage of population with a college degree or more Percentage of population in administrative/professional occupations 	The three variables combined give a measure of the income, employment, and educational attainment of the residents in the school district. Each measure was standardized and then its z-score averaged to calculate the composite value.
<i>Location Composite</i>	<ul style="list-style-type: none"> Population density Percentage of nonagricultural property value Population within the district Incorporation of a city larger than 55,000 (dummy variable) 	The four variables combined give a measure of the population and geographic characteristics of the urban-rural continuum. Each measure was standardized and then its z-score averaged to calculate the composite value. Population density was capped at 5,000 people per square mile to negate the effect of outliers. The higher the value, the more “urban” the district.
<i>Race & Ethnicity</i>	<ul style="list-style-type: none"> Percentage of African-American, Hispanic, Native-American, Pacific Islander or Multiracial students enrolled in the school district 	This is a measure of the racial/ethnic diversity of the student population in the district. These data are transformed by multiplying each value by 100 and taking log (base 10).
<i>Tax Capacity</i>	<ul style="list-style-type: none"> Per-pupil amount of commercial, industrial, mining, tangible and public utility property value 	This is a measure of a community's ability to generate revenue for schools separate from its residential or agricultural tax base. These data were transformed by taking log (base 10).

Data from these dimensions serve as the input for the cluster analysis. The k-means cluster analysis method was used to maintain these classifications. Since one goal of the update is to create a typology that closely mirrors the 2007 classifications, the number of clusters was restricted to seven in statistical program SPSS. The initial cluster centers were defined by taking the mean values of the new data for districts classified in the same group in the 2007 typology. For example, the average value using updated data of all districts classified as “1” in the 2007 typology for the *district size* dimension became the initial cluster mean for that dimension and classification.

The result of the initial cluster analysis was not acceptable. Most districts moved classifications and there were too many districts in classifications that didn’t fit based on independent knowledge of those specific districts. For example, districts that are “known” as rural districts were categorized along with districts that were clearly considered as urban. Furthermore, the clustering did not provide sufficient statistical difference between certain clusters. In an effort to better guide the difficult and borderline districts, a new, eighth classification was created. This mirrors the typology developed in 1996, which also had eight classifications.

This new classification is statistically mid-way between a Small Town and Urban district. Its enrollment, poverty and diversity are larger than the existing Small Town classification and its income is lower than the typical Small Town. As the table to the right shows, most of the districts that enter this new classification are formally designated as urban. Where the 2007 typology struggled with over identification of districts as urban, the new classification captures the outlying towns and county seats that share many characteristics of urban (percent minority) and rural (location) school districts.

Source of Districts in New Classification, by 2007 Typology	
2007 Code	Number in New Classification
1 (Rural)	14
2 (Rural)	12
4 (Urban)	54
6 (Suburban)	9

The cluster analysis was rerun with the same initial clusters for the original seven classifications and an estimate of where the new classification would fall on each dimension. The clusters were limited to eight. The resulting output had many districts moving classifications, but none of the moves were considered significant. The new cluster requires a new code: “4.”

Typology Update Code Crosswalk		
2013 Code	2007 Code	Major Grouping
0	0	Special Districts
1	1	Rural
2	2	Rural
3	3	Small Town
4	New Code	Small Town
5	6	Suburban
6	7	Suburban
7	4	Urban
8	5	Urban

As a result of the new cluster, there is a change in typology classifications in the 2013 update. A crosswalk for this change

can be found in the table above. The final cluster means and the final number in each classification can be found below.

Final Cluster Centers for 2013 Typology								
Dimension	1	2	3	4	5	6	7	8
<i>District Size</i>	3.06	2.97	3.17	3.29	3.55	3.59	3.57	4.43
<i>School Poverty</i>	.49	.39	.32	.54	.29	.14	.67	.86
<i>Socioeconomic Composite</i>	-.71	-.39	.12	-.51	.86	2.53	-.42	-.31
<i>Location Composite</i>	-.40	-.55	-.16	.09	.44	.60	.85	3.25
<i>Race & Ethnicity</i>	.54	.46	.66	1.05	1.04	1.03	1.57	1.84
<i>Tax Capacity</i>	4.10	3.68	4.26	4.38	4.53	4.44	4.43	4.53

Many school districts in Ohio have particularly unique qualities that make them difficult to “fit” neatly into classifications with other districts. One example is Cleveland Heights – University Heights School District. The population within the district has a very high socioeconomic composite value, appearing as a wealthy suburban district. However, the school population does not reflect that wealth suggesting that many of the wealthier households do not have children in the local school system. As a result, the poverty level of the students that actually attend the school is more in line with an urban district. The district was considered a “Major Urban” district in the 2007 typology. However, after closely analyzing the data, it has been determined that the district best matches the updated suburban classification: “5.” Decisions about borderline districts like this offer insight as to why the typology should be used primarily as a statistical device and not as a policy classification.

A final count of districts by 2013 typology can be found in the table below. A table showing the movement of districts between typology codes from the 2007 codes to the 2013 codes is on the following page.

Change in Districts Within Each Typology Code				
2013 Typology	2007 Typology	2007 District Count	2013 District Count	Change in Districts
1	1	97	124	27
2	2	161	107	-54
3	3	81	111	30
4	---	0	89	89
5	6	107	77	-30
6	7	46	46	0
7	4	102	47	-55
8	5	15	8	-7

Movement of Districts Between Typology Codes									
	2013 Code								
2007 Code	1	2	3	4	5	6	7	8	Total
1	57	22	4	14	0	0	0	0	97
2	58	62	29	12	0	0	0	0	161
3	3	22	49	0	6	1	0	0	81
4	5	1	8	54	1	0	33	0	102
5	0	0	0	0	1	0	6	8	15
6	1	0	21	9	65	3	8	0	107
7	0	0	0	0	4	42	0	0	46
Total	124	107	111	89	77	46	47	8	609

2013 School District Typology Descriptors

Typology Descriptors

The 2013 update to the school district typology, including the addition of a new typology classification, required a change in typology descriptors. These descriptors bring meaning to the typology classifications and better inform comparisons. However, a potential descriptor scheme faces several challenges:

- No one dimension or measure can be used to differentiate between all classifications, making direct comparisons difficult.
- There must be differentiation *within* major groupings (such as Rural) while still clear differentiation *between* major groupings.
- The descriptors must make the distinctions clear while not being too long or technical.

To help accommodate the variety of uses of the typology descriptors, three types of descriptors were developed:

1. Major Grouping Descriptors (Rural, Small Town, Suburban, and Urban)
 - a. Used by the general public.
2. Abbreviated Descriptors (e.g. Rural – one measure)
 - a. Used by policy makers and the educational community.
3. Full Descriptors (e.g. Rural – two measures)
 - a. Used by researchers and school administrators making detailed comparisons.

This scheme allows for differentiation between major groupings and within groupings. The scheme also offers different levels of detail depending on the user’s need. A summary of the new descriptors can be found on the last page of this document (page 11).

It is important to note that these descriptors apply to the “average” school district in the typology classification, not to a specific district or every district within the classification.

These districts were grouped based on a combination of measures, not because of one measure, such as poverty. As a result, some districts may have a measure that is very different than the typology average.

Major Grouping Descriptors

These descriptors are the widely used labels for this kind of classification (Rural, Small Town, Suburban, and Urban). Most users generally have a sufficient understanding of these descriptors and the type of Ohio school district that each would represent. A detailed description of each major grouping, using the measures and dimensions from the analysis, is outlined on the next page.

Detailed Descriptions of Major Groupings	
<p>Rural <i>General Factors</i></p> <ul style="list-style-type: none"> • Average student poverty • Small population and enrollment • Small student minority population • Significant agricultural tax base • Low parental educational attainment <p><i>Unique Factors</i></p> <ul style="list-style-type: none"> • Small tax base • Low population density 	<p>Small Town <i>General Factors</i></p> <ul style="list-style-type: none"> • Average student poverty • Average population and enrollment • Average student minority population • Mix of agricultural and professional employment • Average parental educational attainment <p><i>Unique Factors</i></p> <ul style="list-style-type: none"> • Low population density
<p>Suburban <i>General Factors</i></p> <ul style="list-style-type: none"> • Low student poverty • Large population and enrollment • Average student minority population • Primarily professional employment • High parental educational attainment <p><i>Unique Factors</i></p> <ul style="list-style-type: none"> • Large tax base 	<p>Urban <i>General Factors</i></p> <ul style="list-style-type: none"> • High student poverty • Very large population and enrollment • High student minority population • Average parental educational attainment • Mix of professional and nonagricultural employment <p><i>Unique Factors</i></p> <ul style="list-style-type: none"> • High population density

Abbreviated Descriptors

These descriptors include the major grouping and then a metric value that best differentiates that typology classification from the other typology classifications *within* the major grouping. For example, two abbreviated descriptors might be “Rural – Low Population Density” and “Rural – Average Population Density.” The best measure to use for these descriptors is student poverty. Every level of student poverty exists between all the districts and no major grouping has the same student poverty level for two typology classifications. A list of abbreviated typology descriptors is in the table below.

Abbreviated 2013 Typology Descriptors	
Typology Code	Abbreviated Descriptor <i>(Major Grouping – Student Poverty Measure)</i>
1	Rural – High Student Poverty
2	Rural – Average Student Poverty
3	Small Town – Low Student Poverty
4	Small Town – High Student Poverty
5	Suburban – Low Student Poverty
6	Suburban – Very Low Student Poverty
7	Urban – High Student Poverty
8	Urban – Very High Student Poverty

Full Descriptors

The full descriptors convey a holistic view of the districts within the typology classification in a clear and consistent manner. Each typology category will be compared across the same two variables. Previous schemes often would reference a “high” value on one measure for one typology classification and then omit the same measure for another classification. This system includes two measures that will be included in all typology descriptors: student poverty and student population.

These two measures have the most variability and offer the best differentiation of any other variables. Each variable is measured on a five point continuum, with the “average” label being the average value for that measure. This range includes very high/large, high/large, average, low/small and very low/small.

As was previously stated, these descriptors apply to the “average” school district in the typology classification, not to a specific district or every district within the classification. These districts were grouped based on a combination of measures, not because of one measure, such as poverty. As a result, some districts may have a measure that is very different than the typology average.

The table below gives the full descriptors for each typology classification. The full descriptors alone should suffice and offer consistent, but relevant comparisons. No other single measure offers meaningful comparisons across all categories. If further differentiation is required, there are unique measures that may be included. For example, classification one is notable for its low parental educational attainment, classification six is notable for its very high median income, and classification eight is notable for its very high minority population.

Full Descriptors for 2013 District Typology		
2013 Code	Major Grouping	Standard Measures (<i>Poverty & Student Population</i>)
1	Rural	High Poverty & Small Student Population
2	Rural	Average Poverty & Very Small Student Population
3	Small Town	Low Poverty & Small Student Population
4	Small Town	High Poverty & Average Student Population Size
5	Suburban	Low Poverty & Average Student Population Size
6	Suburban	Very Low Poverty & Large Student Population
7	Urban	High Poverty & Average Student Population
8	Urban	Very High Poverty & Very Large Student Population

Typology Codes

The addition of a new typology classification requires a change in the typology codes. There are now nine codes instead of eight. Like the previous typology, all the special districts removed from the analysis will be grouped in code zero. Community schools cannot be included in the typology because they are not geographically based.

The new typology codes are organized in the rough order of their “urbanicity” (as measured by the location composite score), from the least “urban” to the most “urban.” The table below shows the changes in typology codes between the 2007 typology and 2013 typology. The table also illustrates, through the descriptors, the slight differences in categories in the 2013 update.

Comparison of 2007 Typology Codes and Descriptors and the 2013 Typology Codes and Descriptors			
2013 Code	2007 Code	2007 Descriptors	2013 Abbreviated Descriptors
0	0	Special Districts	Special Districts
1	1	Rural/Agricultural – High poverty, low median income	Rural – High student poverty
2	2	Rural/Agricultural – Small student population, low poverty, low to moderate median income	Rural – Average student poverty
3	3	Rural/Small Town – Moderate to high median income	Small Town – Low student poverty
4	---	New	Small Town – High student poverty
5	6	Urban/Suburban – High median income	Suburban – Low student poverty
6	7	Urban/Suburban – Very high median income, very low poverty	Suburban – Very low student poverty
7	4	Urban – Low median income, high poverty	Urban - High student poverty
8	5	Major Urban – Very high poverty	Urban - Very high student poverty
<i>Note: Because the groupings contain different sets of schools, the descriptors of the 2007 typology may not accurately describe the schools in the 2013 typology classification.</i>			

Summary

The three typology descriptors outlined in this document satisfy the varying needs of different stakeholders. They can be general enough to be used on a map key or in simple conversation and detailed enough to give a full description of the districts. The table below summarizes the three levels of descriptors for the 2013 school district typology update.

2013 Typology Descriptors – Summary			
Typology Code	Major Grouping	Abbreviated Descriptor	Full Descriptor
1	Rural	Rural – High Student Poverty	Rural - High Student Poverty & Small Student Population
2	Rural	Rural – Average Student Poverty	Rural - Average Student Poverty & Very Small Student Population
3	Small Town	Small Town – Low Student Poverty	Small Town - Low Student Poverty & Small Student Population
4	Small Town	Small Town – High Student Poverty	Small Town - High Student Poverty & Average Student Population Size
5	Suburban	Suburban – Low Student Poverty	Suburban - Low Student Poverty & Average Student Population Size
6	Suburban	Suburban – Very Low Student Poverty	Suburban - Very Low Student Poverty & Large Student Population
7	Urban	Urban – High Student Poverty	Urban - High Student Poverty & Average Student Population
8	Urban	Urban – Very High Student Poverty	Urban - Very High Student Poverty & Very Large Student Population