

2016-2017 North Carolina Public Schools Educational Attainment Data Overview

Introduction

The North Carolina Public Schools Report Card [1] and Statistical Profiles Databases [21] contain a large volume of information about public, charter, and alternative schools in the State of North Carolina. Information that is made publicly accessible comprises data at the school, district, and state levels. This includes statistics on student and school performance, academic growth, diversity, safety, instructor experience levels, school funding, educational attainment, and much more.

Data Overview

There were 17 tables of data reviewed within the North Carolina report card database. Two additional tables including racial composition statistics were subsequently located in the statistical profiles database [21]. The current database versions used for this report contain data ranging from 1990-2017. However, not all tables contain data dating back to 1990 or current as of 2017. The following list includes high level details about each of the tables reviewed and how the data is organized:

- **School Profile** – This table contains profiles at the school, district, and state levels from 2006-2016. Most data in the other database tables link to a single school profile contained in this table using the unit_code field. Unit codes with the value “NC-SEA” represent profiles at the state level, and unit codes ending in “LEA” represent data at the district level. Unit codes belonging to individual schools may be mapped to a given district using the first 3 characters of the unit code. For example, schools belonging to the district “995LEA” will each have unit code that begins with “995” [2].
- **Profile Metrics** – Contains 2002-2016 average class/course size for school, district, and state in grades 00 – 08, Biology, English II, and Math I [3].
- **Funding** – 2002 – 2016 local, state, and federal funding details at the school, district, and state levels [4].
- **School Performance Grade (SPG)** – School report card performance grades for the 2014-2015 year at the school level [5].
- **Ready Accountability** – Contains all 2015-2016 READY Accountability data found in the School Report Card. This includes EOG, EOC, The ACT, ACT WorkKeys, Math Course Rigor (Passing Math III), and Cohort Graduation Rate. This data is segmented by race [6,7].
- **Read To Achieve (RTA)** – Contains 2014-2016 school, district, and state outcome metrics for GCE_ALL, GCE_LEP, GCE_PRM, GCE_RPF, GCE_SWD, PASSED_EOG, PASSED_LAA, PASSED_RTA, PROMOTED, RETAINED [8].
- **Participation Targets Overall** – While a link to this table appears on the NC SRC Datasets page [10], no file was available for download [9].
- **School Indicators** – 2002-2016 detailed participation rates by school, district, and state for SAT, AP, and IB exams [11].
- **Advanced Placement Courses** - 2015 list of all advanced placement courses by school [12].
- **Specialized Course Enrollment (SCE)** – 2014-2016 percentage of students enrolled in at least one specialized course (CTE, AP/IB, Community College or University academic course) at the school, district, and state levels [13].

- **College Enrollment** – 2011-2014 school, district, and state counts and percentages of postsecondary enrollment action as defined in the US Department of Education C160 EDEN (Education Data Exchange Network) specification. ENROLL: Enrolled in an IHE within 16 months of receiving a regular high school diploma. NOENROLL: Did not enroll in an IHE within 16 months of receiving a regular high school diploma. These numbers are segmented by race and socioeconomic status [14].
- **College Course Completion** - 2009-2012 school, district, and state counts and percentages of postsecondary credits earned as defined in the US Department of Education C161 EDEN (Education Data Exchange Network) specification. COMP1Y: Completed at least one year's worth of credit (applicable to a degree) within two years of enrollment in the IHE. NOCOMP1Y: Did not complete at least one year's worth of credit (applicable to a degree) within two years of enrollment in the IHE. These numbers are segmented by race and socioeconomic status [15].
- **Environment** – 2006-2016 school, district, and state counts and percentages of daily attendance, crimes or acts of violence, suspensions, expulsions, and the ratio of students to internet connected computers [16].
- **Personnel** - 2006-2016 school, district, and state data on principals and teachers including counts and percentages of advanced degrees, turnover, race, national board certifications, lateral entry, highly qualified classes, and classes taught by highly qualified teachers. These numbers are segmented by race and socioeconomic status [17].
- **National Assessment of Educational Progress (NAEP)** – 2009-2015 national and state level proficiencies for grades 4-8 in reading and math [18].
- **Educator Experience** - 2006-2016 percentage of teachers and principals at a given experience level at the School, district, and State levels for 0-3 years, 4-10 years, 10+ years of experience [19].
- **Educator Effectiveness** – 2011-2016 percentages of teachers and principals at certain “professional standards”. Professional standards outline the skills, knowledge, and behaviors that should be displayed by teachers and principals. Valid values are 1, 2, 3, 4, 5, 6, 7, or 8. Valid levels are Not Demonstrated, Developing, Proficient, Accomplished, Distinguished, Does Not Meet Expected Growth, Meets Expected Growth, Exceeds Expected Growth [20].

School Profiles for 2016

In reviewing the Profile table, there were a total 3,071 school profiles in North Carolina for 2016. This included profiles at the individual school (2,597), district (468), and state (6) levels. Profiles at each level are segmented by the following six category codes:

Category Code	Description
E	School has elementary schools grades (PK-5)
M	School has middle schools grades (6-8)
H	School has high schools grades (9-13)
I	School has elementary and middle school grades
T	School has middle and high school grades
A	School has elementary, middle, and high school grades

There were 18 closed school profiles and 0 new school profiles for the year 2016. Once district, state, and closed school profiles are excluded, there are 2,579 “active” school level profiles in the State of North Carolina. The following charts illustrate these 2,579 schools segmented in various ways.

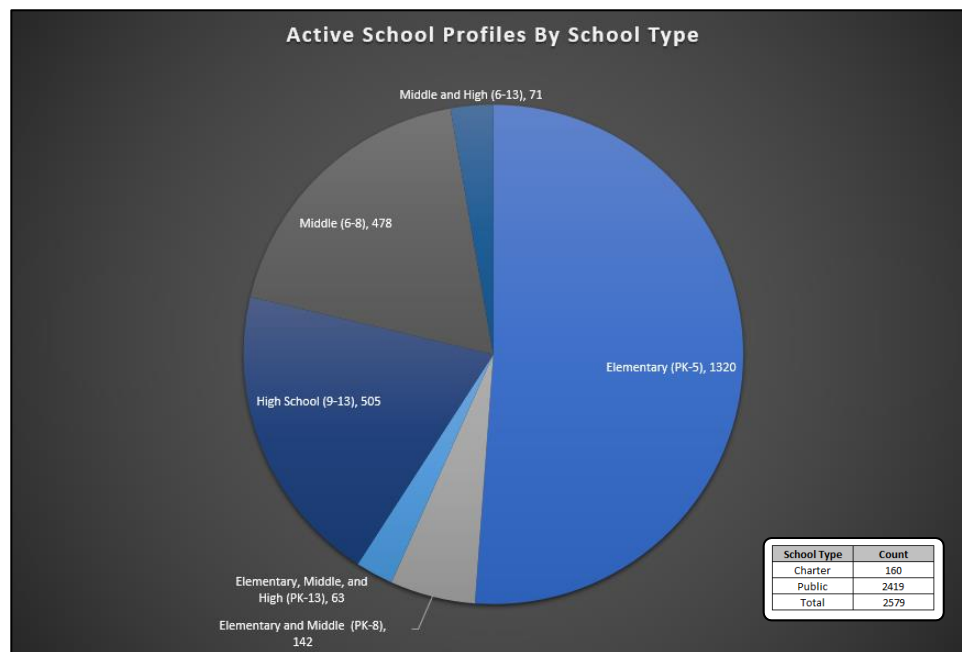


Figure 1- Active School Profiles by Campus Type 2016-2017

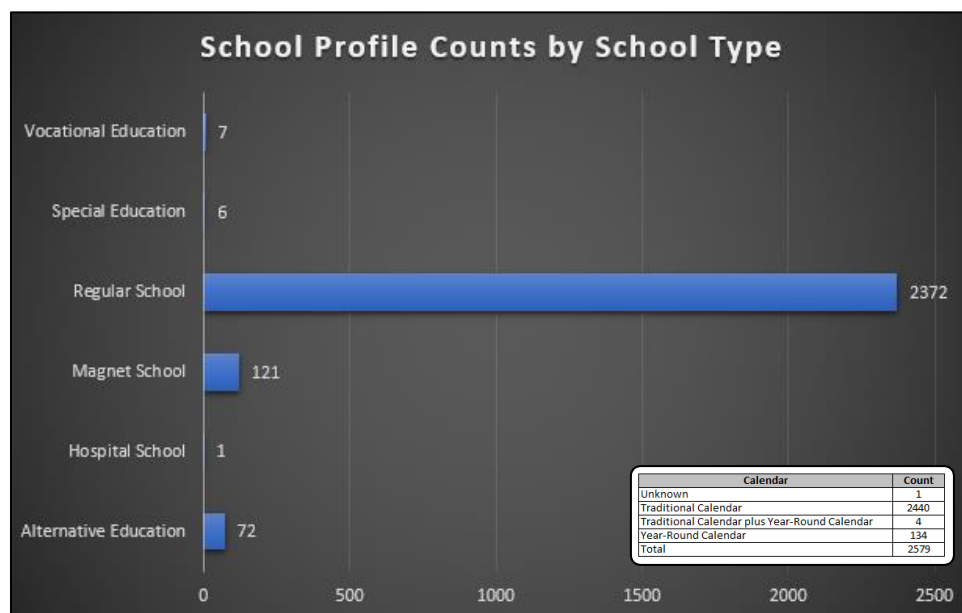


Figure 2 - School Profile Counts by School Type 2016-2017

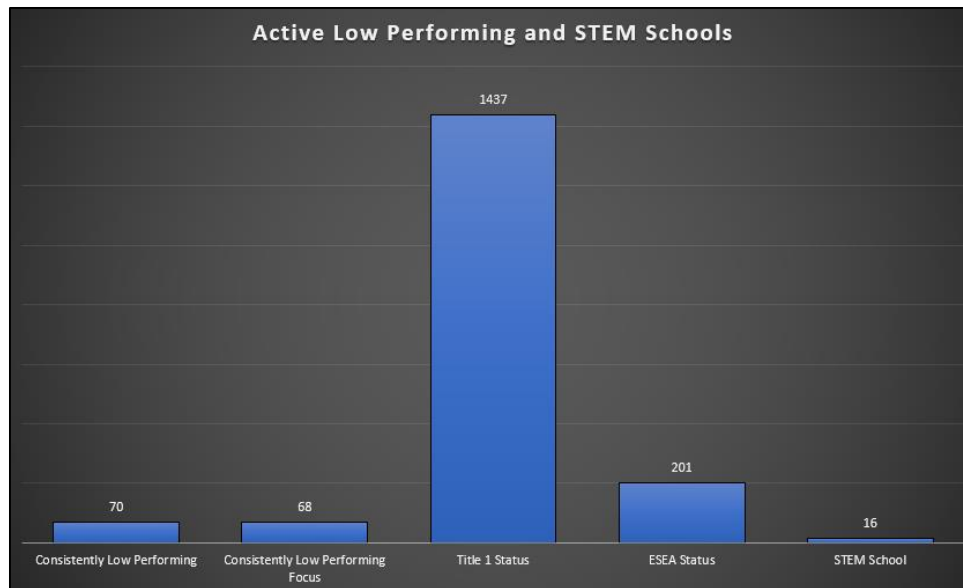


Figure 3 - Active Low Performing and Stem Schools 2016-2017

There were 291 data elements across the 17 NC school report card tables which I was able to map into a single consolidated file by school unit code for each of the 2,579 active schools. While most elements map to all school profiles, some only map to certain school types such as high schools. For example, an elementary school would not have average SAT scores while most high schools would. While there were a multitude of data elements available, student populations by racial subgroups were not found on any of the NC school report cards which I reviewed. In Texas, student body racial compositions are currently reflected on all public school report cards. After multiple emails, I was able to locate this data within the NC Public School's Statistical Profile Database [21]. Racial composition data is available at the school and district levels between 2011 and 2017. There were 24 additional school level features captured using this data source [21].

Student Body Populations and Race

Data contained in the North Carolina Public School's Statistical Profile Database [21, 22] provides detailed insights on the history of student body racial compositions at the school level. Figure 4 below shows that overall student body populations in the State of North Carolina have increased 142% over the past 28 years. Statewide, the student body population has increased from 1.078 million in 1990 to 1.531 million during 2017. While all race memberships have increased over the past 28 years, the Hispanic and Asian populations have seen substantial growth at 3622% and 546% respectively. In 1990, there were 7,100 Hispanic children attending North Carolina Public schools. This number has grown to 257,147 during the 2016-2017 school year. The Asian student body membership has grown from 8,938 to 48,781 during the same period.

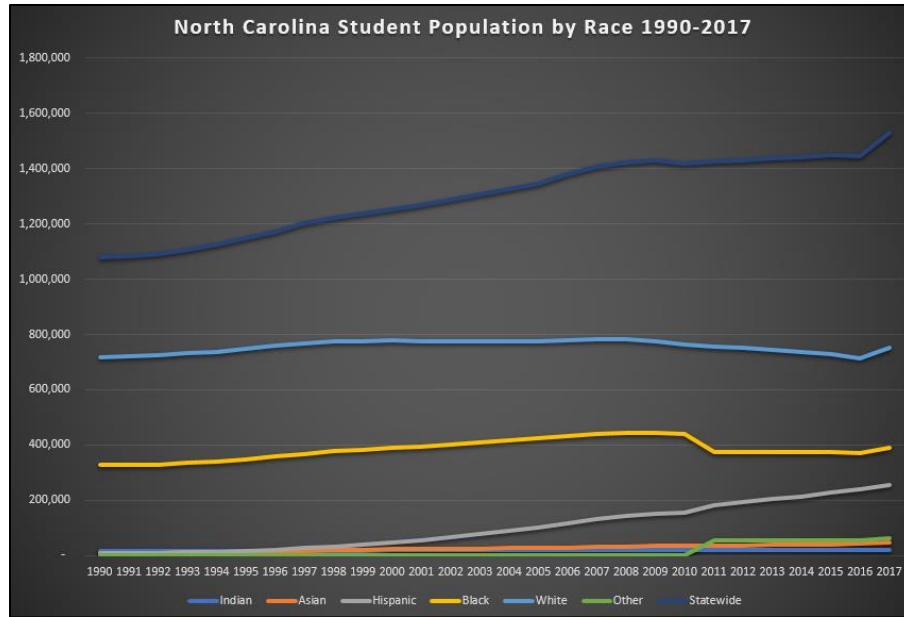


Figure 4 - North Carolina Student Population Growth by Race 1990-2017 [22]

Figure 5 illustrates North Carolina student body membership percentages by race. Since 1990, membership percentages in White (-17.4%), Black (-4.9%), and Indian (-0.3%) populations have decreased or remained flat while Hispanic (16.1%), Asian (2.4%), and Other (4.1%) student memberships have increased. Other race memberships currently tracked include Pacific Islanders and Mixed-Race subgroups. Statistics for these memberships were not available until 2010. Since 2010, other student memberships have increased by 3.9%. Both the Black and Other racial subgroups show similar positive and negative changes during 2010. This may indicate that a majority of the Mixed-Race subgroup was previously defined as “Black” prior to 2010.

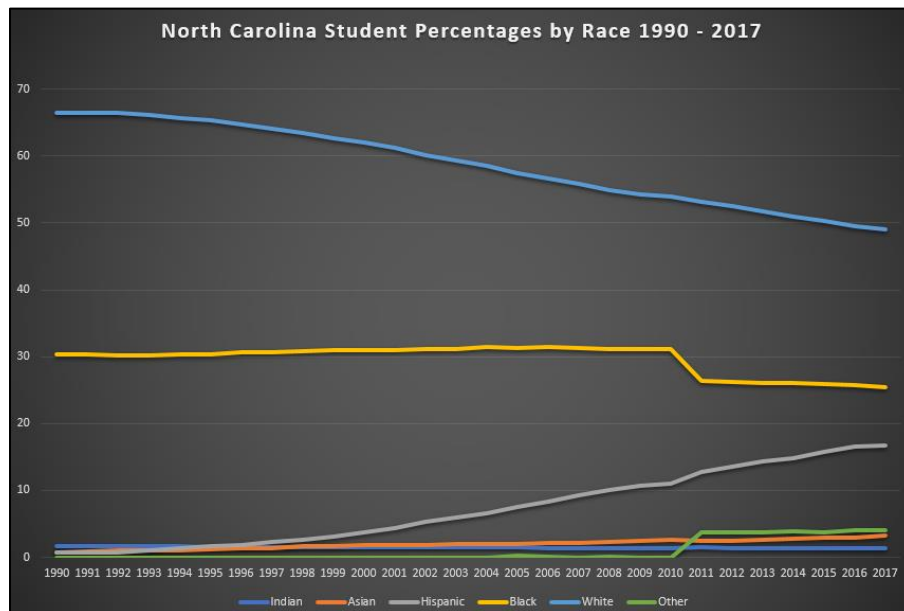


Figure 5 - North Carolina Student Percentages by Race 1990 – 2017 [22]

While Figure 4 shows that North Carolina public school student populations and all racial subgroups have increased in size since 1990, Figure 5 illustrates that the White subgroup has decreased from 66.5% of the statewide North Carolina student population to 49.1% during 2017. This is predominately due to the staggering growth in the Hispanic (0.7% to 16.8%) and Asian (0.8% to 3.2%) subgroups during the same period. In addition, two new racial subgroups were added during 2010 (Pacific Islander, and Two or More Races) which now account for 4.1% of the student population during 2017.

Majority Minority Schools 2011 - 2017

This report defines a majority Minority school as any public school in the State of North Carolina which comprises less than 50% membership in the racial subgroup “White”. The North Carolina Public School’s Statistical Profile Database [21] provides racial composition data at the individual school level between 2011 and 2017. Figure 6 contrasts North Carolina’s statewide student body racial composition percentages for White and Minority subgroups with the statewide percentage of majority-minority schools.

It is clear in Figure 6 that the White majority subgroup has consistently decreased on a percentage basis (53.1% to 49.1%) between 2011 and 2017. During this same period, statewide Minority subgroups have grown from 46.9% of the student body population to 50.9%. This is predominately driven by substantial growth in the Hispanic (163.7%) and Asian (133.6%) subgroups between 2011 and 2017. It is significant to note that in 2017, Caucasians still represent the largest racial subgroup by a substantial majority (49.1%) with African Americans representing the second largest student body racial subgroup at 25.5%.

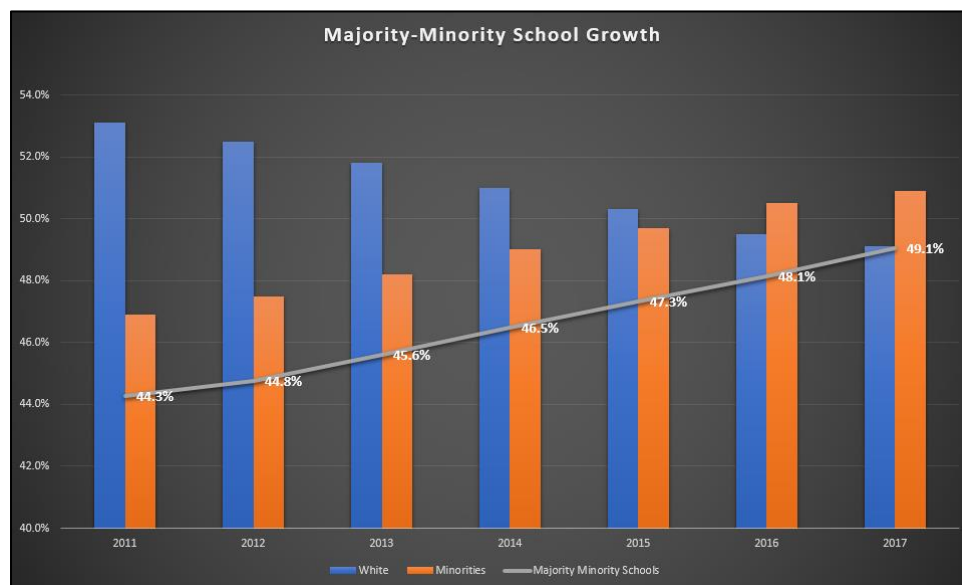


Figure 6 - Majority Minority School Growth 2011-2017 [22]

Figure 6 also shows that the statewide percentage of majority-minority schools in North Carolina has increased from 44.3% in 2011 to 49.1% during 2017. As of 2017, there are 1,200 out of 2,446 North Carolina public schools reporting student body memberships by race which also qualify as majority-minority schools. Out of the 2,579 “active” school profiles identified in the North Carolina report card

database [2], 166 or 6.44% of these profiles were missing student body membership statistics by race in the North Carolina Public Schools Statistical Profile Database [21, 22]. This included 160 charter schools and 6 vocational schools. While the total students attending these 6 vocational schools is unknown, the 160 charter schools enrolled a total of 80,546 or 5.26% of NC students during 2016-2017. Previous research as of 2010 has shown that charter school enrollment both nationwide and in the state of North Carolina is highly segregated [23]. The majority-minority school percentages shown in Figure 6 do not reflect the impact of North Carolina charter schools.

According to Figure 7, the North Carolina majority-minority school percentage is around 4.3% higher at the elementary and middle school levels. However, the distributions between majority and Minority subgroups also differ with Minority student subgroups taking a majority share of both the elementary and middle school student populations. For example, there were 1,284 out of 1320 active North Carolina elementary school profiles identified providing racial subgroup data during 2017. Figure 7 shows that 53.3% of these students are Minorities and 46.7% are White. If all 1,284 of these elementary schools had student body populations which exactly matched the statewide racial subgroup distributions, then all elementary schools in the State of North Carolina would be majority-minority schools.

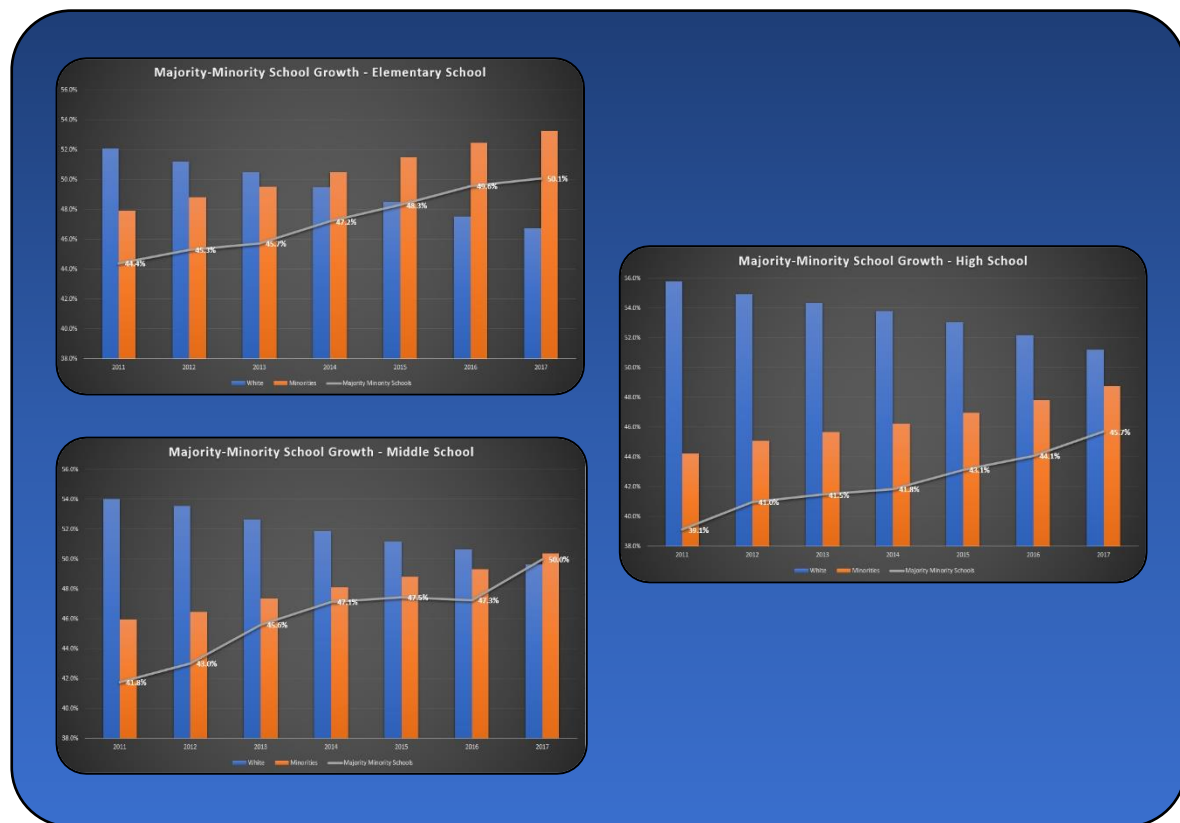


Figure 7 - Majority Minority School Growth by Campus 2011-2017 [22]

Changes in the racial composition of North Carolina's student body are primarily driven by migration patterns and a change in birthrates for both White and Minority subgroups [24]. During 2010, live births per 1000 people for Whites (10.9) was lower than Blacks (13.9) and less than half that of Hispanics (23.4) [24]. This trend is also reflected in the Figure 7 2011 – 2017 student body racial composition with

notable Minority increases at the elementary and middle school campuses. Selected Vital Statistics for North Carolina [25] show that the 2016 birth rate per 1000 people for Whites, Blacks, and Hispanics are 10.3, 12.8, and 20.3 respectively.

While some increase in the percentage of majority-minority schools is explained by changing racial compositions within the statewide student body, Figure 8 reflects alarming levels of segregation in underperforming public school campuses across North Carolina. Specifically, campuses identified as Consistently Low Performing (101) and those eligible for flexibility under the ESEA - Elementary and Secondary Education Act (195) have racial compositions which include drastically underrepresented White subgroup populations. The White subgroup for CLP, Title 1, ESEA, and STEM capuses make up 35.9%, 38.7%, 26.8%, and 43.4% of the student body respectively. The 2017 statewide majority-minority school percentage reflected in Figure 8 is currently 49.1%. However, public schools classified as consistently low performing (70) and ESEA campuses (201) have drastically higher majority-minority school percentages which are 69.5% and 79.1% respectively.

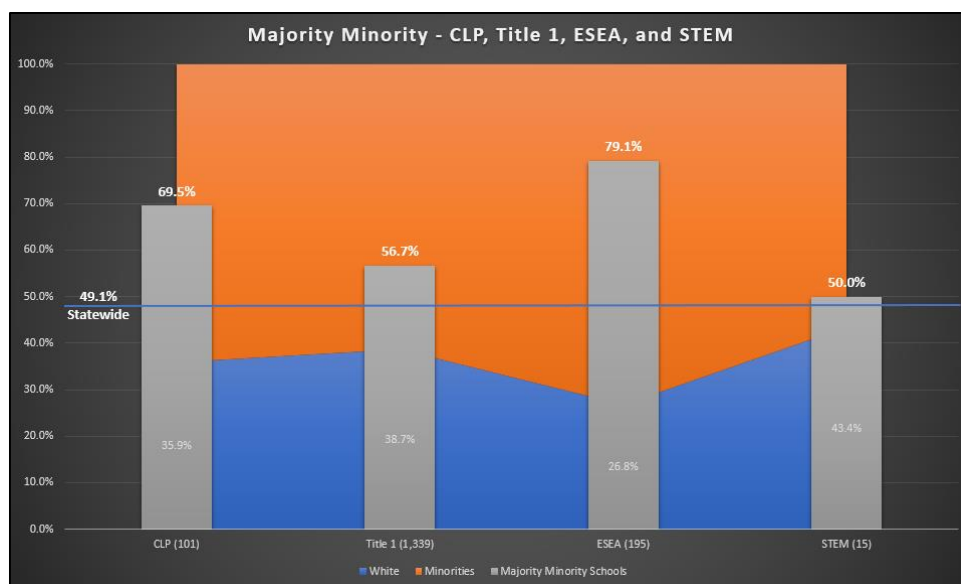


Figure 8 -Racial Compositions for CLP, Title 1, ESEA, and STEM Campuses during 2017

A closer review of the 2,446 schools reporting membership statistics by race in the North Carolina Public School's Statistical Profile Database [21, 22] identifies public school campuses in which racial compositions for both White and Minority subgroups are either substantially over or under represented.

Figure 9 illustrates each of the 2,446 schools reporting membership statistics by race discretized into 10 equal ranges for both the White and Minority subgroup percentages. There are 120 North Carolina public schools in which the student body racial composition comprises less than or equal to ~12% Minorities and greater than or equal to ~88% White. Similarly, there are 260 North Carolina public schools in which the student body racial composition comprises less than or equal to ~10% White and greater than or equal to ~90% Minorities. When an 80 / 20 split is considered, 456 North Carolina public schools have a student body racial composition comprising greater than or equal to 80% Minorities, and

389 public schools have a student body racial composition comprising greater than or equal to 78% White.

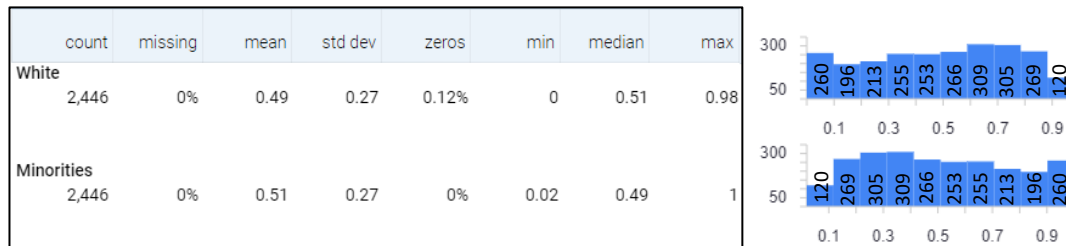


Figure 9 - Distribution of White and Minority Student Membership Percentages by School Campus

Potential School Level Indicators for Educational Attainment

Between the School Report Card [1] and Statistical Profile [21] databases I have currently identified and mapped a total of 315 features to the individual school level. Some of these features are ideal candidates for measuring various aspects of educational attainment. Machine learning techniques including classification, regression, clustering, and others may be used to identify school level features or characteristics which strongly impact certain educational attainment outcomes.

The following sections include available school level features which may be exceptional candidates for measuring educational attainment outcomes.

All School Levels

- **CLP_IND** - Consistently Low Performing indicator.
- **Focus_CLP_IND** - Focus school designation due to CLP status.
- **Title1_type_cd** - Title I Status
- **Esea_status** - ESEA status
- **Avg_daily_attend_pct** - Average daily attendance percentage at school level
- **Crime_per_c_num** - Number of crimes or acts of violence per 100 students at School level
- **Short_susp_per_c_num** - Short term suspensions per 100 students at school level
- **Expelled_per_c_num** - Expulsions per 100 students at School Level
- **ttl_crimes_num** - Total number of crimes
- **stud_internet_comp_num** - Ratio of students to internet connected computer at school level
- **Class_teach_num** - Average number of classroom teachers at School Level
- **Highqual_class_pct** - Percent of highly qualified classes at school level
- **Total_class_tch_num** - Number of classroom teachers

Elementary Schools

- **Gce_All** - Percentage of Third Grade Students Passed with Good Cause Exemption
- **Gce_Lep** - Number and Percentage of Third Grade Students Passed with Good Cause Exemption Limited English Proficiency

- **Gce_Prm** - Percentage of Third Grade Students Passed with Good Cause Exemption Previously Retained
- **Gce_Rrf** - Percentage of Third Grade Students Passed with Good Cause Exemption Proficient through a Reading Portfolio
- **Gce_Swd** - Percentage of Third Grade Students Passed with Good Cause Exemption Students with Disabilities
- **Passed_Eog** - Percentage of Third Grade Students Passed BOG3 and/or Grade 3 Reading EOG
- **Passed_Laa** - Percentage of Third Grade Students Passed Local Alternative Assessment
- **Passed_Rta** - Percentage of Third Grade Students Passed State Read to Achieve Assessment
- **Promoted** - Percentage of Third Grade Students Promoted to Fourth Grade
- **Retained** - Percentage of Third Grade Students Retained in Third Grade

Middle and High Schools

- **Sat_avg_score_num** - Average SAT Score (Critical Reading plus Math) at the School Level
- **Sat_participation_pct**
- **Ap_participation_pc** - Percentage of High School Students taking an AP exam at the School Level
- **Ap_pct_3_or_above** - Percentage of AP Exams with Scores of 3 or Above at the School Level
- **Ib_participation_pct** - Percentage of High School Students taking an IB Exam at the School Level
- **Ib_pct_4_or_above** - Percentage of IB Exams with Scores of 4 or Above at the School Level
- **AP_Courses_Offered** – Count of AP courses offered at the school level.

College, Career, and Technical Education Enrollment

- **Total_specialized_courses** - Percent of students enrolled in at least one specialized course (CTE, AP/IB, Community College or University academic course) at the school level.
- **Ap_ib_courses** - Percent of students enrolled in at least one Advanced Placement (AP) or International Baccalaureate (IB) at the school level
- **Cte_courses** - Percent of students enrolled in at least one Career and Technical Education (CTE) course at the school level
- **Univ_college_courses** - Percent of students enrolled in at least one academic course at a community college or university at the school level
- **sch_percent_college_enrolled_16_mos_post_grad** - Enrolled in an IHE within 16 months of receiving a regular high school diploma.
- **One_Yr_College_Complete_wi_2_yrs_Enrolled** – Percentage of students that completed at least one year's worth of credit (applicable to a degree) within two years of enrollment in the IHE at the school level.

Educators

- **Flicensed_teach_pct** - Percent of teachers that meet NC fully licensed definition at school level.
- **Nbpts_num** - Number of National Board Certified Staff at school level
- **Advance_dgr_pct** - Percent of teachers with masters or higher degree at school level

- **1yr_tchr_trnovr_pct** - One Year Teacher turnover percentage at school level
- **Tch_Exp_Pct_0_3_Years** - Percentage of teachers at a given experience level at the school level
- **Tch_Exp_Pct_4_10_Years** - Percentage of teachers at a given experience level at the school level
- **Tch_Exp_Pct_10+_Years** - Percentage of teachers at a given experience level at the school level
- **Professional Standards** – Percentage of teachers/principals at a given level for a given Standard. Includes 8 standards plus a “student growth” standard. Formal standard definitions are currently unknown. Standards are measured at a total of nine different levels (Not Demonstrated, Developing, Proficient, Accomplished, Distinguished, Does Not Meet Expected Growth, Meets Expected Growth, Exceeds Expected Growth)

North Carolina Educational Attainment Website

North Carolina provides a substantial amount of data specific to public education. However, there are no websites which present this data in a visual format that is easy for the public to review and analyze. One new open source, web-based data analytics tool is called Google Facets [26], which may be embedded into websites. Figure 10 illustrates the Google Facets Overview tool presenting both numeric and categorical North Carolina Public School racial composition statistics. This tool provides several feature searches and filters. A quick glance at Figure 10 shows that out of the 2,446 schools reporting racial compositions, there are 120 schools at which the White subgroup makes up between 88% and 98% of the student body.

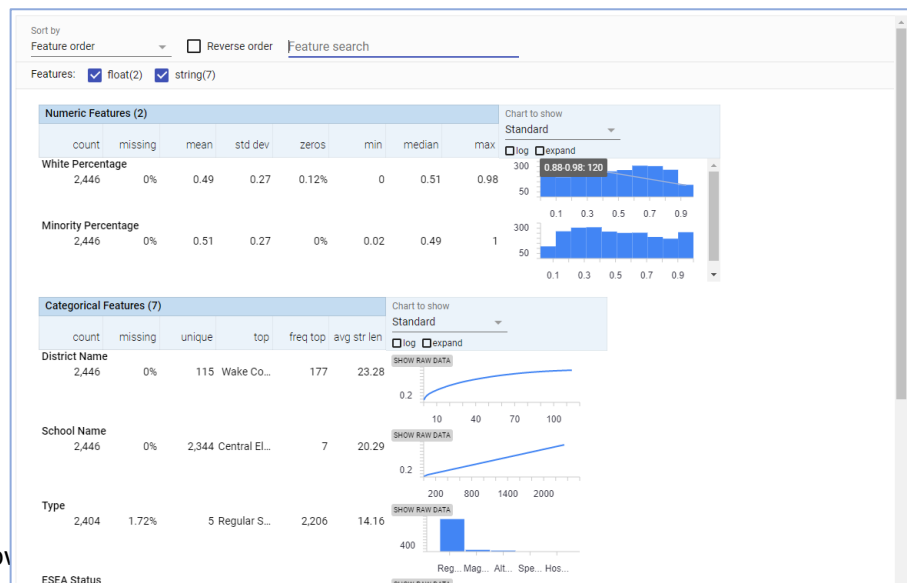


Figure 11 shows the Google Facets “Overview” tool using North Carolina Public School racial composition data. In the Figure 11 example, 2,446 public schools are divided into 10 equally sized minority racial composition percentiles. Figure 10 - Google Facets “Overview” Tool using North Carolina Public School Data [26] status. Furthermore, this visualization has been color coded by school district. A quick glance shows the proportion of ESEA schools at various minority racial compositions and the top school districts contributing campuses within a specific minority racial composition range.

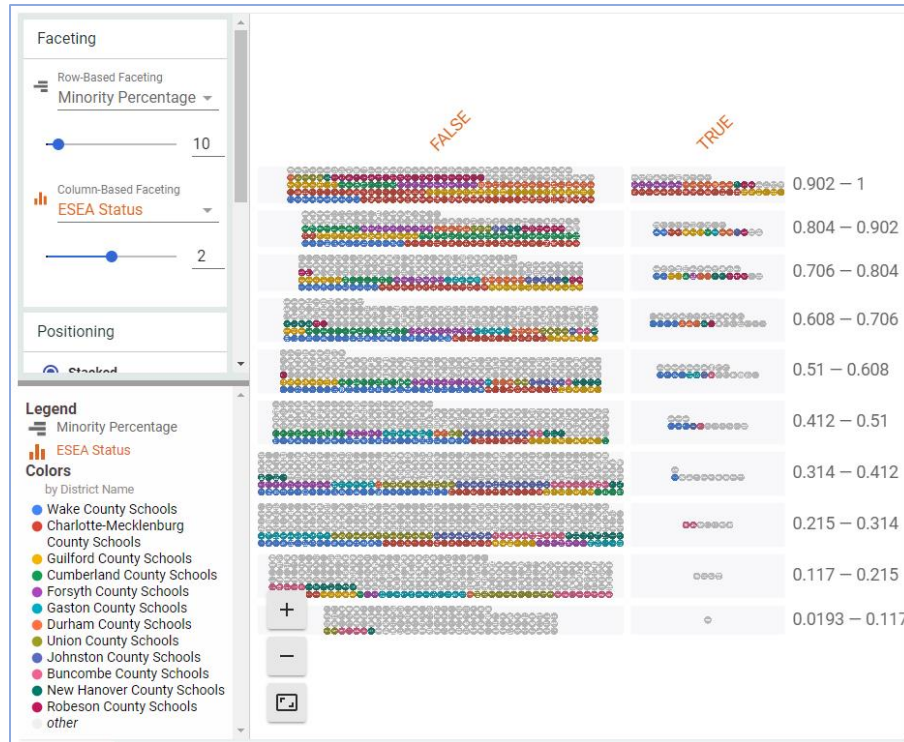


Figure 11 - Google Facets "Dive" Tool using North Carolina Public School Data [26]

The Google Facets "Dive" tool lets you see both the high-level picture and quickly scroll in to see additional details. For example, Figure 12 shows the actual names and districts for North Carolina ESEA schools with a minority racial composition of greater than ~90%.



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