Report No. 2160P

Evaluation of Colorado's K–12 Education Accountability System

Prepared for:

Colorado Office of the State Auditor
1525 Sherman St., 7th Floor
Denver, CO 80203

November 2022

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November 15, 2022

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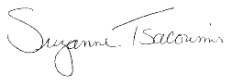
This report contains the results of a performance evaluation of Colorado's K-12 Education Accountability System. The evaluation was conducted pursuant to Section 2-3-127, C.R.S., which requires the State Auditor to select and contract with a public or private entity to conduct a performance evaluation of the statewide system of standards and assessments and the statewide system for accrediting schools and districts (collectively referred to as the statewide accountability system through the report). The Office of the State Auditor contracted with the Human Resources Research Organization (HumRRO) to conduct this evaluation.

Sincerely,



Suzanne Tsacoumis, Ph.D.
President & CEO

cc: Monica Gribben

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Report Highlights

Background

Colorado's statewide education accountability system includes a statewide system of standards and assessments and a system for accrediting schools and districts that are primarily designed to (a) provide valid and actionable information regarding the progress of all students toward meeting academic standards and (b) prioritize support for schools and districts identified for improvement. All public school students enrolled in Colorado are required to take a standards-based assessment (commonly referred to as standardized tests) each year. These statewide assessments are administered in specific subjects and grade levels and help students and their families know whether they are meeting grade-level expectations, how they are performing compared to their peers statewide, and how they have grown academically over time. The statewide assessments are also a primary means for helping local school and district leaders, the State Board of Education (State Board), the Colorado Department of Education (Department), policymakers, and the public evaluate overall student learning, progress, and proficiency against grade-level expectations and statewide instructional priorities.

Annually, the Department reviews the performance of public schools and districts and issues performance ratings. This performance rating process helps the Department and the State Board to identify high-performing schools and districts for understanding and disseminating best practices, as well as low-performing schools and districts for directing additional resources and supports or, if low performance persists over time, initiating corrective action.

The Department uses quantitative data for three performance indicators when determining school and district performance ratings: Academic Achievement (mean scale scores from statewide standardized assessments), Academic Growth (student progress from one year to the next based on median growth percentiles), and Postsecondary and Workforce Readiness (factors such as graduation rates, average scores on college entrance exams, and enrollment for college or other postsecondary options).

School and District Performance Ratings

Overall, we found that the performance indicators and measures used in Colorado's statewide education accountability system provide a reasonable and appropriate basis for objectively measuring the performance of districts and public schools. We did not identify any significant gaps in the design of the accountability system. Our analysis showed that schools and districts are assigned performance ratings consistent with their underlying performance indicator scores.

Disaggregated Student Groups

A major component of the analysis required for this evaluation involved examining whether and to what extent a relationship exists between school academic performance and concentrations of different student groups within Colorado schools (e.g., race/ethnicity, gender, socioeconomic status, and disability status). We found statistically significant differences in academic outcomes among some student groups. Specifically, schools with higher proportions of Hispanic or Black students, schools with higher proportions of students receiving free or reduced lunches, and schools with higher proportions of students with disabilities generally had lower overall academic achievement (mean scale scores on statewide student assessments) and academic growth (median growth percentiles) outcomes. We also found that even among the highest

performing schools, some percentage of these schools had students in an underrepresented student group who did not meet academic achievement or growth expectations.

However, we caution against over-interpreting the results of our analysis—differences in academic outcomes for student groups could indicate the presence of unintended barriers or obstacles affecting their performance, but these differences could also be attributable to other factors, such as the quality of the educational services provided to these student groups, something that the accountability system is specifically designed to help identify.

Effect of Low Performing Schools' Participation in State-Supported Intervention Programs

Overall, our analysis showed that lower performing schools that participated in one or more of the intensive state-supported interventions designed to help participants implement research-based strategies and best practices for improving student outcomes generally experienced more gains or fewer losses in academic achievement, academic growth, and graduation rates than non-participating schools.

Postsecondary and Workforce Readiness

Student learning opportunities targeted at building postsecondary and workforce readiness skills are important since some students will seek higher education upon graduation, some will seek career or technical training to pursue a particular vocation, and others will immediately seek to enter the workforce. Overall, we found that high schools with a higher number of Advanced Placement course offerings or a higher percentage of career and technical education graduates tended to have better student academic achievement, academic growth, and postsecondary and workforce readiness outcomes. In terms of student groups, schools serving higher proportions of students receiving free or reduced lunch tended to have fewer Advanced Placement opportunities (i.e., the number of Advanced Placement courses for which examinations were given decreased) or did not have International Baccalaureate programs.

Understanding and Use of Accountability Data

The results of our Educator and Parent Surveys, as well as our interviews with district and school administrators and teachers and other stakeholders, indicate that accountability data are being used to help inform decision making in support of students' educational outcomes. However, the results also indicate that these data need to be made more accessible, understandable, and useful, especially for parents. For example, 92 percent of responding educators reported that they use academic achievement and growth data either somewhat or to a great extent to inform student-level instruction, and 88 percent of responding educators reported that they use these data either somewhat or to a great extent to provide targeted assistance to student groups. However, in terms of parents, 58 percent of responding parents indicated that the statewide student assessment results were not helpful for understanding how well their child is achieving academically, and about 30 percent of responding parents disagreed or strongly disagreed with a statement that the student assessment score reports use plain language they can understand.

Chapter 1: Background and Overview

Governance of K–12 Education in Colorado

The Colorado Constitution [Art. IX, Sec. 2] establishes the General Assembly's responsibility to "provide for the establishment and maintenance of a thorough and uniform system of free public schools throughout the state." The Colorado Constitution [Art. IX, Sec. 1] vests the general supervision of the State's public schools with a publicly elected State Board of Education (State Board). The State Board's duties and powers are further prescribed in state statute [Sections 22-2-106 and 107, C.R.S.] and include the following:

- Exercise general supervision over public schools in the state.
- Adopt a comprehensive set of guidelines, including minimum standards or core competencies or skills for the establishment of high school graduation requirements to be used by each local school district.
- Appoint a Commissioner of Education.
- Appraise and accredit public schools, school districts, and the State Charter School Institute.
- Submit recommendations to the General Assembly and the Governor for improvements in education.
- Approve the annual budget for the Department of Education prior to submission to the General Assembly.
- Distribute federal and state funds.
- Promulgate and adopt policies, rules, and regulations concerning general supervision of the public schools and the Department of Education.

As the administrative arm of the State Board, the Colorado Department of Education (Department) is responsible for implementing state and federal education laws, disbursing state and federal funds, holding schools and districts accountable for performance, licensing all educators, and providing public transparency of performance and financial data. The Department is led by the Commissioner of Education.

Lastly, Article IX, Section 15 of the Colorado Constitution vests locally elected school boards with "control over instruction," which means that local school boards have the power and authority to tailor educational policy to suit the needs of their respective districts, including the ability to make decisions on issues such as curriculum, personnel, budget, school calendars, and classroom policy.

Colorado K–12 Education Facts and Figures

During the 2021–22 school year, Colorado had a total of 178 school districts (see Appendix A for a map of school districts) and 1,927 accredited elementary, middle, and high schools, which includes 399 accredited charter, innovation, and online schools. In addition to the 178 school districts, for purposes of the accountability data and performance frameworks, the Department treats each of the five Boards of Cooperative Education Services (BOCES) that authorize schools as a school district. BOCES are educational service agencies that provide services (e.g., school authorization, special education, curriculum and staff development, alternative schools and programs, standards and assessment support, technology support, vocational education, data management, and grant management) to two or more member school districts that alone cannot afford the service or find it advantageous and cost-effective to cooperate with other districts. The Department includes two other entities as school districts in the accountability data and performance frameworks: the Colorado School for the Deaf and Blind and the Charter School Institute, which authorizes 41 charter schools.

Table 1 shows statewide total student enrollment, pupil-teacher ratios, and 4-year graduation rates for the 2013–14 through 2021–22 school years. For the 2021–22 school year, student enrollment totaled 886,517 students, and the pupil-teacher ratio was 17.1 to 1. The latest available 4-year graduation rate was 81.7 percent (2020–21 school year). When looked at over time, total student enrollment had been increasing until the 2020–21 school year when it dropped during the COVID-19 pandemic. The pupil-teacher ratio has also dropped slightly over time. The 4-year graduation rate has increased over time.

Table 1. Colorado Total Student Enrollment, Pupil-Teacher Ratios, and 4-Year Graduation Rates, 2013–14 to 2021–22 School Years

	School Year								
	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22
Total Student Enrollment	876,999	889,006	899,112	905,019	910,280	911,536	913,223	883,199	886,517
Pupil-Teacher Ratio	17.7 to 1	17.5 to 1	17.5 to 1	17.6 to 1	17.5 to 1	17.3 to 1	17.1 to 1	16.6 to 1	17.1 to 1
4-Year Graduation Rate	77.3%	77.3%	78.9%	79.0%	80.7%	81.8%	81.9%	81.7%	–[1]

Source: Colorado Department of Education, Colorado Education Facts and Figures (April 2022).

[1]Not available as of November 2022.

Of Colorado's 178 school districts, 153 districts (86 percent) are classified as rural and serve 17 percent of Colorado's total student population; 84 of these rural districts have fewer than 500 students. The remaining 25 districts (11 percent) are classified as urban/suburban and serve 83 percent of Colorado's total student population.

Table 2 shows demographics for the statewide student population for the 2021–22 school year broken out by disaggregated student groups. Much of our analysis for this evaluation involved examining student achievement data across these student groups because they represent a common set of education demographic data that is captured for all students statewide and they were specifically highlighted in the state statute requiring this evaluation.

Table 2. Colorado Student Population Demographics, 2021–22 School Year

Demographic	Student Count	Percentage[1]
Race/Ethnicity		
White	460,186	51.9%
Hispanic	306,215	34.5%
Black	40,229	4.5%
Asian	28,214	3.2%
American Indian	5,745	<1.0%
Hawaiian/Pacific Islander	2,578	<1.0%
Two or More Races	43,353	4.9%
Gender		
Female	431,522	48.7%
Male	454,995	51.3%
Free or Reduced Lunch[2]	329,600	37.2%
English Learner[3]	109,581	12.4%
Students with Disabilities[4]	105,399	11.9%

Source: Colorado Department of Education.

[1]Percentages are calculated based on a statewide total student enrollment of 886,517 students.

[2]Students who qualify for free or low-cost school meals based on applicable household income guidelines. Free or reduced lunch status is commonly used in educational research as a proxy measure for socioeconomic status.

[3]Students who are unable to communicate fluently or learn effectively in English and who typically require specialized or modified instruction in both the English language and in their academic courses.

[4]Students who are classified as having a disability and receive special education and related services.

Assessment and Accountability

Colorado's statewide system of standards and assessments and statewide system for accrediting schools and districts are primarily designed to (a) provide valid and actionable information regarding the progress of all students toward meeting academic standards and (b) prioritize support for schools and districts identified for improvements. We refer to these two interrelated components as the statewide education accountability system. A description of key terms and definitions used throughout this report is provided at the end of the report.

Statewide System of Standards and Assessments

In 2008, Colorado adopted a statewide system of standards and assessments through passage and enactment of the Preschool to Postsecondary Education Alignment Act [Sections 22-7-1001 through 1019, C.R.S.]. This effort was intended to align the public education system to ensure that students are prepared for higher education or the workforce by:

- Aligning statewide academic standards and assessments from preschool through secondary education.
- Collecting data to assess student performance, workforce planning, preparation, and readiness.

- Requiring annual reporting from the Department that summarizes actions taken by the State Board, the Colorado Commission on Higher Education, and schools and districts.

All public school students enrolled in Colorado are required by state law to take a standards-based summative assessment (commonly referred to as standardized tests) each year. Administered in specific subjects and grade levels, these statewide assessments help students and their families know whether they are meeting grade-level expectations, how they are performing compared to their peers statewide, and how they have grown academically over time. The statewide assessments are also the primary means for helping school and district leaders, the Department, policymakers, and the public evaluate student learning, progress, and proficiency against grade-level expectations defined in the Colorado Academic Standards. The Colorado Academic Standards reflect statewide instructional priorities and set clear, consistent guidelines for essential skills development (e.g., critical thinking, creativity, problem solving, collaboration, communication) regarding what students should know and be able to do at each grade level or grade span across 10 content areas.

Colorado's current statewide assessments include the following:

- Colorado Measures of Academic Success (CMAS) assessments are the State's common statewide standards-based assessments of student performance in English language arts (ELA), math, and science. In spring of a typical year, the CMAS ELA and CMAS math assessments are administered to students in grades 3 through 8, and the CMAS science assessment is administered to students in grades 5, 8, and 11. CMAS ELA and math assessment scores range from 650 to 850, and CMAS science assessment scores range from 300 to 900. Prior to 2014, Colorado used the Colorado Student Assessment Program (CSAP) assessments.

- PSAT is a standardized test administered to students in grades 9 and 10 and covers reading, writing and language, and math. PSAT scores are divided into two components: evidence-based reading and writing (reading/writing) and math, ranging from 120 to 760 for students in grades 9 and 10 for each component (240 to 1520 for the total combined score). PSAT scores are used as a postsecondary readiness benchmark; however, the PSAT is not used in college and university admissions decisions.

- SAT is a standardized test administered to students in grade 11 and covers reading, writing and language, and math. SAT scores are divided into two components: evidence-based reading and writing (reading/writing) and math, ranging from 200 to 800 for each component (400 to 1600 for the total combined score). SAT scores are used as a postsecondary readiness benchmark and an indicator of achievement of the Colorado Academic Standards. The SAT is also used as an entrance exam for some college and university admissions decisions. Prior to 2017, Colorado used the American College Testing (ACT) test as its statewide assessment for students in grade 11.

- Colorado Alternate Assessments (CoAlt) are the State's common statewide standards-based assessments of student performance in ELA, math, and science that are designed specifically for students with the most significant cognitive disabilities. The CoAlt assessments are administered in place of the CMAS assessments, PSAT, and SAT on a similar overall schedule. Approximately 1 percent of all students statewide take the CoAlt assessments.

- ACCESS for ELLs is a standardized English language proficiency assessment given annually to those students in kindergarten through grade 12 who have been identified as English learners. It provides information about the English language proficiency level of students in the language domains of listening, speaking, reading, and writing.

Statewide System for Accrediting Schools and Districts

In 2009, Colorado adopted a statewide system for accrediting schools and districts through passage and enactment of the Education Accountability Act of 2009 [Sections 22-11-101 through 705, C.R.S.]. This system for accreditation includes, in part:

- Creation of a state data reporting system and reporting requirements for schools and districts.

- Use of performance ratings for schools and districts to report whether and to what extent they are meeting established performance expectations.

- Interventions for schools or districts not consistently meeting standards.

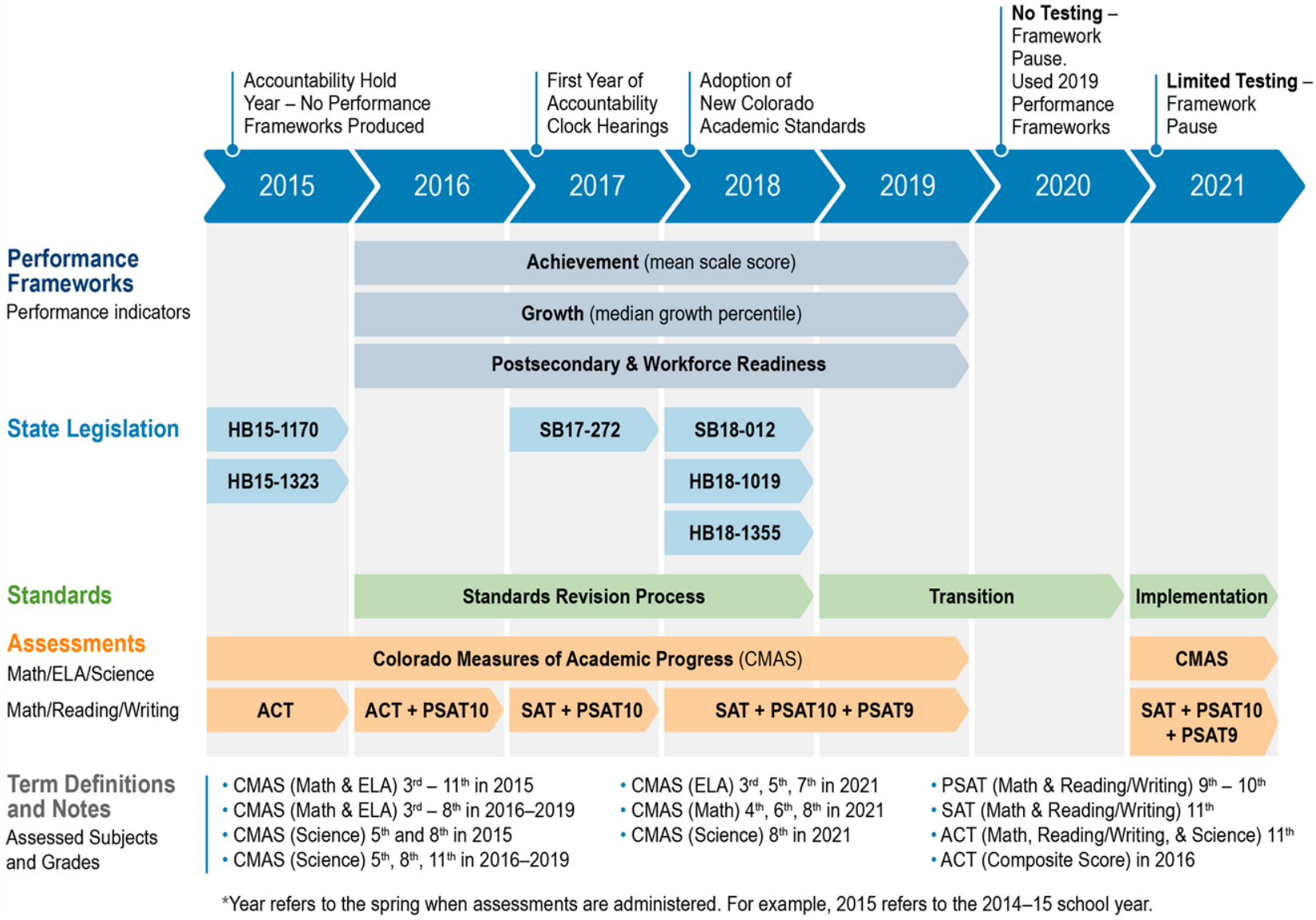
- Adoption of the Colorado Growth Model to measure longitudinal academic growth (i.e., how individual students progress academically from one year to the next).

Each year, the Department relies on quantitative data measuring three performance indicators of student academic performance—academic achievement, academic growth, and postsecondary and workforce readiness—to determine whether and to what extent each school and district has met overall performance expectations. The Department combines these three performance indicators to determine an overall performance rating for each school and district. Schools and districts with low performance ratings are advised to implement research-based strategies to improve student outcomes. Additional details on school and district performance indicators and the resulting ratings are provided in Chapter 2.

Changes Over Time

There have been a number of structural changes to Colorado's statewide accountability system over the past decade (see Figure 1). Subsequent to passage of the Preschool to Postsecondary Education Alignment Act in 2008, the State Board adopted the new Colorado Academic Standards, and Colorado began transitioning to using the CMAS assessments and the PSAT and SAT as the new statewide standardized assessments. Full transition to the new statewide assessments took place over several years. For example, students started taking the CMAS science assessments in the 2013–14 school year and the CMAS assessments for ELA and math in the 2014–15 school year. The PSAT was introduced in the 2015–16 school year for students in grade 10 and replaced the corresponding CMAS assessments. Students in grade 11 took the ACT test for the final time, and the corresponding CMAS assessments were discontinued. During the 2016–17 school year, students in grade 10 took the PSAT and students in grade 11 took the SAT. The PSAT was subsequently added in the 2017–18 school year for students in grade 9, replacing the corresponding CMAS assessments.

Figure 1. Timeline of Colorado Performance Frameworks and Assessments



Source: Colorado Department of Education.

More recently, due to the COVID-19 pandemic, no content assessments were administered during the 2019–20 school year (ACCESS for ELLs was administered since its testing window was prior to the pandemic closures), and assessments were administered on a limited basis during the 2020–21 school year (e.g., students in grades 3, 5, and 7 took the CMAS ELA assessment and students in grades 4, 6, and 8 took the CMAS math assessment). All assessments used for accountability purposes were administered for the 2021–22 school year, which was in progress during our evaluation.

Due to these structural changes and other significant external events, the comparability and completeness of the assessment data over time was limited. Therefore, we generally focused our analyses in this evaluation on the 2015–16 through 2018–19 school years.

Evaluation Purpose, Scope, and Methodology

In accordance with the provisions of House Bill 21-1294, codified in Section 2-3-127, C.R.S., the Colorado Office of the State Auditor (OSA) contracted with the Human Resources Research Organization (HumRRO), to conduct an independent evaluation of Colorado's K–12 Education Accountability System. Work on this evaluation was performed from October 2021 through November 2022. HumRRO is a nationally recognized, independent, nonprofit research organization with extensive experience and expertise in state education assessment and accountability systems. HumRRO has worked with numerous state departments of education and has supported state assessment programs in Florida, Kentucky, and Minnesota for more than 15 years.

Sections 2-3-127(3)(a) through (o), C.R.S., outline the following 15 specific objectives for the evaluation:

Evaluation Objective	Chapter Reference for Discussion and Analysis
A. Whether the statewide education accountability system is effective in objectively measuring the performance of public schools and school districts in delivering a thorough and uniform public education for all groups of students.	Chapter 2
B. Whether and to what extent the statewide education accountability system effectively identifies success and drives effective support for improvement at each level of the statewide system of public education.	Chapter 2, Chapter 4
C. Whether and to what extent unintended barriers or obstacles exist that inadvertently impact the performance of students from different racial, ethnic, socioeconomic, or disability communities, as measured by the statewide system of standards and assessments and the statewide accountability system, including how these systems are implemented by schools and school districts.	Chapter 2

Evaluation Objective	Chapter Reference for Discussion and Analysis
D. Whether and to what extent interventions implemented under the statewide education accountability system are effective in supporting and improving outcomes for schools that serve predominantly low-income students, students of color, or students with disabilities, including interventions that focus primarily on increasing students' performance on statewide standardized tests in lieu of other non-testing-related courses and activities within a school	Chapter 4
E. Whether and to what extent interventions, including interventions identified by the statewide education accountability system, effectively support students who are in poverty or students with disabilities and schools and districts serving high percentages of students in poverty or students with disabilities.	Chapter 4
F. Whether and to what extent the outcomes identified and measured by the system of standards and assessments and the statewide education accountability system reflect inequities and correlate to the level of poverty present within, and concentration of students with disabilities within, the student populations enrolled in the public schools, school districts, and boards of cooperative services.	Chapter 2
G. Whether and to what extent low-income students and students with disabilities enrolled in public schools, school districts, and boards of cooperative services are given access to learning opportunities that will allow them to achieve the same levels of attainment that their higher-income peers achieve on the preschool through elementary and secondary education standards adopted pursuant to Section 22-7-1005, C.R.S.	Chapter 3
H. Whether and to what extent, and how, in response to the system of standards and assessments and the statewide education accountability system, school districts shift educational resources and interventions, change their instructional practices, and target assistance to students who are close to achieving grade-level scores or modify their instructional practices and target particular cohorts of students.	Chapter 3
I. Whether and to what extent variations in the size of student populations have a disproportionate impact on the accuracy and comparability of results achieved through the statewide system of standards and assessments and the statewide education accountability system.	Chapter 2

Evaluation Objective	Chapter Reference for Discussion and Analysis
J. Whether and to what extent the outcomes measured by the statewide system of standards and assessments and the statewide education accountability system accurately correlate to a school's effectiveness in helping students develop the skills and capacities that are relevant to families and employers, including but not limited to innovation, academic rigor, career and technical education, and workforce readiness and essential skills.	Chapter 3
K. Whether and to what extent participation rates on statewide standardized tests affect the results achieved through the statewide system of standards and assessment and the statewide education accountability system.	Chapter 2
L. Whether the Colorado Growth Model continues to meet the statutory goals for the model.	Chapter 3
M. Whether the statewide system of standards and assessments and the statewide education accountability system provide a credible basis for comparison between and among public schools and between and among school districts, boards of cooperative services, and the State Charter School Institute.	Chapter 2
N. Whether and to what extent information regarding assessments and accountability is accessible to educators, parents, and families, and communicated in a language parents and families can understand, with clear guidance on actions to support student learning.	Chapter 3
O. Whether and to what extent the statewide system of standards and assessments and the statewide education accountability system identify schools and school districts that are not meeting the academic needs of under-represented groups of students, including groups based on race, ethnicity, religion, sex, sexual orientation, nationality, disability, age, and economic status, and whether interventions to serve the students in these groups are successful in increasing academic achievement for students in these groups.	Chapter 2, Chapter 4

Overall, we developed and executed a work plan for the evaluation that was data-driven and relied on both quantitative and qualitative methodologies. As required by Sections 2-3-127(4)(a) and (4)(b), C.R.S., we obtained data and information directly from the Department or other publicly available sources to the greatest extent possible. This approach was designed to minimize the direct burden on districts and schools and to limit the overall timeline and cost of the evaluation. We also entered into a Data Sharing Agreement with the Department and the OSA for audit purposes in compliance with the Federal Educational Rights and Privacy Act of 1974, as amended.

Work performed on the evaluation involved the following key areas of activity:

- Reviewed state statutes related to the statewide system of standards and assessments, the statewide education accountability system, and the Colorado Growth Model.

- Reviewed documents, reports, fact sheets, and technical information and guidance available on the Department's website related to statewide student assessments, school and district performance frameworks, state-supported interventions, unified improvement planning, postsecondary and workforce readiness, the Colorado Growth Model, and state accountability data.

- Reviewed relevant educational research and best practices related to education accountability measures.

- Obtained and analyzed statewide assessment data (CMAS, PSAT, SAT, CoAlt, and ACCESS for ELLs) for the 2014–15 through 2020–21 school years. We generally limited our analyses of the assessment data to the 2015–16 through 2018–19 school years due to issues with the comparability and completeness of the data over time. Schools and districts without sufficient student-level data for calculating and reporting performance ratings were generally excluded from our analysis.

- Obtained and analyzed district and school-level data for the 2008–09 through 2020–21 school years for disaggregated student groups (e.g., demographic characteristics, free or reduced lunch eligibility, English learner status), graduation and dropout rates, matriculation (enrollment) rates at 2-year and 4-year institutions, career and technical education participation, Advanced Placement and International Baccalaureate exam participation, participation in state-supported interventions, and statewide assessment parent excusal counts.

- Obtained and analyzed data related to school and district performance indicators and resulting performance ratings for the 2010–11 through 2018–19 school years.

- Conducted a voluntary online Educator Survey targeted for participation by district and school administrators, classroom teachers, and special educators. The purpose of the Educator Survey was to gauge perceptions and attitudes about the usefulness and understandability of the accountability data and the extent to which these data are used to inform educational programing or instruction.

    - An invitation to participate in the Educator Survey was sent to all district superintendents with a request that they further distribute the invitation, along with the survey link, to appropriate district and school personnel. The Educator Survey was active from March 22 through April 16, 2022, and we received a total

of 1,446 valid responses. See Appendix B for the distribution of responses based on the county in which the respondent reported their district or school is primarily located. About 74 percent of the responses we received were from respondents who reported that their school or district is primarily located in Adams, Arapahoe, El Paso, or Pueblo Counties.

  - *Because of the Educator Survey's design and voluntary nature, the results are only representative of those 1,446 individual educators who responded. The Educator Survey results are not representative of and cannot be projected to any specific school, district, or statewide educator populations.*

- Conducted a voluntary online Parent Survey targeted for participation by parents and guardians with students in Colorado's public school system. The purpose of the Parent Survey was to gauge perceptions and attitudes about the usefulness and understandability of accountability data and the extent to which these data are used to support the education of their children. The Parent Survey was made available in English and Spanish.

  - An invitation to participate in the Parent Survey was sent to all district superintendents with a request that they further distribute the invitation, along with the survey links, to parents and guardians through existing district and/or school communication channels. The Parent Survey links may have also been distributed through various parent groups and associations.

  - The Parent Survey was active from March 22 through April 16, 2022, and we received a total of 3,130 valid responses (3,088 responses to the English language survey and 42 responses to the Spanish language survey). See Appendix C for the distribution of responses based on the county in which the respondent reported they live. About 74 percent of the responses we received were from respondents who reported living in Adams, Arapahoe, El Paso, or Pueblo Counties.

  - *Because of the Parent Survey's design and voluntary nature, the results are only representative of those 3,130 individual parents who responded. The Parent Survey results are not representative of and cannot be projected to any specific school, district, or statewide parent populations.*

- We conducted interviews with administrators and personnel from a sample of districts and schools. Specific districts were targeted for participation based on their current or past participation in one or more state-supported interventions (i.e., Connect for Success, School Turnaround Leaders Development, Tiered Intervention Grant, and/or Transformation Network). Specific high schools were targeted for participation based on their current performance rating and their postsecondary and workforce readiness measures (these measures do not apply to elementary or middle schools). A request to participate in the district and school interviews was made to district superintendents for the targeted districts and schools. We invited administrators and personnel from 20 districts to participate in interviews; administrators and personnel from nine districts participated (Adams 12 Five Star Schools, Cañon City School District RE-1, the State Charter School Institute, Colorado Springs School District 11, Harrison School District 2, Mesa County Valley School District 51, Pueblo City School District 60, Roaring Fork School District RE-1, Thompson School District R2-J). We invited administrators and

personnel from 24 high schools to participate in interviews; administrators and personnel from six high schools participated (Adams City High School, Discovery Canyon Campus High School, Fairview High School, Fruita Monument High School, Rifle High School, Thomas MacLaren State Charter School). The district and school interviews took place between March 22 and May 20, 2022. We worked to ensure equal opportunity for targeted districts and schools to participate, and the interviews provided important contextual information. *However, because of the interviews' limited and voluntary nature, the results are only representative of those nine districts and six high schools who participated and cannot be projected to any broader populations.*

- We held listening sessions with various stakeholder groups representing a variety of interests, including rural and urban districts and schools, charter schools, the business community, liberal and conservative groups, local school boards, school executives, and regional consortiums. Although we had several broad questions to guide participants' discussion, the sessions were open for stakeholders to offer their perspectives on any aspect of the accountability system and their related issues and concerns. We invited 14 stakeholder groups to participate in the listening sessions; representatives from 11 stakeholder groups participated (Association of Colorado Educational Evaluators, Colorado Association of School Boards, Colorado Association of School Executives, Colorado League of Charter Schools, Colorado Rural Schools Alliance, Colorado Succeeds, Democrats for Education Reform, Denver Area School Superintendent's Council, Pikes Peak Region Student Achievement Consortium, Ready Colorado, Western Slope Superintendents). The listening sessions took place between May 9 and August 25, 2022. We worked to ensure equal opportunity for stakeholder groups to express a variety of views and perspectives, and the listening sessions provided important contextual information. *However, because of the listening sessions' limited and voluntary nature, the results are only representative of those 11 stakeholder groups who participated and cannot be projected to any broader populations.*

The scope of the evaluation was limited to the specific objectives outlined in Sections 2-3-127(3)(a) through (o), C.R.S. Accordingly, this evaluation did not include any other areas of the State Board's or the Department's responsibilities, including, but not limited to school or district fiscal oversight or school funding-related matters; the design or validity of the Colorado Academic Standards, the Colorado Growth Model, or the statewide assessment; data reporting; specific intervention, support, or technical assistance grants or programs; educator licensing; or accreditation-related monitoring, decisions, actions, and administrative processes. The evaluation also did not include any governance or administration-related matters at the district or school levels.

We appreciate the cooperation and input provided by the Department, district and school administrators and personnel, parents, and stakeholder groups throughout the evaluation.

Chapter 2: School and District Performance Frameworks

In the legislative declaration to the Education Accountability Act of 2009, the General Assembly established that an effective statewide education accountability system is one that (a) holds the State, school districts, and individual public schools accountable for performance on the same set of statewide performance indicators supported by consistent, objective measures, and (b) recognizes success and provides support for improvement at each level [Sections 22-11-102(1)(d), (3)(a), and (3)(e), C.R.S.].

In this chapter, we discuss various analyses related to the district and school performance frameworks.

Performance Indicators and Performance Ratings

The Colorado Department of Education (Department) conducts an annual review of the performance of public schools and districts in the state and makes recommendations to the State Board of Education (State Board) concerning the type of school improvement plan to be implemented in each school and the accreditation category for each district. These school and district performance ratings help the Department and State Board identify high-performing schools and districts for understanding and disseminating best practices, as well as low-performing schools and districts for directing additional resources and supports or, if low performance persists over time, initiating corrective action.

Student assessments used in calculating performance indicators are administered in the spring, toward the end of each school year. The assessment data are then aggregated and analyzed with final performance reports and ratings issued in the fall at the start of the subsequent school year. Throughout the report, we use the school year format for dates. For example, 2017–18 refers to the school year starting in fall 2017 and ending in spring 2018. In this example, the statewide assessments for this school year would have been administered in spring 2018 with the resulting school and district performance reports and ratings distributed in fall 2018.

As shown in Figure 2, the Department uses quantitative data for three performance indicators to assign a performance category based on whether each school and district Exceeds, Meets, Approaches, or Does Not Meet expectations for the performance indicator. The three performance indicators are as follows:

- Academic Achievement (Achievement) – This performance indicator reflects student achievement based on mean scale scores (i.e., average scale scores) from statewide standardized assessments.

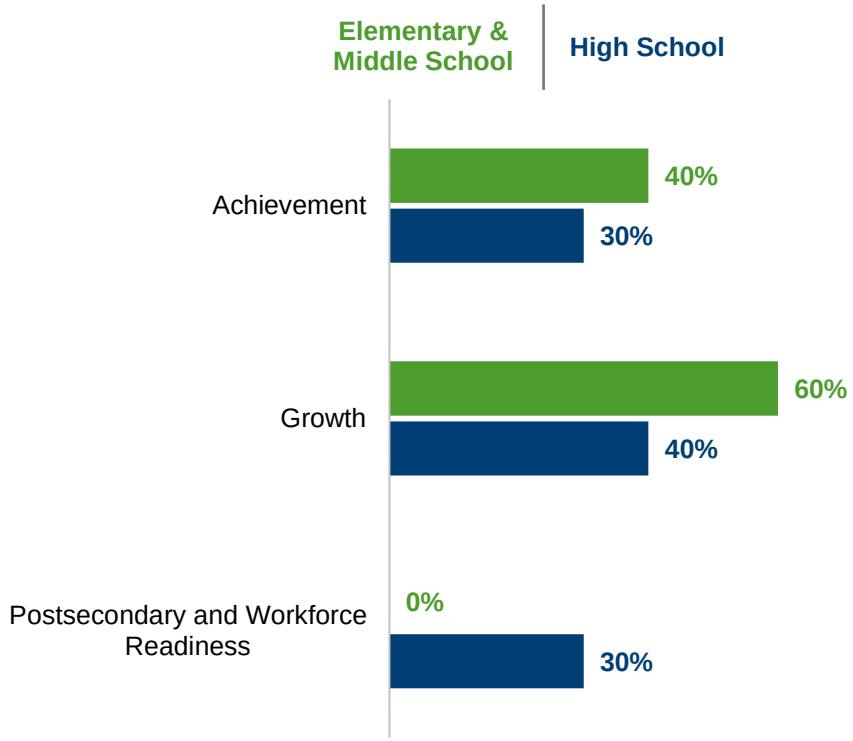
- Academic Growth (Growth) – This performance indicator reflects student achievement progress on statewide standardized assessments from one year to the next based on growth percentiles calculated from the Colorado Growth Model. We provide a description of the Colorado Growth Model, including student growth percentiles and median growth percentiles, in the next section.

- Postsecondary and Workforce Readiness (PWR) – This performance indicator only applies to high schools and districts and measures factors such as graduation rates, dropout rates, average scores on college entrance exams, and matriculation (enrollment)

rates for college and other postsecondary options. Inclusion of a postsecondary and workforce readiness component in performance ratings is required by the federal Every Student Succeeds Act.

The Department combines and weights the performance indicators and categories to determine an overall performance rating (also referred to as a plan type) for each school and district. Performance ratings for elementary and middle schools are weighted 40 percent Achievement and 60 percent Growth; there is no PWR component. For high schools and districts, the weighting is 30 percent Achievement, 40 percent Growth, and 30 percent PWR. The State Board set the current weights in 2015–16.

Figure 2. Weighting of School and District Performance Indicators.



Source: Colorado Department of Education.

Table 3 and 4 describe the respective performance ratings for districts and schools, ordered from the highest performance rating to the lowest performance rating.

Table 3. District Performance Rating Descriptions and Distribution, 2018–19

District Performance Rating		Number (Percent) of Districts
● Accredited with Distinction	These districts are identified as high performing. They meet or exceed expectations on the majority of performance indicators.	20 (10.9%)
● Accredited	These districts are meeting expectations on the majority of performance indicators.	111 (60.3%)
● Accredited with Improvement Plan	These districts are identified as lower performing. They may be meeting expectations on some performance indicators, but they are not meeting or are only approaching expectations on many.	49 (26.6%)
● Accredited with Priority Improvement Plan	These districts are identified as low performing. They are not meeting or are only approaching expectations on most performance indicators. The State monitors and provides support to these districts until they improve.	4 (2.2%)
● Accredited with Turnaround Plan	These districts are identified as among the lowest performing districts in the state. They are not meeting or are only approaching expectations on most performance indicators. The State monitors and provides support to these districts until they improve.	0 (0%)
● Insufficient State Data[1]	These districts did not have enough data to calculate and report a performance rating due to (a) small student populations in tested grades, (b) no tested grades served, and/or (c) low test participation among enrolled students.	0 (0%)

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Percentages may not sum to 100 due to rounding.
[1]This is not a performance rating category. Analyses in this evaluation do not include districts in this category because there are no performance data reported for these districts.

Table 4. School Performance Rating Descriptions and Distribution, 2018–19

School Performance Rating		Number (Percent) of Schools
● Performance Plan	These schools are meeting expectations on the majority of performance indicators.	1,256 (68.6%)
● Improvement Plan	These schools are identified as lower performing. They may be meeting expectations on some performance indicators, but they are not meeting or are only approaching expectations on many.	395 (21.6%)
● Priority Improvement Plan	These schools are identified as low performing. They are not meeting or are only approaching expectations on most performance indicators. The State monitors and provides support to these schools until they improve.	114 (6.2%)
● Turnaround Plan	These schools are identified as among the lowest performing schools in the state. They are not meeting or are only approaching expectations on most performance indicators. The State monitors and provides support to these schools until they improve.	40 (2.2%)
● Insufficient State Data[1]	These schools did not have enough data to calculate and report a performance rating due to (a) small student populations in tested grades, (b) no tested grades served, and/or (c) low test participation among enrolled students.	27 (1.5%)

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Percentages may not sum to 100 due to rounding.
[1]This is not a performance rating category. Analyses in this evaluation do not include schools in this category because there are no performance data reported for these schools.

Based on data for the 2018–19 school year, most districts received the second-highest Accredited rating, and most schools received the highest Performance Plan rating. The performance ratings were paused for the 2019–20 and 2020–21 school years in response to disruptions created by the COVID-19 pandemic.

Schools and districts with Priority Improvement Plan or Turnaround Plan ratings receive guidance on implementing research-based strategies to improve student outcomes and are eligible to participate in intervention programs to facilitate improvement. Additionally, the Department monitors schools or districts with Priority Improvement Plan or Turnaround Plan ratings for improvements. The State Board must direct schools and districts that receive either of the lowest two ratings for five or more years to pursue one of the remedies outlined in statute, such as working with an external management partner, converting a district-run school into a charter school, pursuing an innovation plan, or closing a school.

Colorado Growth Model

The Colorado Growth Model (Growth Model) is a statistical model that uses the results of statewide assessments to measure the relative academic growth of individual students from one year to the next. Individual students' scores from statewide assessments are matched with those of their academic peers (i.e., students currently in the same grade with a similar score history on the statewide assessments in that subject). For example, a student who scored 685 on the third grade CMAS math assessment in 2017 and 710 on the fourth grade CMAS math assessment in 2018 would be grouped with other students in their grade who had similar CMAS math assessment score histories. As a result of this analysis, each student is given a **student growth percentile** (also referred to as a growth score). For example, a student with a student growth percentile of 60 grew academically from the prior year as well as or better than 60 percent of their academic peers.

The State Board has defined the following growth categories:

- *Low growth* is a student growth percentile of 35 or below.
- *Typical growth* is a student growth percentile of 36 to 65.
- *High growth* is a student growth percentile above 65.

Median growth percentile is an aggregate measure of overall student growth outcomes *for schools, districts, and disaggregated student groups.* It represents the midpoint of the distribution of all the individual student growth percentiles for students enrolled in a school or district during the October 1 census count and the spring testing window. In general, a higher median growth percentile indicates higher growth rates for students in that school or district (i.e., the school's or district's distribution midpoint is higher). For a school or district to have a higher median growth percentile, the overall population of students in the school or district must demonstrate higher levels of growth than their academic peers (i.e., have higher student growth percentiles).

Because of the way it is calculated, the median growth percentile allows for an overall comparison of student growth between schools and districts. As mentioned previously, the Colorado Growth Model supplies the necessary data for the Academic Growth performance indicator, which is one of three performance indicators used in the annual school and district performance ratings. We provide a review of whether the Colorado Growth Model supports its statutory objectives in Chapter 3.

Table 5 presents the average, minimum, and maximum median growth percentiles across all districts by subject for 2018–19.

Table 5. Average, Minimum, and Maximum District Median Growth Percentiles by Subject, 2018–19

Subject	Average Median Growth Percentile	Minimum Median Growth Percentile	Maximum Median Growth Percentile
CMAS ELA	48.5	26.0	68.0
CMAS Math	48.3	30.0	68.0
PSAT/SAT Reading/Writing	46.4	25.0	71.0
PSAT/SAT Math	48.7	24.0	81.0

Source: HumRRO's analysis of data from the Colorado Department of Education.

Work Performed

We examined the school and district performance indicators and resulting performance ratings for 2018–19 to determine the extent to which schools and districts are being assigned an appropriate performance rating given the underlying achievement, growth, and postsecondary workforce readiness of their students. Specifically, we examined the proportion of districts and schools in each performance rating who exceeded, met, approached, or did not meet the standards on each indicator (Achievement, Growth, and PWR). Districts and schools with large numbers of students who meet or exceed standards should be in the higher performance categories. Conversely, districts and schools with large numbers of students who do not meet or are approaching performance expectations should be in the lower performance categories. We also examined whether school type (e.g., traditional public schools, charter schools) has any relationship with overall performance ratings or mean scale scores on statewide assessments.

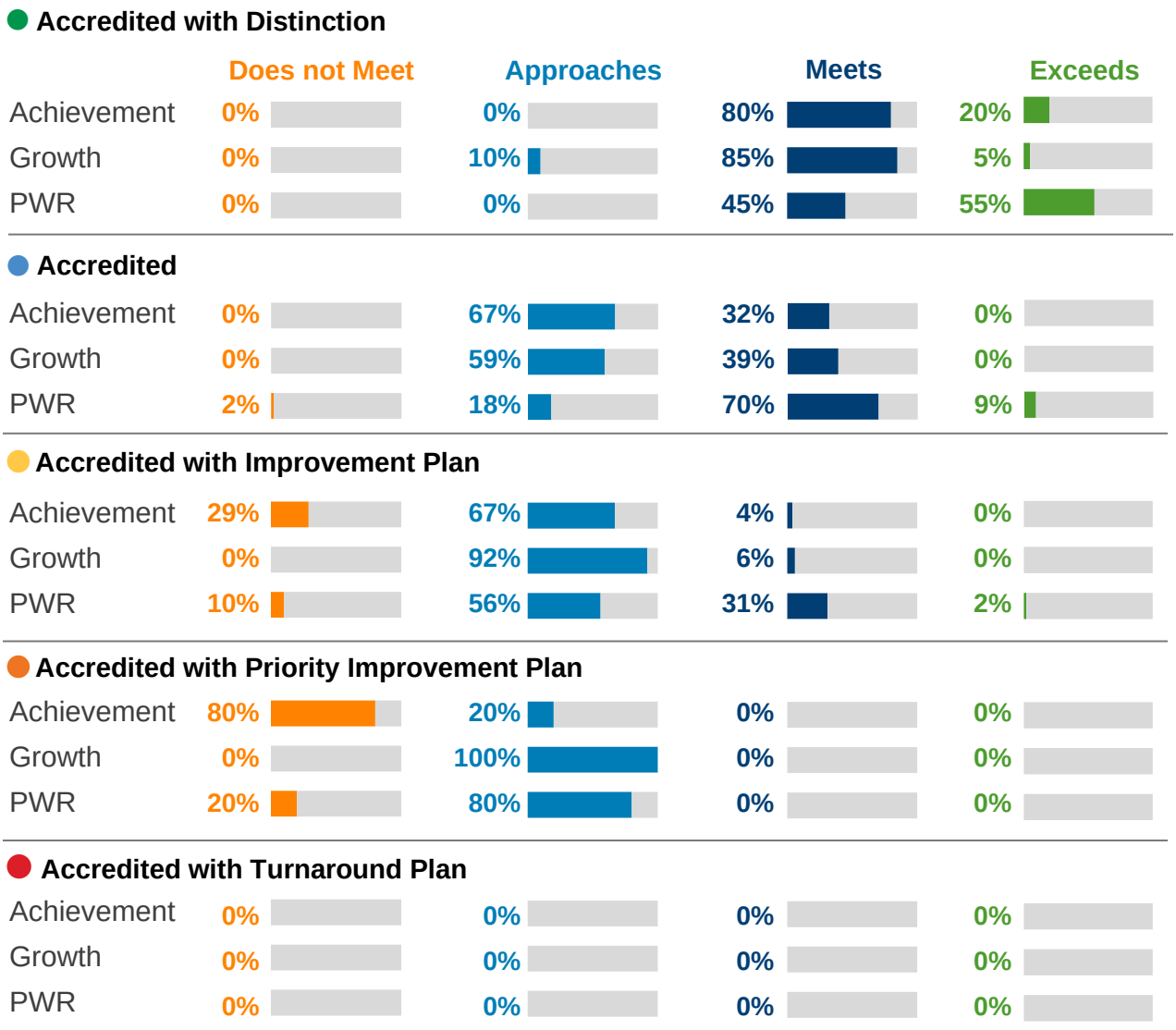
What We Found

Overall, we found that the performance indicators and measures used in Colorado's statewide education accountability system provide a reasonable and appropriate basis for objectively measuring the performance of districts and public schools. We did not identify any significant gaps in the design of the accountability system. Additionally, our analysis showed that schools and districts are assigned performance ratings consistent with their underlying performance indicator scores. As expected, we found that higher performing districts and schools tend to have performance indicator scores that Meet or Exceed standards, whereas lower performing districts and schools tend to have performance indicator scores that Approach or Do not Meet standards. Districts and schools with higher performance ratings tend to have higher mean scale scores on statewide assessments, higher median growth percentiles, and higher PWR scores. The last section of this chapter includes information about the relationships between achievement and growth and school performance ratings at the disaggregated student group level. Additionally, our review of performance rating data over time generally shows that schools and districts receiving lower performance ratings see improvements in subsequent years, indicating that receiving a lower performance rating can be a catalyst for helping to focus and facilitate improvement efforts. Finally, we found that differences in school performance ratings and academic achievement by school type were minor.

Distribution of Performance Indicator Scores

We analyzed the distribution of scores for the Achievement, Growth, and PWR performance indicators for schools and districts within each performance rating in 2018–19. At the district level (Figure 3), data show that districts with higher performance ratings generally either met or exceeded expectations for the underlying performance indicators. For example, all districts with an Accredited with Distinction rating (the highest performance rating) in 2018–19 either met or exceeded expectations for the Achievement and PWR performance indicators; 90 percent of these districts either met or exceeded expectations for the Growth performance indicator.

Figure 3. Distribution of Performance Indicator Scores Across Performance Categories by District Performance Rating, 2018–19



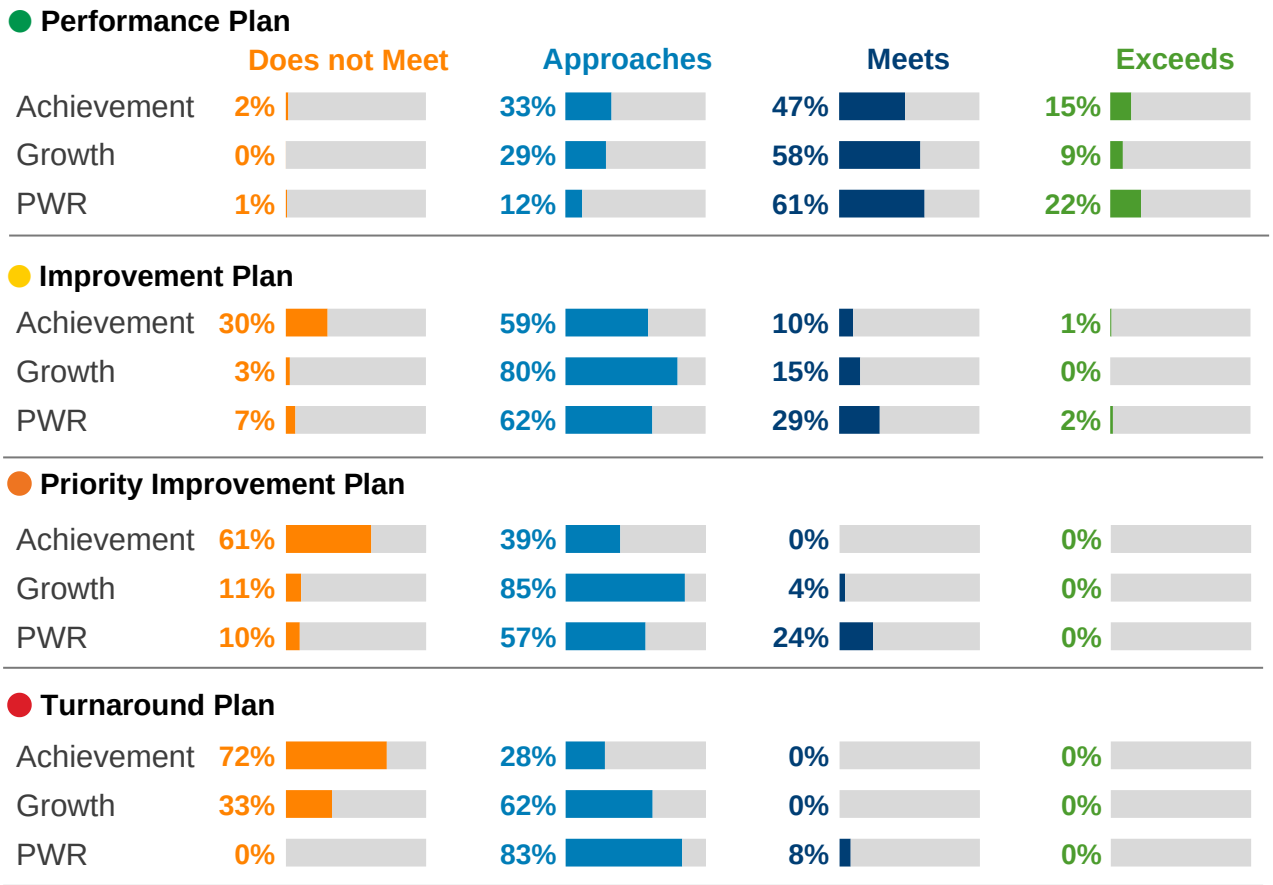
Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Percentages may not sum to 100 because some indicators are not available for some schools.

In the lower performance rating categories, the overall percentage of districts that either approached or did not meet expectations for each performance indicator increased. For example, all districts with an Accredited rating in 2018–19 either approached or met expectations for the Achievement and Growth performance indicators, and all districts with an Accredited with Priority Improvement Plan rating (the second-lowest performance rating) in 2018–19 either approached or did not meet expectations for all three performance indicators. No districts received an Accredited with Turnaround Plan rating (the lowest performance rating) in 2018–19.

Results at the school level (Figure 4) demonstrate a similar pattern as the district-level results. A larger percentage of schools with higher performance ratings either met or exceeded expectations, whereas a higher percentage of schools with lower performance ratings either approached or did not meet expectations for the underlying performance indicators. For example, 62 percent of schools receiving a Performance Plan rating (the highest school rating) in 2018–19 either met or exceeded expectations for the Achievement performance indicator; this percentage was 67 percent for the Growth performance indicator, and 83 percent for the PWR performance indicator (high schools only). All schools receiving a Turnaround Plan rating (the lowest school rating) in 2018–19 either approached or did not meet expectations for the Achievement and Growth performance indicators; 83 percent of high schools receiving a Turnaround Plan rating approached expectations for the PWR performance indicator.

Figure 4. Distribution of Performance Indicator Scores Across Performance Categories by School Performance Rating, 2018–19



Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Percentages may not sum to 100 because some indicators are not available for some schools.

Although higher performing schools and districts tended to have higher performance indicator scores and lower performing schools and districts tended to have lower performance indicator scores, there was more variation in the school-level data than the district-level data. For example, we found that 35 percent of schools with a Performance Plan rating (the highest school rating) in 2018–19 were approaching or did not meet expectations for the Achievement performance indicator; 29 percent were approaching or did not meet expectations for the Growth indicator; and 13 percent were approaching or did not meet expectations for the PWR indicator (high schools only). Conversely, about 8 percent of high schools receiving a Turnaround Plan rating (the lowest school rating) met expectations for the PWR performance indicator. Because multiple performance indicators are used and they are weighted differently when determining overall performance ratings, higher scores on one performance indicator can compensate to some extent for lower scores on another performance indicator and vice versa.

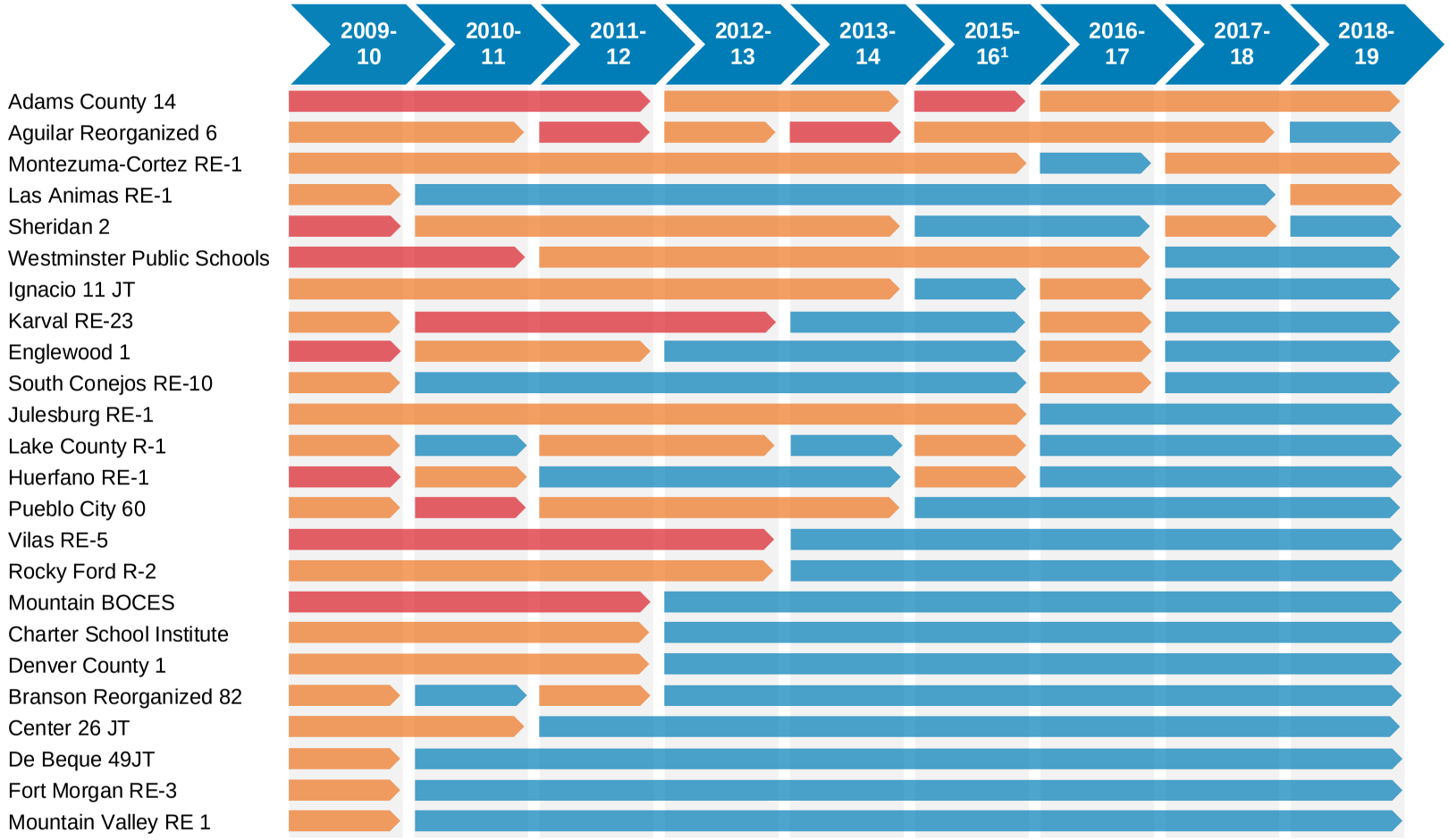
Schools and Districts Receiving Low Performance Ratings

We reviewed data from 2010–11 to 2017–18 and identified a total of 720 schools that received the lowest Priority Improvement Plan or Turnaround Plan ratings at some point during the period. Of these 720 schools, only 132 schools (18 percent) remained in these two lower performance rating categories for more than one or two years.

At the district level, 24 districts received Accredited with Priority Improvement Plan or Accredited with Turnaround Plan ratings in 2009–10. Figure 5 shows the subsequent performance trajectories of these 24 districts. Three of the districts received higher Accredited with Improvement Plan, Accredited, or Accredited with Distinction ratings the following year (2010–11) and remained in that status through 2018–19. Half of the districts received Accredited with Priority Improvement Plan or Accredited with Turnaround Plan ratings for one to seven years before moving to the Accredited with Improvement Plan rating or higher and remaining there. The other half of the districts improved but later returned to a lower Accredited with Priority Improvement Plan rating for one or two years. One district continuously received Accredited with Priority Improvement or Accredited with Turnaround Plan ratings from 2009–10 through 2017–18, finally receiving a higher Accredited with Improvement Plan rating in 2018–19. One district continuously received Accredited with Priority Improvement or Accredited with Turnaround Plan ratings from 2009–10 through 2018–19. As mentioned previously, the State Board must impose consequences for districts that receive either of the lowest two ratings for five or more years, including actions such as requiring the district to contract with an external party to help manage the district or issuing an order for reorganizing the district, which could result in changes in district boundaries, governance, or management.

Figure 5. Performance Trajectory of Districts Receiving Priority Improvement Plan or Turnaround Plan Performance Ratings in 2009–10

Turnaround Plan | Priority Improvement Plan | Improvement Plan, Accredited, or Accredited with Distinction



Source: HumRRO's analysis of data from the Colorado Department of Education.

[1]There were no performance framework ratings in 2014-15 during the transition year to the new CMAS statewide student assessments.

Differences by Type of School

As part of our analysis, we examined whether different types of schools fare differently in the statewide education accountability system by looking at the relationship between school type and school performance ratings and the relationship between school type and mean scale scores on statewide assessments for 2015–16 through 2018–19. We used the following three school type categories for the analysis:

- Traditional Public School – Public schools that are operated and governed by local school districts with separately elected boards of education. Students generally attend primary and secondary schools in the school district in which they live. However, Colorado law allows for students to enroll in public schools outside of their attendance boundary.

- Charter School – Public schools that are operated by a group of parents, teachers and/or community members under a charter or contract between the charter school and its authorizer, either a local school district or the State Charter School Institute. Charter schools generally have more flexibility than traditional public schools with respect to curriculum, fiscal management, and overall school operations, and charter schools may offer education programs that are more innovative than those offered in traditional public schools.

- Boards of Cooperative Education Services (BOCES) – Educational service agencies that provide services to two or more member school districts that alone cannot afford the service or find it advantageous and cost-effective to cooperate with other districts. BOCES are an extension of the local member school districts and only provide those programs and services authorized by their members. Examples of BOCES services include school authorization, special education, curriculum and staff development, alternative schools and programs, standards and assessment support, technology support, vocational education, data management, and grant management. For purposes of our analysis in this section, we only focused on those BOCES that independently authorize schools.

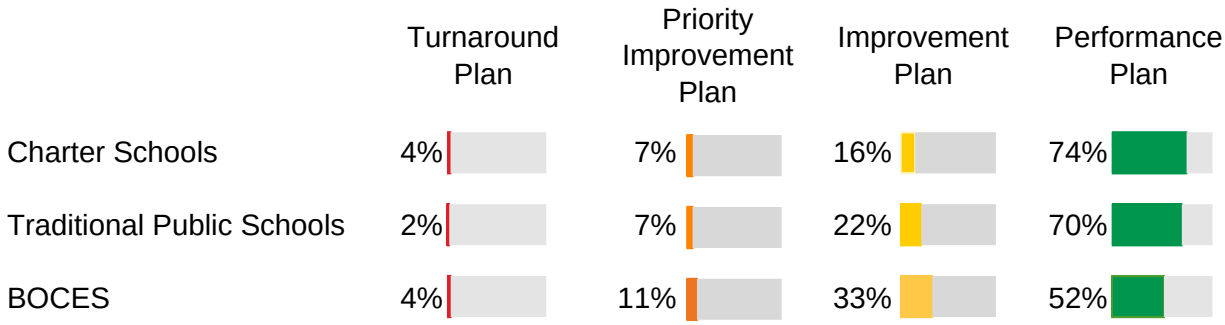
Alternative Education Campus (AEC) is used to designate those schools with specialized missions designed to serve high-risk student populations (e.g., students at risk of not graduating). The Department conducts a distinct performance review and uses different performance rating categories for those schools that meet the definition of an AEC. We did not include AECs in our analysis of school performance ratings by school type.

Our analysis covered data for the 2015–16 through 2018–19 school years. We counted each school in each school year as a separate data point (resulting in a total of 6,665 schools), which accounted for any schools that changed school type during the period reviewed (e.g., a traditional public school that became a charter school). Of the 6,665 schools in our analysis, 87 percent were traditional public schools, 12 percent were charter schools, and less than 1 percent were BOCES schools.

Figure 6 shows that traditional public schools and charter schools were more likely to have received a Performance Plan rating (the highest performance rating), whereas BOCES schools were more likely to have received lower Priority Improvement or Improvement Plan ratings. However, it is important not to read too much into this direct comparison by school type given (a) the overall lower numbers of charter schools and BOCES schools when compared with

traditional public schools, and (b) 69 percent of all schools were in the highest performance rating category, regardless of school type.

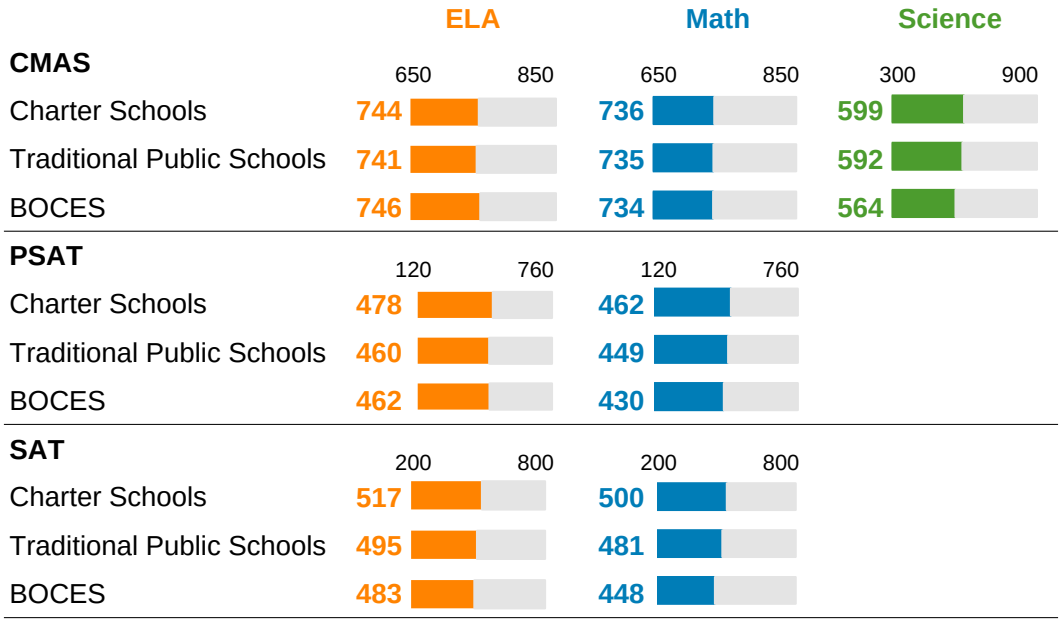
Figure 6. School Performance Ratings by School Type, 2015–16 Through 2018–19



Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Percentages may not sum to 100 due to rounding.

Figure 7 shows the mean scale scores on statewide assessments for each school type for the 2015–16 through 2018–19 school years combined. While comparisons across type of school within an assessment and content area are appropriate, comparisons across content areas and across assessment types (i.e., CMAS, PSAT, SAT) are not appropriate because the assessments are scored on different scales. Charter schools showed the highest mean scale scores on statewide assessments for this period, regardless of subject. These differences were statistically significant; however, we did not control for any differences in student population between school types and due to the large sample size, even small differences can be statistically significant. To help with further interpretation of the results, we looked at the size of the differences in mean scale scores between the school types as an indicator of the *practical* importance of such differences (see Funder and Ozer, 2019). This analysis showed Cohen's D effect sizes less than 0.2, which indicates that the differences in mean scale scores between school types were minor.

Figure 7. Mean Scale Scores on Statewide Assessments by Subject and School Type, 2015–16 Through 2018–19



Source: HumRRO's analysis of data from the Colorado Department of Education.

Additional Information and Context

Although we did not identify any significant gaps in the overall design of the statewide education accountability system, we note the following items to provide additional information and context for understanding various implementation-related discussions.

An additional performance indicator is being developed and implemented. Since the transition to the CMAS assessments in 2014–15, and with significant input from stakeholders, the Department has been working on developing and implementing a new performance indicator that will help gauge whether students are making progress toward attaining grade-level expectations. This new on-track growth performance indicator will require at least two consecutive years of assessment data. The Department reported to us that on-track growth calculations may be included for elementary and middle school performance framework reports as early as fall 2023 for information purposes and fall 2024 for performance ratings. Implementing this new performance indicator for high schools is on a longer time horizon—fall 2024 for information purposes and fall 2025 for performance ratings.

There have been significant and substantive changes over time. Transition to new standards, assessments, and performance frameworks; the gradual shift from the ACT test to the PSAT and SAT; and pursuing implementation of the new on-track growth performance indicator have led to significant and substantive changes in the statewide education accountability system nearly every year since 2014–15. Additionally, the COVID-19 pandemic added additional complexities to the timeline—assessments were not administered in 2019–20 and only limited testing was done in 2020–21. The ongoing shifts in assessments, performance frameworks, and policy were a common source of frustration for the educators and stakeholders that we interviewed. One district administrator likened the changes in the accountability system to moving the goal posts in the middle of a football game. For example, in 2016 the State Board

decreased the weight of the Academic Growth performance indicator and subsequently increased the weight of the Academic Achievement performance indicator. This change was perceived by some district administrators and stakeholders as making it more difficult for districts with large numbers of lower achieving students to attain higher performance ratings, even when students in the district had demonstrated academic growth over time relative to their peers.

Many stakeholders are critical of the current system. A predominant theme in our interviews with district and school personnel and other stakeholders was that the statewide education accountability system is treated as one-size-fits-all, unfairly comparing smaller schools and districts to larger schools and districts, and also failing to acknowledge important differences between rural and urban schools and districts. For example, accountability data help to identify those schools and districts needing resources and support. Schools typically need district guidance for data-driven decision making, and small districts do not have staff dedicated to support data interpretation at the district or school level. Despite language to the contrary in the enabling legislation, many stakeholders we spoke with also suggested that the performance ratings are still perceived and received as largely punitive for low performing schools and districts. Rather than a rating system that is positive and focused on learning and helping schools and districts achieve high levels of student academic performance, one stakeholder referred to the performance ratings as being improperly interpreted and treated by families and communities as an "Angie's List" or consumer review-type rating. Schools and districts perceived as receiving fewer consumer review "stars" often have difficulty recruiting staff or students transfer to a different school or district, both of which can hinder meaningful improvement efforts underway. Another stakeholder described the performance ratings as "ranking and shaming on a scale from wealth to poverty." Several stakeholders expressed a desire for the statewide education accountability system to take a more comprehensive and holistic picture of students, such as by including factors related to students' social/emotional well-being and mental health. Several stakeholders also suggested factoring school culture and governance into performance ratings.

We did not expect there to be—nor was there—a clear consensus among the stakeholders we interviewed about what changes are needed in the current statewide education accountability system. However, what was apparent from our interviews with school and district educators and personnel, regional groups and consortia, and others is that this broader stakeholder community is a tremendous resource with ideas and experiences that should continue to be leveraged in the evolution of Colorado's statewide education accountability system.

School-Level Academic Outcomes and Student Population Demographics

A major component of the analysis required for this evaluation involved examining whether and to what extent a relationship exists between school academic performance and concentrations of different student demographic groups—specifically race/ethnicity, gender, socioeconomic status, and disability status—within the school.

As we discuss in this section, we found differences in academic outcomes among student groups. The legislation requiring this component of the evaluation implied that any differences in academic outcomes among these student groups could indicate the presence of unintended barriers or obstacles affecting the performance of students from different communities. However, we also caution against over-interpreting the results of our analysis, since differences in academic outcomes are not conclusive evidence that the accountability system is biased or unfair. Differences in educational outcomes could be attributable to other factors, such as the

quality of the educational services provided to these student groups, something that the accountability system is specifically designed to help identify.

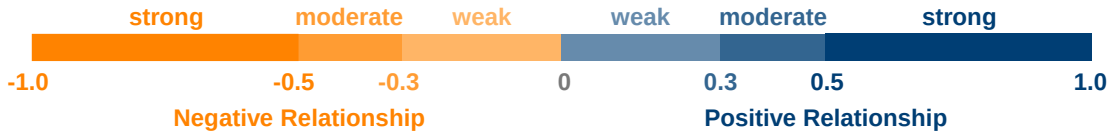
Work Performed

We calculated correlations between student population demographic characteristics and academic performance on statewide assessments from 2015–16 through 2018–19. Specifically, school-level student demographics were defined as the percentage of students in a school who are Black, Asian, or Hispanic; receive free or reduced lunch; have a disability; or are female. School-level academic outcomes were defined as schools' mean scale scores from statewide assessments (academic achievement) and median growth percentiles (academic growth) by subject and grade level. These analyses allow us to examine associations between school-level academic outcomes and student demographic characteristics, as well as the direction and strength of any relationships. We analyzed each year separately and all years combined. Because results for each year were similar, we present only the combined results.

What We Found

The correlation analysis showed that schools with higher proportions of Hispanic students, higher proportions of students who receive free or reduced lunch, or higher proportions of students with disabilities generally had poorer academic outcomes—received lower mean scale scores from statewide assessments and lower median growth percentiles. Higher proportions of female students in a school generally were associated with better academic outcomes.

In each of the following subsections, we present correlations for all assessments and subjects. We color-coded the correlations to help illustrate the direction and strength of the relationships. It is important to note that correlation only establishes a relationship between two variables; it does not establish a causal link. It is also the case that, unless there is a perfect correlation between two variables, there will be observations that run counter to the overall relationship trend.



When interpreting correlations, the numeric value of the correlation ranges from -1.0 to 1.0 and represents the degree to which changes in one variable are associated with changes in the other variable. A positive correlation between two variables means that both variables tend to increase or decrease together. A negative correlation between two variables means that as one variable increases, the other variable decreases. The numeric value of the correlation conveys the strength of the relationship. For purposes of our analysis, we characterize correlations between 0.5 and 1.0 or -0.5 and -1.0 as indicating a strong relationship between the two variables, correlations between 0.3 and 0.5 or -0.3 and -0.5 as indicating a moderate relationship between the two variables, and correlations between 0.0 and 0.3 or 0.0 and -0.3 as indicating a weak relationship between the two variables (based on Cohen, 1992). We acknowledge that other researchers or statisticians may use different cut points and labels on the correlation scale based on preference and context for mapping to qualitative descriptors of correlation interpretations.

Students of Color

Tables 6 and 7 show there were moderate to strong negative correlations between the percentage of Hispanic students or the percentage of Black students in a school and the school's mean scale scores and median growth percentiles. That is, as the percentage of Hispanic or Black students in a school increased, the school's academic achievement and growth outcomes generally decreased. This negative correlation held regardless of assessment or subject. The negative correlations for schools with a higher percentage of Black students were not as strong as the negative correlations for schools with a higher percentage of Hispanic students. The negative correlations also were not as strong when median growth percentile was used as the school-level academic outcome measure. Lastly, the analysis showed positive correlations between the percentage of Asian students in a school and the school's mean scale scores and median growth percentiles. School-level correlations for the Black and Asian student groups should be interpreted with caution due to the smaller numbers of Black and Asian students in schools.

Table 6. Correlations Between School-Level Mean Scale Scores and Percentage of School Student Population in Students of Color Group by Assessment and Subject, 2015–16 Through 2018–19

			Variable 2 Percentage of Students of Color Group		
			Asian	**Black**	**Hispanic**
Variable 1 **Mean Scale Score**	CMAS	ELA	0.27	-0.25	-0.63
		Math	0.30	-0.24	-0.64
		Science	0.23	-0.33	-0.71
	PSAT	Reading/Writing	0.35	-0.27	-0.69
		Math	0.40	-0.22	-0.60
	SAT	Reading/Writing	0.41	-0.27	-0.66
		Math	0.46	-0.23	-0.57
	CoAlt	ELA	N.S.	N.S.	N.S.
		Math	N.S.	N.S.	N.S.

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

N.S. = Correlation is not statistically significant ($p > .05$).

Table 7. Correlations Between School-Level Median Growth Percentiles and Percentage of School Student Population in Students of Color Group by Assessment[1] and Subject, 2015–16 Through 2018–19

			Variable 2 Percentage of Students of Color Group		
			Asian	Black	Hispanic
Variable 1 Median Growth Percentile	CMAS	ELA	0.09	N.S.	-0.11
		Math	0.12	-0.03	-0.21
	PSAT	Reading/Writing	0.28	-0.14	-0.35
		Math	0.20	-0.11	-0.35
	SAT	Reading/Writing	0.32	-0.13	-0.46
		Math	0.36	N.S.	-0.37

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

N.S. = Correlation is not statistically significant ($p > .05$).

[1]These data did not include median growth percentiles for the CMAS science assessment or the CoAlt assessments.

Free or Reduced Lunch Status

Whether a student receives free or reduced school lunch is commonly used in educational research as a proxy measure for income or socioeconomic status. Existing educational research shows that students from lower income households are more likely to have lower achievement scores than those from higher income households (Camara & Schmidt, 1999). The results of our correlation analysis are consistent with this prior research. Specifically, Tables 8 and 9 show there is a strong negative correlation between the size of a school's free or reduced lunch student population and academic achievement and growth. That is, schools with higher proportions of students receiving free or reduced lunches generally had lower overall mean scale scores and median growth percentiles than those schools with fewer students receiving free or reduced lunches.

The negative correlation between schools' academic outcomes and the proportion of their students receiving free or reduced lunch held across all assessments and grades, except for the CoAlt assessment. The results for the CoAlt assessment, which is administered in place of the CMAS assessments and the PSAT and the SAT for students with the most significant cognitive disabilities, showed a positive correlation with school-level academic achievement. That is, mean scale scores on the CoAlt assessment tended to increase as the percentage of free or reduced lunch students in the school increased. However, there is no clear linear relationship between mean scale scores from CoAlt assessments and the percentage of students who received free or reduced lunch. These positive correlations appear to be anomalous and do not refute the overall pattern of negative correlations between the percentage of students who receive free or reduced lunch in a school and the school's academic outcomes.

Table 8. Correlations Between School-Level Mean Scale Scores and Percentage of School Student Population on Free or Reduced Lunch Status by Assessment and Subject, 2015–16 Through 2018–19

			Variable 2 **Percentage of Students on Free or Reduced Lunch Status**
Variable 1 **Mean Scale Score**	CMAS	ELA	-0.74
		Math	-0.74
		Science	-0.76
	PSAT	Reading/Writing	-0.78
		Math	-0.71
	SAT	Reading/Writing	-0.75
		Math	-0.68
	CoAlt	ELA	0.22
		Math	0.22

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

Table 9. Correlations Between School-Level Median Growth Percentiles and Percentage of School Student Population on Free or Reduced Lunch Status by Assessment[1] and Subject, 2015–16 Through 2018–19

			Variable 2 **Percentage of Students on Free or Reduced Lunch Status**
Variable 1 **Median Growth Percentile**	CMAS	ELA	-0.16
		Math	-0.26
	PSAT	Reading/Writing	-0.47
		Math	-0.40
	SAT	Reading/Writing	-0.53
		Math	-0.46

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

[1]These data did not include median growth percentiles for the CMAS science assessment or the CoAlt assessments.

Students with Disabilities

Existing educational research shows that students with disabilities are generally outperformed by their peers without disabilities (Fuchs et al., 2015). The results of our correlation analysis are consistent with this prior research. Specifically, Tables 10 and 11 show there is a moderately strong negative correlation between the percentage of students with disabilities in a school and the school's overall academic achievement and growth. That is, schools with higher proportions

of students with disabilities generally had lower overall mean scale scores and median growth percentiles than those schools with fewer students with disabilities. This negative correlation held across all grades and subjects, except for the CoAlt assessments where the analysis showed weak positive correlations.

Table 10. Correlations Between School-Level Mean Scale Scores and Percentage of School Student Population with Disabilities by Assessment and Subject, 2015–16 Through 2018–19

			Variable 2 **Percentage Students with Disabilities**
Variable 1 **Mean Scale Score**	CMAS	ELA	-0.36
		Math	-0.35
		Science	-0.36
	PSAT	Reading/Writing	-0.43
		Math	-0.42
	SAT	Reading/Writing	-0.47
		Math	-0.46
	CoAlt	ELA	0.02
		Math	0.05

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

Table 11. Correlations Between School-Level Median Growth Percentiles and Percentage of School Student Population with Disabilities by Assessment[1] and Subject, 2015–16 Through 2018–19

			Variable 2 **Percentage Students with Disabilities**
Variable 1 **Median Growth Percentile**	CMAS	ELA	-0.13
		Math	-0.15
	PSAT	Reading/Writing	-0.34
		Math	-0.24
	SAT	Reading/Writing	-0.30
		Math	-0.30

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

[1]These data did not include median growth percentiles for the CMAS science assessment or the CoAlt assessments.

Gender

Tables 12 and 13 show there were weak positive correlations between the percentage of female students in a school and the school's mean scale scores and median growth percentiles. That is, as the percentage of female students in a school increased, the school's academic achievement and growth outcomes generally increased slightly. For academic achievement and growth outcomes, this positive weak correlation held for all assessments and subjects, except for academic achievement on CoAlt ELA and math and academic growth on SAT reading/writing.

Table 12. Correlations Between School-Level Mean Scale Scores and Percentage of Females by Assessment and Subject, 2015–16 Through 2018–19

			Variable 2 **Percentage Female Students**
Variable 1 **Mean Scale Score**	CMAS	ELA	0.11
		Math	0.07
		Science	0.11
	PSAT	Reading/Writing	0.21
		Math	0.16
	SAT	Reading/Writing	0.22
		Math	0.21
	CoAlt	ELA	N.S.
		Math	N.S.

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

N.S. = Correlation is not statistically significant ($p > .05$).

Table 13. Correlations Between School-Level Median Growth Percentiles and Percentage of Females by Assessment[1] and Subject, 2015–16 Through 2018–19

			Variable 2 **Percentage Female Students**
Variable 1 **Median Growth Percentile**	CMAS	ELA	0.04
		Math	0.05
	PSAT	Reading/Writing	0.15
		Math	0.10
	SAT	Reading/Writing	N.S.
		Math	0.14

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

N.S. = Correlation is not statistically significant ($p > .05$).

[1]These data did not include median growth percentiles for the CMAS science assessment or the CoAlt assessments.

School and District Performance Ratings and Student Population Demographics

In addition to analyzing school-level academic achievement and growth data by disaggregated student groups, a related objective for this evaluation was to determine whether and to what extent the statewide education accountability system identifies schools and districts that are not meeting the academic needs of underrepresented groups of students. For this objective, statute defined underrepresented groups to include "groups based on race, ethnicity, religion, sex, sexual orientation, nationality, disability, age, and economic status" [see Section 2-3-127(3)(o), C.R.S.].

Work Performed

In our analysis, we looked at school-level performance data by student groups based on students' race/ethnicity status, English learner status, free or reduced lunch status, and disability status. We did not request age data from the Department for privacy reasons; we relied on grade level as a proxy for age in some analyses. We included gender in our previous correlation analysis and found weak to no significant differences; therefore, we did not include gender in this subsequent student group analysis. The Department does not collect (nor would we expect the Department to collect) student-level data on religion, sexual orientation, or nationality. Therefore, although they were specifically mentioned in one of the statutory objectives for this evaluation, we did not conduct any analyses based on these student groups.

We analyzed available performance data from 2018–19 to assess at the school level, how underrepresented student groups performed. First, we identified those schools receiving a Performance Plan rating (the highest performance rating) that had reported academic achievement and growth data for their underrepresented student groups. In some cases, the number of students in a group within a school was too small for the Department to report aggregate school-level data and maintain student confidentiality; therefore, these schools were excluded from our analysis. Second, we analyzed how the aggregate academic achievement and growth data for the school's underrepresented student groups were distributed across the Does Not Meet, Approaches, Meets, or Exceeds performance expectation categories. We divided the results by grade level (elementary, middle, and high schools) and by subject. Elementary and middle school students in the Meets or Exceeds performance expectations categories are considered to be on track to being college and career ready. High school students in the Meets or Exceeds performance expectations categories are considered to be college and career ready.

What We Found

Overall, we found that even among the highest performing schools, some percentage of these schools had students in an underrepresented student group that did not meet academic achievement or growth expectations.

Tables 14 through 16 present our analysis of academic achievement data for those schools that received Performance Plan ratings (the highest performance rating), broken out by student group and subject. Appendix D contains tables that provide this same analysis based on academic growth data.

Interpreting the tables in this section and the additional tables included in Appendix D is complex. To help with interpretation and understanding, we provide the following detailed explanation for the first part of Table 14: In 82 percent of the elementary schools that received a Performance Plan rating in 2018–19, the students with disabilities group did not meet academic achievement expectations for the CMAS ELA assessment. Similarly, in 24 percent of elementary schools with a Performance Plan rating in 2018–19, the English learners group did not meet academic achievement expectations for the CMAS ELA assessment.

The focus of our analysis and the tables in this section was on the highest performing schools. However, we also looked at the percentage of schools across the three remaining lower school performance ratings with underrepresented student groups not meeting performance expectations. Although the detailed results are not presented herein, this additional analysis confirmed that a higher percentage of lower performing schools had underrepresented student groups that did not meet academic achievement or growth expectations. This pattern held across all grades and subjects.

Table 14. Percentage of Elementary Schools Receiving a Performance Plan Rating with Student Groups Falling into Each Performance Category (Based on Academic Achievement Expectations) by Subject, 2018–19

CMAS ELA	Does not Meet	Approaches	Meets	Exceeds
Students with disabilities (n=511)	82%	17%	1%	0%
English learners (n=340)	24%	50%	20%	6%
Free or reduced lunch students (n=657)	6%	60%	31%	4%
Students of color (n=695)	4%	40%	39%	17%
All Students (n=783)	1%	24%	45%	29%
CMAS Math				
Students with disabilities (n=514)	76%	20%	4%	0%
English learners (n=351)	21%	45%	27%	8%
Free or reduced lunch students (n=658)	13%	54%	31%	2%
Students of color (n=695)	9%	39%	40%	13%
All Students (n=783)	4%	29%	46%	22%
CMAS Science				
Students with disabilities (n=30)	80%	20%	0%	0%
English learners (n=131)	39%	53%	7%	2%
Free or reduced lunch students (n=401)	14%	65%	21%	0%
Students of color (n=462)	11%	48%	31%	9%
All Students (n=741)	5%	28%	46%	22%

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Ns represent the number of schools included in the analysis. The Ns of All Students refer to the number of schools with a Performance Plan rating in 2018–19 and is not a sum of the student group Ns because students may belong to more than one group, and these groups do not include all students. Percentages may not sum to 100 due to rounding.

Table 15. Percentage of Schools with Student Groups Falling into Each Performance Category (Based on Academic Achievement Expectations) by Subject for Those Middle Schools with a Performance Plan Rating, 2018–19

CMAS ELA	Does not meet	Approaching	Meets	Exceeds
Students with disabilities (n=213)	90%	9%	1%	0%
English learners (n=191)	25%	49%	19%	7%
Free or reduced lunch students (n=334)	10%	50%	35%	4%
Students of color (n=333)	5%	35%	43%	17%
All Students (n=408)	4%	18%	52%	26%
CMAS Math				
Students with disabilities (n=214)	90%	9%	1%	0%
English learners (n=198)	32%	43%	16%	9%
Free or reduced lunch students (n=334)	13%	58%	24%	5%
Students of color (n=333)	9%	41%	32%	17%
All Students (n=408)	5%	25%	44%	26%
CMAS Science				
Students with disabilities (n=81)	89%	11%	0%	0%
English learners (n=68)	66%	31%	3%	0%
Free or reduced lunch students (n=207)	28%	58%	13%	2%
Students of color (n=237)	20%	44%	26%	11%
All Students (n=367)	7%	32%	41%	20%

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Ns represent the number of schools included in the analysis. The Ns of All Students refer to the number of schools with a Performance Plan rating in 2018–19 and is not a sum of the student group Ns because students may belong to more than one group, and these groups do not include all students. Percentages may not sum to 100 due to rounding.

Table 16. Percentage of Schools with Student Groups Falling into Each Performance Category (Based on Academic Achievement Expectations) by Subject for Those High Schools with a Performance Plan Rating, 2018–19

	Does not Meet	Approaches	Meets	Exceeds
PSAT Reading/Writing				
Students with disabilities (n=114)	88%	11%	1%	0%
English learners (n=106)	85%	11%	3%	1%
Free or reduced lunch students (n=234)	28%	50%	21%	2%
Students of color (n=225)	23%	39%	27%	12%
All Students (n=301)	11%	31%	41%	18%
PSAT Math				
Students with disabilities (n=114)	90%	10%	1%	0%
English learners (n=107)	66%	25%	7%	2%
Free or reduced lunch students (n=234)	30%	47%	20%	3%
Students of color (n=225)	22%	41%	24%	12%
All Students (n=301)	13%	32%	40%	15%
CMAS Science				
Students with disabilities (n=32)	91%	9%	0%	0%
English learners (n=46)	91%	7%	2%	0%
Free or reduced lunch students (n=130)	54%	34%	11%	2%
Students of color (n=152)	42%	36%	18%	4%
All Students (n=282)	18%	35%	34%	12%

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Ns represent the number of schools included in the analysis. The Ns of All Students refer to the number of schools with a Performance Plan rating in 2018–19 and is not a sum of the student group Ns because students may belong to more than one group, and these groups do not include all students. Percentages may not sum to 100 due to rounding.

Relationship Between School Size and Aggregate School-Level Assessment Results

One objective for this evaluation was to determine whether and to what extent variations in the size of student populations have a disproportionate impact on the accuracy and comparability of aggregated school-level assessment results. This objective stems from the fact that (a) there is measurement error associated with students' assessment scores and (b) school-level scores are aggregated from student-level scores.

Each student's assessment score is a point-in-time observation; it is only an *estimate* of the student's actual knowledge and skills—their "true score"—which is unknowable. A student's true score is the theoretical score a student would receive if their performance could be measured perfectly, with no measurement error or other factors influencing the score. Classification accuracy represents the precision with which we can use assessment scores to assign students to performance categories. For example, consider a student with an assessment score that puts them at the cut point between two performance categories (e.g., Approaches Standards versus

Meets Standards). That student's true score would be equally likely to fall into either of the two categories. A student with an assessment score toward the middle of the score distribution of a category would be much more likely to have a true score within the same category. If a student's assessment score and true score fall within the same performance category, the student would be considered "correctly classified." If the assessment score and true score fall into different categories, the student would be considered "misclassified." Classification accuracy statistics estimate the proportion of students who are expected to be correctly classified. Classification accuracy is affected by the number of categories, the distribution of students on the score scale, *and the measurement error of the assessment*.

Measurement error represents the uncertainty around student assessment scores and allows for an estimate of how close an assessment score (the observed score) is expected to be to the student's true score. The same logic applies at the school level. That is, a school's mean scale score is only an *estimate* of the school's true mean scale score, which is also unknowable. Measurement error represents the uncertainty around school-level mean scale scores and allows for an estimate of how close a school's mean scale score (the observed score) is expected to be to the school's true mean scale score.

At the student level, measurement error is affected by factors such as the number and quality of the items on the assessment. At the school level, measurement error is affected by factors such as the number of students whose assessment scores are being aggregated and where their scores fall on the score scale. Ideally, measurement error is evenly distributed, such that a student's assessment score (their observed score) is equally likely to be higher or lower than their true score. Therefore, if there are many students (many estimates), the school's mean scale score would likely be closer to the school's true mean scale score than if we have fewer students (fewer estimates). The positive and negative error at the student level cancel each other out and, theoretically, the aggregated school-level estimate is a more accurate reflection of the school's true mean scale score.

Work Performed

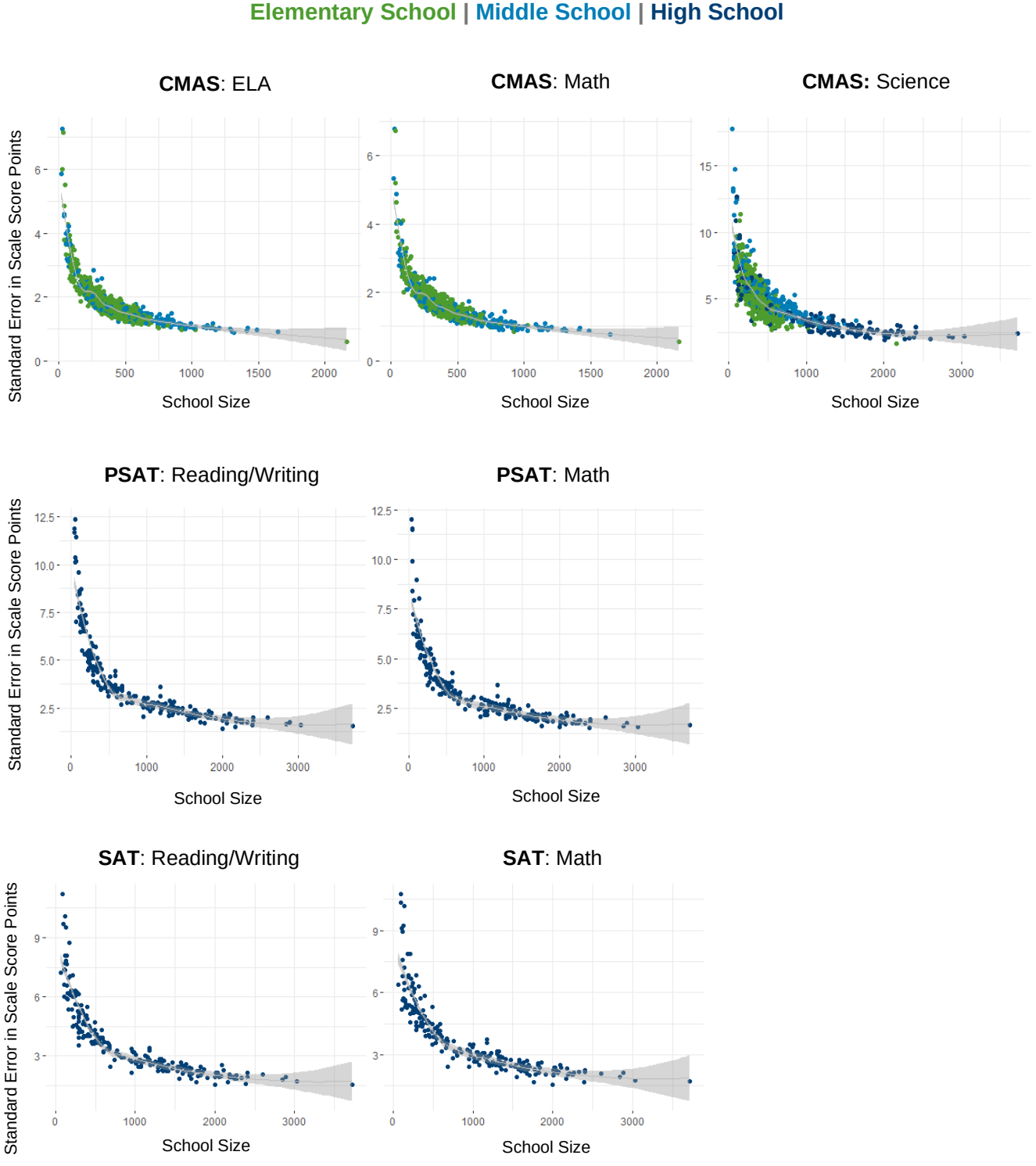
We analyzed data for 2018–19 to identify the relationship between school size (measured by the school's student population count) and the variability in schools' mean scale scores from statewide assessments (measured by the standard error associated with each school's mean scale score). We also looked at the correlation between school size and the standard error of mean scale scores. We did not calculate classification accuracy but discuss it to help illustrate the relationship between school size and the precision of assessment scores.

What We Found

Overall, as expected, our analysis showed that school size is related to the precision of aggregated school-level assessment results. Because there are more data points comprising the aggregated assessment results, there is greater classification accuracy (e.g., more precise measures) in schools with larger student populations. In smaller schools, there is more variability in the aggregated assessment results since individual students' assessment scores are more likely to affect the school's aggregate mean scale scores.

Figure 8 shows that very small schools have very high standard errors associated with their mean scale scores; however, this error drops precipitously once the student population reaches a certain size. The plots show a similar trend for schools' CMAS, PSAT, and SAT mean scale scores. This is why the Department aggregates across three years of data for small schools—to try to provide more consistent results.

Figure 8. Relationship Between School Size (Student Population Count) and Standard Error of Mean Scale Scores by Assessment, 2018–19



Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: The grey shading depicts the 95-percent confidence interval surrounding the regression line for each plot. PSAT includes students in grades 9 and 10. SAT includes students in grade 11.

Table 17 also shows that, as expected, the correlation between school size and standard error is moderately strong and negative, indicating that as school size increases, the standard error of mean scale scores decreases. Larger schools exhibited less error in their mean scale scores than smaller schools. This pattern held across all subjects and grade levels. The amount of error associated with any score should be considered relative to the inferences that will be made from that score and the consequences associated with high or low performance. If the level of inference and the stakes are low, more error can be tolerated. If the level of inference and the stakes are higher, the user needs to be more sure of the precision of the score. Examining classification accuracy at the school level can inform policy related to accountability.

Table 17. Correlations Between School Size and Standard Error of Mean Scale Scores by Subject and Grade Level, 2018–19

			Variable 2 **Standard Error of Mean Scale Scores**
Variable 1 **School Size**	Elementary School CMAS	ELA	-0.90
		Math	-0.90
		Science	-0.77
	Middle School CMAS	ELA	-0.95
		Math	-0.93
		Science	-0.90
	High School CMAS	ELA	N/A
		Math	N/A
		Science	-0.92
	PSAT	Reading/Writing	-0.97
		Math	-0.96
		Science	N/A
	SAT	Reading/Writing	-0.96
		Math	-0.96
		Science	N/A

Source: HumRRO's analysis of data from the Colorado Department of Education.

N/A = Analysis not applicable.

Effect of Participation in State Assessments on Performance Ratings

Student participation in statewide assessments is critical to the success of Colorado's statewide education accountability system. Another objective for this evaluation was to determine whether and to what extent participation rates on statewide standardized tests affect the results achieved. Participation in the required state assessments can vary across schools, grade levels, and student groups for a variety of reasons. Most students participate in the state assessments; however, some students may not take part due to student absence or school decisions

regarding make-up assessments. Additionally, Colorado law allows parents to excuse their student from participating in one or more of the required assessments. Districts are required to have parent excusal policies that explain how parents may excuse their student from participating and to notify parents of those policies.

Districts cannot impose negative consequences on students or parents if a parent excuses their student from participating in a required state assessment. Districts also cannot impose an unreasonable burden or requirement on a student that would discourage the student from taking a statewide assessment or encourage the student's parent to excuse the student from taking the statewide assessment. Ultimately, nonparticipation in state assessments limits the available data about student achievement and growth and negatively affects the ability of school and district leaders, the Department, policymakers, and the public to understand and assess overall school and district performance. As participation rates decrease and vary across student, school, and district groups, challenges with interpreting results will increase. Depending on the specific school or district, some student groups may be overrepresented in the results and others may be underrepresented. Participation information may indicate that in some cases, conclusions should be drawn with caution or completely avoided.

Under the school and district performance frameworks, if a school or district fails to achieve a 95 percent participation rate on state assessments in two or more content areas, the Department lowers their performance rating by one level. Parent excusals are removed from and not factored into the state accountability calculation; however, the number of parent excusals are reported on the school and district performance framework reports.

Approximately 6 percent of all students statewide were excused from participating in the required assessments in the 2018–19 school year, down from nearly 11 percent in 2015–16. High school students were somewhat more likely to be excused from taking the PSAT or SAT for accountability purposes (7 percent in 2018–19), compared to elementary and middle school CMAS parental excusal rates of less than 6 percent.

Work Performed

We conducted a number of correlation analyses to determine whether and to what extent participation rates on statewide assessments are related to school and district performance ratings. Specifically, we examined whether a relationship exists at the school or district levels between (a) current-year assessment participation rates and current-year performance ratings, (b) prior-year performance ratings and current-year assessment participation rates, and (c) the number of parent excusals and current-year performance ratings.

What We Found

Assessment participation rates do not have a significant effect on school or district performance ratings. Relationships do not exist or are weak between (a) current-year assessment participation rates and current-year performance ratings, (b) prior-year performance ratings and current-year assessment participation rates, and (c) the number of parent excusals and current-year performance ratings. As shown in Tables 18 through 23, most of the correlations from our analyses were found to be not statistically significantly different from zero, thereby indicating no relationship. In a few instances, specifically at the high school level, we found a statistically significant positive relationship between the participation rate and current-year performance ratings, which would indicate a slight tendency for schools with higher parent excusal rates to

have higher overall performance ratings. However, the strength of these relationships was generally weak.

Table 18. Correlations Between Current-Year Assessment Participation and Current-Year Performance Rating (School Level), by School Year and Grade Level, 2015–16 Through 2018–19

		Variable 2 Current-Year School Participation[1]			
		2015–16	2016–17	2017–18	2018–19
Variable 1 Current-Year School Performance Rating	Elementary School	N.S.	N.S.	N.S.	N.S.
	Middle School	N.S.	N.S.	N.S.	N.S.
	High School	N/A	.16	.22	.08

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Cell values are correlation coefficients.
[1] Elementary and middle school assessments include CMAS. High school assessments include PSAT and SAT.
N.S. = Correlation is not statistically significant ($p > .05$).
N/A = Data not available.

Table 19. Correlations Between Current-Year Assessment Participation and Current-Year Performance Rating (District Level), by School Year and Grade Level, 2015–16 Through 2018–19

		Variable 2 Current-Year District Participation[1]			
		2015–16	2016–17	2017–18	2018–19
Variable 1 Current-Year District Performance Rating	Elementary School	N.S.	N.S.	N.S.	N.S.
	Middle School	N.S.	N.S.	N.S.	N.S.
	High School	N/A	.33	.32	.25

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Cell values are correlation coefficients.
[1] Elementary and middle school assessments include CMAS. High school assessments include PSAT and SAT.
N.S. = Correlation is not statistically significant ($p > .05$).
N/A = Data not available.

Table 20. Correlations Between Prior-Year Performance Rating and Current-Year Assessment Participation (School Level), by School Year and Grade Level, 2016–17 Through 2018–19

		Variable 2 Current-Year School Participation[1]		
		2016–17	2017–18	2018–19
Variable 1 Prior-Year School Performance Rating	Elementary School	-.07	N.S.	N.S.
	Middle School	N.S.	N.S.	N.S.
	High School	N/A	.12	.19

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

[1] Elementary and middle school assessments include CMAS. High school assessments include PSAT and SAT.

N.S. = Correlation is not statistically significant ($p > .05$).

N/A = Data not available.

Table 21. Correlations Between Prior-Year Performance Rating and Current-Year Assessment Participation (District Level), by School Year and Grade Level, 2016–17 Through 2018–19

		Variable 2 Current-Year District Participation[1]		
		2016–17	2017–18	2018–19
Variable 1 Prior-Year District Performance Rating	Elementary School	N.S.	N.S.	N.S.
	Middle School	N.S.	N.S.	N.S.
	High School	N/A	.24	.38

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

[1] Elementary and middle school assessments include CMAS. High school assessments include PSAT and SAT.

N.S. = Correlation is not statistically significant ($p > .05$).

N/A = Data not available.

Table 22. Correlations Between Number of Parent Excusals for Assessments and Current-Year Performance Rating (School Level), by School Year and Grade Level, 2016–17 Through 2018–19

		Variable 2 Parent Excusals[1]			
		2015–16	2016–17	2017–18	2018–19
Variable 1 Current-Year School Performance Rating	Elementary School	.09	.10	.09	N.S.
	Middle School	N.S.	N.S.	N.S.	.10
	High School	N/A	N.S.	.07	.08

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

[1] Elementary and middle school assessments include CMAS. High school assessments include PSAT and SAT.

N.S. = Correlation is not statistically significant ($p > .05$).

N/A = Data not available.

Table 23. Correlations Between Number of Parent Excusals for Assessments and Current-Year Performance Rating (District Level), by School Year and Grade Level, 2016–17 Through 2018–19

		Variable 2 Parent Excusals[1]			
		2015–16	2016–17	2017–18	2018–19
Variable 1 Current-Year District Performance Rating	Elementary School	N.S.	N.S.	N.S.	N.S.
	Middle School	N.S.	N.S.	N.S.	N.S.
	High School	N/A	N.S.	N.S.	N.S.

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

[1] Elementary and middle school assessments include CMAS. High school assessments include PSAT and SAT.

N.S. = Correlation is not statistically significant ($p > .05$).

N/A = Data not available.

Chapter 3: Postsecondary and Workforce Readiness, Colorado Growth Model, and Use and Accessibility of Assessment and Accountability Information

When establishing the current statewide education accountability system in 2009, the General Assembly specified its legislative intent and goals that an effective accountability system is one that, among other things:

- Focuses the attention of educators, parents, students, and other members of the community on maximizing every student's progress toward postsecondary and workforce readiness and post-graduation success [Section 22-11-102(1)(a), C.R.S.].

- Is built around implementation of the Colorado Growth Model [Section 22-11-102(1)(b), C.R.S.]

- Reports information concerning performance at the state level, school district or institute level, and individual public school level that is perceived by educators, parents, and students as useful [Section 22-11-102(1)(b), C.R.S.] and that reports performance in clear, readily understandable terms [Section 22-11-102(3)(c), C.R.S.].

We cover analysis related to these goals in this chapter.

Postsecondary and Workforce Readiness

One of the key performance indicators used for high schools and school districts in Colorado's school and district performance frameworks is postsecondary and workforce readiness. Postsecondary and workforce readiness is a broad goal since it must take into account the fact that different students will have different career aspirations. Some students will seek higher education upon graduation, some will seek career or technical training to pursue a particular vocation, and others will immediately seek to enter the workforce.

The Colorado Department of Education (Department) measures how prepared high school students are by analyzing data such as:

- Graduation rates – The 4-year graduation rate (presented in this report) is based on the number of students receiving a regular diploma within four years of entering ninth grade. The Department also computes 5-year, 6-year, and 7-year graduation rates.

- Dropout rates – By state law, a dropout is defined as a "person who leaves school for any reason, except death, before completion of a high school diploma or its equivalent, and who does not transfer to another public or private school or enroll in an approved home study program." The school dropout rate is calculated annually as the percentage of all students in grades 9 through 12 who leave school during a school year without evidence of attending another recognized educational institution or program.

- Average scores on the SAT – The SAT is a standardized test administered to students in grade 11 and used as a postsecondary readiness benchmark, an indicator of achievement of the Colorado Academic Standards, and an entrance exam for some

college and university admissions decisions. SAT scores are divided into two components: evidence-based reading and writing (reading/writing) and math.

- Matriculation – Enrollment into a college or career certificate program.

Schools also collect and report student participation in college- or university-level preparatory and curriculum programs, such as Advanced Placement and International Baccalaureate programs, as well as career and technical education programs. Advanced Placement and International Baccalaureate data will be incorporated into the school and district performance frameworks starting in 2023.

- Advanced Placement courses offer college-level curricula and examinations to high school students. Colleges and universities may grant placement and course credit to students who take Advanced Placement courses and obtain high scores on Advanced Placement examinations.

- The International Baccalaureate programs are college preparatory programs providing students the option of pursuing either the full International Baccalaureate diploma or certificates in one or more areas of selected study. They provide a set of examinations that are intended to qualify successful candidates for higher education in any of several countries. Students may earn college credit or advanced standing for their International Baccalaureate coursework.

- Career and technical education programs (formerly referred to as vocational education) frequently offer both academic and career-oriented courses, and many provide students with the opportunity to gain work experience through internships, job shadowing, on-the-job training, and industry-certification opportunities.

Graduation Rates

Table 24 presents the 4-year graduation rates for all students and various student groups. The overall 4-year graduation rate in Colorado for the Class of 2021 was 81.7 percent. According to the Department, this was a slight decrease from the 2020 graduation rate of 81.9 percent and the first drop in the 4-year graduation rate in more than 10 years. Black students, Hispanic students, economically disadvantaged students, English learners, and students with disabilities showed the lowest graduation rates in 2021.

Table 24. 4-Year Graduation and Dropout Rates by Student Groups, Class of 2021

Ethnicity	4-Year Graduation Rate	Dropout Rate
Asian	91.5%	0.5%
White	86.6%	1.1%
Black	76.0%	2.6%
Hispanic	74.2%	2.8%
Economically disadvantaged	70.6%	2.5%
English learner	67.5%	3.5%
Students with disabilities	66.4%	2.0%
All Students	**81.7%**	**1.8%**

Source: Colorado Department of Education.

Dual and Concurrent Enrollment

Dual enrollment generally refers to the broad array of programs that offer students the opportunity to take college-level academic courses and/or career and technical education courses while they are in high school. During the 2019–20 school year, about 40 percent of high school graduates participated in a dual enrollment program.

Table 25 provides overall trends in dual enrollment in Colorado from 2012–13 through 2019–20. The percentage of high school graduates and current high school students participating in dual enrollment programs steadily increased over this period.

Table 25. Percentage of High School Graduates and High School Students Participating in Dual Enrollment, 2012–13 Through 2019–20

School Year	High School Graduates Participating in Dual Enrollment Programs	Current High School Students Participating in Dual Enrollment Programs
2019–20	39.5%	19.2%
2018–19	38.2%	18.4%
2017–18	35.7%	16.9%
2016–17	33.3%	15.8%
2015–16	31.3%	14.8%
2014–15	25.7%	14.0%
2013–14	22.8%	12.5%
2012–13	21.2%	11.0%

+18.3 percentage points

+8.2 percentage points

Source: Pathway to Affordability: Annual Report on Dual and Concurrent Enrollment in Colorado, 2021.

Concurrent enrollment refers specifically to those opportunities for high school students to enroll in postsecondary courses (including academic courses and career and technical education courses) through cooperative agreements authorized by Colorado's Concurrent Enrollment Program Act of 2009 between districts and schools and institutions of higher education. During the 2019–20 school year nearly all of Colorado's school districts (175 of 178 districts) offered concurrent enrollment programs, and 93 percent of concurrent enrollment credit hours attempted were passed. About 45 percent of concurrent enrollment students participated in career and technical education courses.

Degree and Certificate Completion

Table 26 shows overall increases in degree and certificate completion for students graduating high school in spring 2009 through 2018. More than half of high school graduates since 2012 have completed a 2-year or 4-year college degree or a college or career certificate within five years of graduating from high school. This percentage increased by 8 percentage points from about 45 percent for 2009 graduates to about 53 percent for 2015 graduates.

Table 26. College Degree or College or Career Certificate Completion within Two- to Six-Years Following High School Graduation, 2009–2018

	Percent of Students Earning a Credential or Degree After High School Graduation			
High School Graduation Year	Within Two Years of Graduation	Within Four Years of Graduation	Within Five Years of Graduation	Within Six Years of Graduation
2018	8.3%			
2017	8.1%			
2016	7.2%	38.0%		
2015	6.8%	36.9%	53.5%	
2014	5.8%	36.1%	53.8%	60.0%
2013	5.9%	33.7%	51.6%	57.9%
2012	5.4%	32.6%	50.2%	56.6%
2011	4.8%	30.2%	47.2%	53.5%
2010	4.5%	29.4%	46.5%	52.7%
2009	4.5%	28.3%	45.4%	52.3%

+3.8 percentage points

+9.7 percentage points

+8.1 percentage points

+7.7 percentage points

Source: HumRRO's analysis of data from the Colorado Department of Higher Education.

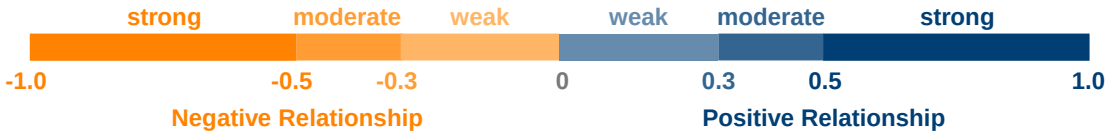
Work Performed

As part of our evaluation, we analyzed whether and to what extent school performance ratings correlate with student learning opportunities targeted at building postsecondary and workforce readiness skills. Specifically, we used data for 2018–19 to correlate the percentage of total points earned for each school-level performance indicator—Academic Achievement, Growth, and Postsecondary and Workforce Readiness (PWR)—with the number of Advanced Placement courses for which examinations were given and the percentage of career and technical education graduates. We also compared mean school-level performance indicator scores for schools with and without International Baccalaureate programs.

To assess economically disadvantaged students' or students with disabilities' access to learning opportunities targeted at postsecondary and workforce readiness, we correlated the number of Advanced Placement courses for which examinations were given in schools with the proportion of students who receive free or reduced lunch and the proportion of students with disabilities. We also compared the distribution of students who receive free or reduced lunch and the proportion of students with disabilities in schools with and without International Baccalaureate programs. Free or reduced lunch status is commonly used in educational research as a proxy measure for income or socioeconomic status. These analyses focus on school-level opportunities because Advanced Placement and International Baccalaureate courses are offered to the eligible student population and not individual students.

Finally, as part of our Educator Survey and during our interviews with district and school personnel and stakeholder groups, we inquired about postsecondary and workforce readiness-related topics.

In the following section, we present the results of our correlation analysis. We color-coded the correlations to help illustrate the direction and strength of the relationships. It is important to note that correlation only establishes a relationship between two variables; it does not establish a causal link. It is also the case that, unless there is a perfect correlation between two variables, there will be observations that run counter to the overall relationship trend.



When interpreting correlations, the numeric value of the correlation ranges from -1.0 to 1.0 and represents the degree to which changes in one variable are associated with changes in the other variable. A positive correlation between two variables means that both variables tend to increase or decrease together. A negative correlation between two variables means that as one variable increases, the other variable decreases. The numeric value of the correlation conveys the strength of the relationship. For purposes of our analysis, we characterize correlations between 0.5 and 1.0 or -0.5 and -1.0 as indicating a strong relationship between the two variables, correlations between 0.3 and 0.5 or -0.3 and -0.5 as indicating a moderate relationship between the two variables, and correlations between 0.0 and 0.3 or -0.0 and -0.3 as indicating a weak relationship between the two variables (based on Cohen, 1992). We acknowledge that other researchers or statisticians may use different cut points and labels on the correlation scale based on preference and context for mapping to qualitative descriptors of correlation interpretations.

What We Found

Overall, all students' educational outcomes are positively correlated with learning opportunities targeted at building postsecondary and workforce readiness skills. Specifically, as shown in Table 27, high schools' Academic Achievement, Growth, and PWR performance indicators are positively correlated with both the number of Advanced Placement courses for which exams were given and the percentage of career and technical education graduates. That is, high schools with a higher number of Advanced Placement course offerings or a higher percentage of career and technical education graduates tended to have better student academic achievement, academic growth, and postsecondary and workforce readiness outcomes. Correlations with school performance indicators were stronger for the number of Advanced Placement course offerings than they were for the percentage of career and technical education graduates. However, providing more Advanced Placement courses or career and technical education opportunities may not increase academic achievement, academic growth, or postsecondary and workforce readiness.

Table 27. Correlations Between School Performance Indicators and the Number of Advanced Placement Courses Offered and the Percentage of Career and Technical Education Completers

		Variable 2	
		Percentage of Career and Technical Education Graduates	**Number of Advanced Placement Courses for Which Exams Were Given**
Variable 1 **School Performance Indicator[1]**	Academic Achievement	0.11	0.33
	Academic Growth	0.26	0.44
	Postsecondary and Workforce Readiness	0.14	0.34

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cell values are correlation coefficients.

[1]Measured as the percentage of total points earned for each performance indicator.

Table 28 provides comparisons of mean performance indicator scores for schools that offer International Baccalaureate programs and those that do not offer International Baccalaureate programs. Although there are only 32 high schools (out of 522 high schools statewide) that offer International Baccalaureate programs, this comparison shows that, on average, these high schools earn a higher percentage of the total points across all three performance indicators.

Table 28. Comparison of Mean Performance Indicator Scores for High Schools With and Without International Baccalaureate Programs, 2018–19

School Performance Indicator[1]	**Mean Percentage Points Earned**	
	Schools without International Baccalaureate Program	**Schools with International Baccalaureate Program**
Academic Achievement	51.9	52.9
Academic Growth	56.6	60.8
Postsecondary and Workforce Readiness	63.1	65.6

Source: HumRRO's analysis of data from the Colorado Department of Education.

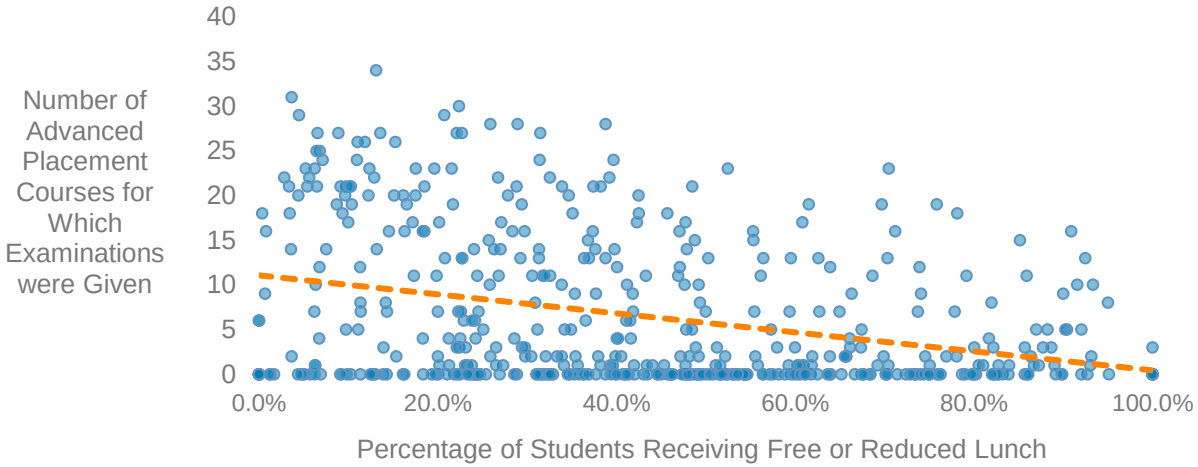
[1]Measured as the percentage of total points earned for each performance indicator.

Free or Reduced Lunch Status

According to a 2018 performance audit by the U.S. Government Accountability Office, their analysis of data from the U.S. Department of Education showed that, nationally, public high schools with more economically disadvantaged students provided fewer academic offerings to prepare students for college. Our analysis for Colorado showed a similar result.

Figure 9 shows that schools serving higher proportions of students receiving free or reduced lunch tended to have fewer Advanced Placement opportunities. That is, as the number of students receiving free or reduced lunch in a school increased, the number of Advanced Placement courses for which examinations were given decreased.

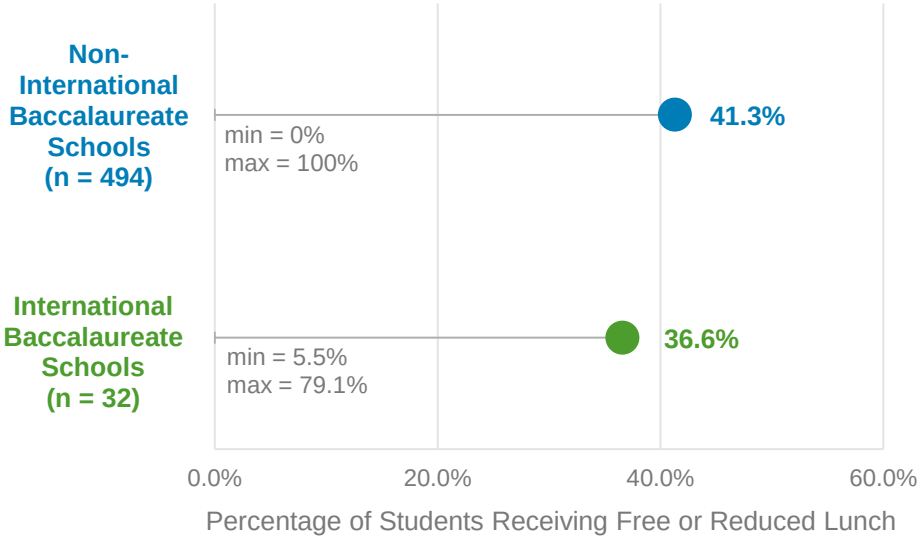
Figure 9. Number of Advanced Placement Courses for Which Examinations Were Given and Percentage of Students on Free or Reduced Lunch Status, High Schools, 2018–19



Source: HumRRO's analysis of data from the Colorado Department of Education.

Figure 10 compares the percentage of students receiving free or reduced lunch in high schools that offered International Baccalaureate programs with high schools that did not offer International Baccalaureate programs in 2018–19. This comparison shows that high schools without International Baccalaureate programs tended to have a higher proportion of students receiving free or reduced lunches. Specifically, the mean percentage of students receiving free or reduced lunch in schools without International Baccalaureate programs was 41 percent, compared to a mean of about 37 percent in schools offering International Baccalaureate programs.

Figure 10. Percentage of Students Receiving Free or Reduced Lunch for Non-International Baccalaureate and International Baccalaureate High Schools, 2018–19



Source: HumRRO's analysis of data from the Colorado Department of Education.

Students with Disabilities

There was no significant relationship between the proportion of students with disabilities served by a high school and the number of Advanced Placement courses offered by the school or whether the school offered an International Baccalaureate program.

Additional Information from Educator Survey and District, School, and Stakeholder Interviews

Eighty-three percent of educators responding to our Educator Survey (discussed later in this chapter) indicated that postsecondary and workforce readiness data helped to inform the selection of targeted interventions or programs in their school or district, and 87 percent of respondents indicated that targeted interventions and programs had positively supported students' development of postsecondary and workforce readiness skills.

A common theme from our interviews with district and school personnel and representatives from stakeholder groups was that the components of the PWR performance indicator (e.g., graduation and dropout rates) are useful for monitoring overall school and district trends; however, individualized opportunities such as career and technical education, Advanced Placement courses, dual and concurrent enrollment, counseling, and extracurricular activities are more important for driving postsecondary and workforce readiness outcomes at the student level. Additionally, many interview participants discussed the fact that there are myriad opportunities related to postsecondary and workforce readiness that are not necessarily captured in the PWR data used in the district and school performance ratings. For example, counseling was highlighted as a critical component of student readiness for life after high school, with local community needs and resources also serving as key factors when selecting postsecondary and workforce readiness programs for high school students. Some high school educators and stakeholders highlighted their efforts to align course offerings, extracurricular opportunities, and student interests with skills needed by employers in their local communities.

The Colorado Growth Model

The Colorado Growth Model is a statistical model that measures the relative academic growth of individual students from one year to the next based on the results of statewide assessments. As described in Chapter 2, the Colorado Growth Model supplies the necessary data for the Academic Growth performance indicator used in the annual school and district performance ratings. State statute [Section 22-11-202(1)(b), C.R.S.] identifies the specific requirements that the Colorado Growth Model must accomplish:

- Reflect best practices, as acknowledged in the scientific literature, in measuring student longitudinal academic growth with high precision.
- Use a method (to the greatest extent possible) that will support the academic improvement of public schools, school districts, and the Charter School Institute.
- Can measure a student's progress toward meeting each of the performance levels on the statewide assessments.
- Can gauge each student's success in making one year's academic growth or more in one year's time.

- Provide results that are meaningful, reliable, and valid, given their intended purposes, to enable parents, teachers, and administrators to identify individual students or groups of students who are or are not making adequate academic growth.

- Recognize the improvement of a student whose scores on the statewide assessments increase even if the increase is not sufficient for the student to attain a higher performance level.

- Use individual student scores achieved on the statewide assessments.

- Is described in a publicly available document that sets forth the mathematical equations used in the model and that fully and accurately explains the methods used to complete the records for students with incomplete data.

- Can treat the analysis and reporting of data electronically and produce student, public school, school district, Charter School Institute, and state reports that the Department provides through its data portal.

Work Performed

One objective for this evaluation was to assess whether the Colorado Growth Model supports the specific objectives outlined in state statute. We reviewed technical documentation and other information publicly available on the Department's website explaining the Colorado Growth Model's purpose, methodology, and application, as well as how to interpret the resulting growth scores and reports. We also reviewed academic literature from published sources, conference presentations, and other technical work related to growth models generally, and student growth percentile models more specifically (see Appendix E for a listing of the academic literature reviewed). We also reviewed the results from our Educator Survey and interviews with school and district personnel and stakeholders to understand generally whether growth data are being used by educators to help inform classroom instruction and targeting of academic supports.

What We Found

Overall, we found that the Colorado Growth Model supports or partially supports all the objectives specified in state statute. The areas where the Colorado Growth Model only partially supports the objectives specified in statute stem from the overall imprecision of growth models. The statute specifies outcomes—terms like "high precision" or "meaningful, reliable, and valid"—without indicating how those terms should be operationalized. Growth models, including those based on student growth percentiles, tend to have substantial error associated with their measurement, which lowers the level of confidence in the accuracy of an individual student's growth estimate. Table 29 summarizes the results of our assessment.

Table 29. Assessment of the Colorado Growth Model's Statutory Objectives

Statutory Objective	Supported by the Colorado Growth Model?
Reflect best practices, as acknowledged in the scientific literature, in measuring student longitudinal academic growth with high precision.	**Partially Supported** Student growth percentile is the most common type of growth model used in states that include growth in their accountability systems. All growth models, including those using student growth percentiles, have low precision for measuring individual students and tend not to be as reliable as static scores on an assessment (e.g., grade 4 reading scores tend to be more reliable than growth estimates from grade 4 to grade 5). Some of the academic literature raises concerns with using student growth percentiles for individual students or for smaller schools because the error associated with student growth percentile measures may be larger than mean year-to-year growth. Objectives or decisions that require reliable estimates for drawing meaningful conclusions at the individual student level, or even for groups of students in smaller schools, may not be fully supported by the Colorado Growth Model.
Use a method (to the greatest extent possible) that will support the academic improvement of public schools, school districts, and the Charter School Institute.	**Partially Supported** There is evidence that the Colorado Growth Model captures school-level performance attributes. School-level growth correlations from year to year are positive and significant, typically in the 0.3 to 0.6 range. However, the growth correlations are not as strong as mean scale score correlations, which tend to be around 0.9 or higher at the school level. The Colorado Growth Model is based on data from statewide assessments, which are *summative* assessments administered at the conclusion of the school year. Summative assessments are valuable for helping to evaluate student learning and growth. Scores clearly tied to the content standards can be used to inform the annual evaluation of curricula, instructional programs, etc. However, *formative* assessment practices (e.g., in-process evaluations of student learning and comprehension) are typically timely and useful for helping classroom teachers adjust instruction and supports to improve student learning while it is happening throughout the year. About 92 percent of educators responding to our Educator Survey indicated they use achievement and growth data to guide classroom instruction "somewhat" or "to a great extent." About 8 percent of respondents reported they do not use achievement and growth data to guide classroom instruction.
Can measure a student's progress toward meeting each of the performance levels on the statewide assessments.	**Partially Supported** The State Board has defined ranges of student growth percentiles as low, typical, and high growth, which helps to define what "adequate" academic growth means. The Colorado Growth Model currently reports student performance on a scale that includes a growth estimate. This estimate indicates where the student needs to achieve high, typical, or low growth to move into an adjacent performance category. However, there is no error estimate associated with the score or the growth estimate included in the reporting.

Statutory Objective	Supported by the Colorado Growth Model?
	Although the student growth percentiles indicate how much students have grown in their academic achievement from one year to the next compared to other students, the student growth percentiles do not indicate whether the growth was sufficient to meet grade-level expectations under the Colorado Academic Standards. The Department has been working to develop and implement an on-track growth measure that will measure student growth toward grade-level expectations; implementation is expected to gradually roll out beginning in fall 2023.
Can gauge each student's success in making one year's academic growth or more in one year's time.	**Partially Supported** Student growth reports indicate whether an individual student has made one year's growth with respect to peers who scored similarly to the student in the prior year. They also provide an estimate of how much more or less than one year's growth the student has made. However, there are significant challenges related to interpreting the meaning of these estimates. First, although the student growth percentile measure is more useful in the aggregate, measurement error makes attributions about individual students problematic. If an estimate of error were included on the individual student growth report, the range of the error would include growth estimates indicating both less than one year's growth and more than one year's growth for most students. Instructional decisions for students should not be based on these estimates without considerable corroborating evidence. Second, one year's growth is difficult to define, and is not the same for all students. Student growth percentiles compare students' growth from one year to the next based on how students in similar starting positions (scores in the prior year) performed. For example, if a student scored toward the bottom of the score scale in 2021, that student's growth percentile in 2022 would be based on how other students from the same area of the score scale in 2021 performed in 2022. If lower-performing students tend to grow less from one year to the next than higher performing students, that student could grow exactly the same as a higher performing peer and be classified as making one year's growth, while the higher performing student would be classified as not making one year's growth. The complexity of interpreting one year's growth may limit the utility of this metric. Third, one year's growth does not imply remaining "on-track" for proficient students. If a student is classified as proficient in third grade and is consistently classified as proficient for grades 4, 5, 6, 7, and 8, one might conclude that the student is making adequate growth in each successive year. However, that same student might have growth reports that indicate less than a year's growth in multiple years. Similarly, a student might be in the lowest performance category in grade 3, meet the requirements for one year's academic growth in grades 4 through 8, and never score in a higher category. Student growth percentiles only indicate how a student is performing in reference to the mean growth of similar students, without reference to other definitions of performance adequacy. Growth estimates can signal aberrant growth in either

Statutory Objective	Supported by the Colorado Growth Model?
	direction (e.g., a student could perform especially poorly or well compared to their peers) but are poor indicators of success.
Provide results that are meaningful, reliable, and valid, given their intended purposes, to enable parents, teachers, and administrators to identify individual students or groups of students who are or are not making adequate academic growth.	**Partially Supported** Growth measures, including student growth percentiles, tend not to be sufficiently reliable to support high stakes decisions regarding individual students (e.g., determining that an individual student has not made sufficient growth and assigning that student to an intervention) and require very reliable and accurate test scores. Specifically, when growth scores are provided to small schools or for individual students, there are serious limitations to how those scores may be appropriately interpreted. Guidance for uses of growth scores should come with strong cautions when interpreting growth for small groups or individuals. Although random error can limit the utility of growth scores for producing valid individual student-level results in certain situations, student growth percentiles remain useful when aggregated to help inform the performance of schools, districts, and/or student groups, especially when growth is one of several indicators being relied upon. The State Board has defined ranges of student growth percentiles as low, typical, and high growth, which helps to define what adequate academic growth means. Although the student growth percentiles indicate how much students have grown in their academic achievement from one year to the next compared to other students, the student growth percentiles do not indicate whether the growth was sufficient to meet grade-level expectations under the Colorado Academic Standards. The Department has been working to develop and implement an on-track growth measure that will measure student growth toward grade-level expectations; implementation is expected to gradually roll out beginning in fall 2023. Of the respondents to the Educator Survey, 89 percent reported using achievement and growth data to provide targeted assistance to student groups. Participants in discussions with educators and stakeholders indicated growth data are the most helpful accountability information for illustrating achievement gaps.
Recognize the improvement of a student whose scores on the statewide assessments increase even if the increase is not sufficient for the student to attain a higher performance level.	**Supported** Student growth percentiles are, by definition, a normative statistic, which means a student's growth estimate is based on their growth compared to the growth of their peers. Student growth percentiles are not tied to performance level, so students can exhibit positive or negative growth (i.e., scores increase more than expected, less than expected, or even decline from one grade to the next) regardless of whether they change performance levels or what performance level they are in. Therefore, the Colorado Growth Model supports objectives related to recognizing the improvement of a student, even if their growth is not sufficient to move them to a higher performance category.

Statutory Objective	Supported by the Colorado Growth Model?
Use individual student scores achieved on the statewide assessments.	**Supported** The Colorado Growth Model uses individual student scores from statewide assessments to calculate student growth percentiles, which measure the relative academic growth of individual students from one year to the next relative to their academic peers. Student growth percentiles are subsequently used to generate aggregate measures of overall student growth outcomes for schools and districts.
Is described in a publicly available document that sets forth the mathematical equations used in the model and that fully and accurately explains the methods used to complete the records for students with incomplete data.	**Partially Supported** The Department's public website provides numerous resources about the Colorado Growth Model, including a general overview of the student growth percentile model and explanation of how to interpret results for individual students. The website links to several technical documents that describe the model in more detail, including the mathematical equations that underpin the growth estimation. There is also a brief description of how students with incomplete data are handled. The information provided about the Colorado Growth Model has little information about the error associated with student growth percentile data and few cautions for interpretation. The validation of test scores for any interpretation relies on estimates of measurement error to establish boundaries for how those test scores might be appropriately used. Reporting error estimates is a necessary step toward best practice for educational measurement.
Can treat the analysis and reporting of data electronically and produces student, public school, school district, Charter School Institute, and state reports that the Department provides through its data portal.	**Supported** The Department's data reporting platform (SchoolView) is accessible via its public website, and all data stemming from the Colorado Growth Model are provided electronically at reporting levels specified in statute (i.e., statewide, for student groups, and for individual schools and districts).

Source: HumRRO's review of Colorado Growth Model documentation from the Colorado Department of Education.

Understanding and Use of Accountability Data

A large volume of assessment and accountability data and related information is publicly available to educators, administrators, parents, and other interested parties via the Department's website. For example, district and school performance ratings and the underlying statewide student assessment and growth data and postsecondary and workforce readiness indicators are available for download. Educators have access to materials about the statewide assessments, including schedules and test administration manuals, to help prepare students for the assessment. Districts and schools receive assessment and accountability data on individual students as well as aggregated reports for student groups. Parents and guardians receive annual reports of their student's achievement and growth scores, along with materials in English and Spanish to help with explanation and interpretation of the results.

As mentioned previously, in the legislative declaration for the Education Accountability Act of 2009, the General Assembly stated that "an effective system of statewide education

accountability is one that…reports information concerning performance at the state level, school district or institute level, and individual public school level that is perceived by educators, parents, and students as…useful" [Section 22-11-102(1)(b), C.R.S.]. The General Assembly further states that "it is in the best interests of the state to adopt an aligned education accountability system for public education in this state that reports performance in clear, readily understandable terms" [Section 22-11-102(3)(c), C.R.S.].

Work Performed

One objective for this evaluation was to assess whether and to what extent information about assessments and accountability (accountability data) is accessible to educators, parents, and families. We conducted separate online surveys of educators and parents to gauge attitudes and perceptions about the understandability and usefulness of accountability data, including the extent to which these data are used to inform educational programing or instruction. The Parent Survey was made available in English and Spanish; we have combined the survey responses for reporting purposes. In addition to the online Educator and Parent Surveys, we conducted interviews with administrators and personnel from a sample of districts and schools and representatives from various other stakeholder groups. Participation in both online surveys and the interviews was voluntary. We provide additional methodological details about the surveys and interviews in Chapter 1, including that the surveys are only representative of those responding or participating and cannot be projected to any specific school, district, or statewide populations.

What We Found

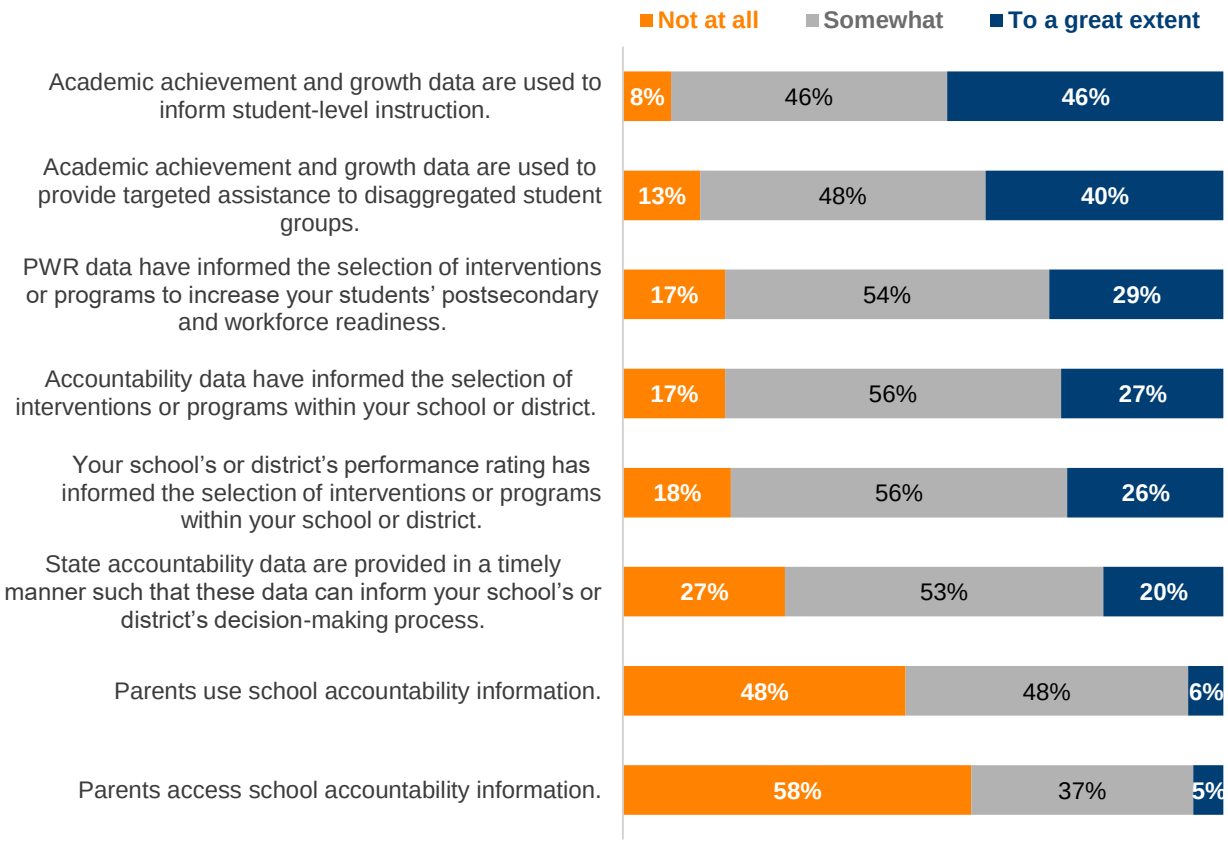
The results of our Educator and Parent Surveys, as well as our interviews with district and school administrators and personnel and other stakeholders indicate that accountability data are being used to help inform decision making in support of students' educational outcomes. However, the results also indicate that these data need to be made more accessible, understandable, and useful, especially for parents.

Educator Survey Results

Educators' attitudes about the overall usefulness and understandability of the accountability data are mixed. The majority of educators responding to our Educator Survey reported they use accountability data to inform student instruction. For example, as shown in Figure 11, 92 percent of respondents reported they use academic achievement and growth data either somewhat or to a great extent to inform student-level instruction. Moreover, 88 percent of respondents reported they use these data either somewhat or to a great extent to provide targeted assistance to student groups.

Figure 11. Educators' Attitudes About the Accessibility and Usefulness of Accountability Data

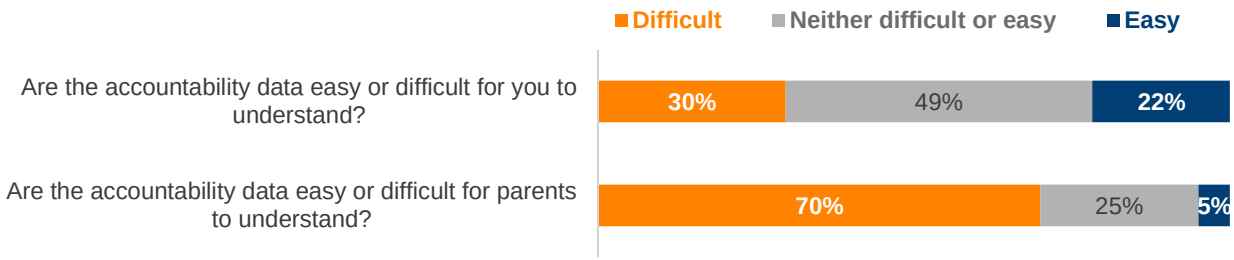
Respondents were asked the extent to which the following statements described the accountability data:



Source: HumRRO's analysis of data from its online Educator Survey administered in April 2022.
Note: Percentages may not sum to 100 due to rounding.

Although the majority of educators responding to our Educator Survey indicated they use and rely on accountability data to help inform instruction and target supports, Figure 12 shows that approximately 30 percent of respondents still indicated that the accountability data are difficult for them to understand. Further, 70 percent of respondents reported their perception that the accountability data are difficult for parents to understand.

Figure 12. Educators' Attitudes About the Understandability of Accountability Data, April 2022 Online Educator Survey



Source: HumRRO's analysis of data from its online Educator Survey administered in April 2022.
Note: Percentages may not sum to 100 due to rounding.

Parent Survey Results

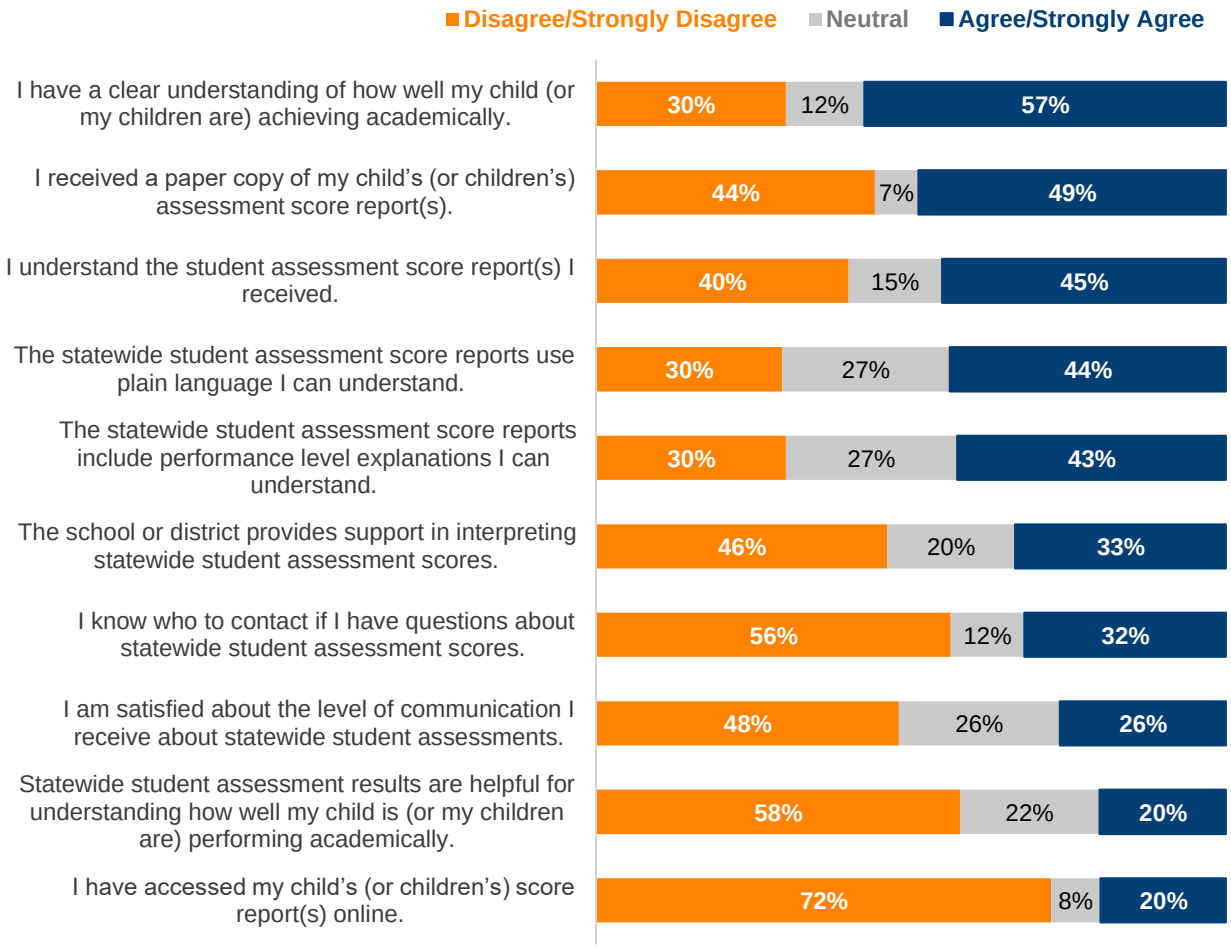
The results of the Parent Survey provided mixed, but less positive results about the overall understandability and usefulness of the accountability data. Figure 13 shows that 57 percent of responding parents agreed or strongly agreed with a statement that they have a clear understanding of how their child is achieving academically. However, the Parent Survey results also raise questions about how important the statewide student assessment data are in helping parents to form this understanding. About 30 percent of parent respondents disagreed or strongly disagreed with a statement that the student assessment score reports use plain language they can understand, and 46 percent indicated that their school or district does not provide support in interpreting score reports.

About 58 percent of responding parents indicated that the statewide student assessment results were not helpful for understanding how well their child is performing academically. Additionally, based on follow-up questions in the survey (not shown in Figure 13), 75 percent and 61 percent of responding parents reported, respectively, that school performance data (a) did not influence their decision to live in a specific neighborhood or (b) help them to make decisions about the school where they wanted to enroll their child.

Forty-eight percent of responding parents reported being dissatisfied with the level of communication they receive about their child's assessments. Nearly half of responding parents (49 percent) indicated they had received a paper copy of a statewide student assessment score report, whereas only 20 percent of responding parents reported having accessed the reports online.

Figure 13. Parents' Attitudes About the Accessibility, Understandability, and Usefulness of Accountability Data

Respondents were asked how much they agreed with the following statements:



Source: HumRRO's analysis of data from its online Parent Survey administered in April 2022.
Note: Percentages may not sum to 100 due to rounding.

Additional Information from District, School, and Stakeholder Interviews

During our interviews, district and school personnel and stakeholders all reported using accountability data to support school and classroom planning, student progress toward achieving grade-level standards, and for preparing for life after high school. Stakeholders specifically reported using accountability data for monitoring district and school trends, particularly at the student group level. Growth data are useful in illustrating achievement gaps; however, stakeholders reported there is some confusion in how the growth data are being used for traditional cohort growth calculations and the new baseline growth calculations for the 2021–22 school year.

A common theme in our interviews was that the system is too far removed from instruction and student experience to support timely intervention and service provision. Many educators we

spoke with reported that the end-of-year statewide assessment data are not timely for adjusting classroom instruction. Some educators were critical that the CMAS and other statewide student assessments are being marketed as “useful for informing classroom instruction” without recognizing that the statewide assessments only provide an end-of-year test score for students who will be in another classroom by the time educators receive the student data. Alternatively, educators we interviewed reported that formative assessments given several times during the year are more useful for monitoring individual student progress and driving data discussions with teachers and teams, thereby providing more opportunities to adjust classroom instructional practices in real time. Participants in the interviews also reported that, while larger districts may have a team of assessment professionals to support schools in understanding and using their accountability data, smaller districts likely do not have a dedicated assessment specialist or other similar resources, thereby limiting the accountability data’s usefulness.

Chapter 4: Effect of School Participation in State-Supported Interventions on Student Outcomes

In the legislative declaration for the Education Accountability Act of 2009, the General Assembly concluded, in part, that it is in the best interests of the State to adopt an education accountability system that "recognizes and rewards areas of success, while also identifying and compelling effective change for areas in need of improvement" [Section 22-11-102(3)(e), C.R.S.], and "ensures the availability of technical assistance, services, and support…to improve students' academic performance" [Section 22-11-102(3)(f), C.R.S.].

Schools and districts with low performance ratings receive guidance on implementing research-based strategies to help improve student outcomes. We focus our analysis in this chapter on determining the overall effect of lower performing schools' participation in one or more selected state-supported intervention programs on student academic outcomes, including student outcomes in schools that serve predominantly economically disadvantaged students, students of color, or students with disabilities.

There were 577 schools that received either a Priority Improvement or Turnaround Plan rating (the two lowest performance ratings) at some point from 2014–15 through 2018–19. Of these 577 Priority Improvement/Turnaround schools, 212 (37 percent) participated in one or more of the following four optional state-supported intensive intervention programs:

- **Tiered Intervention Grant Program** – Provided support to Title I schools in the lowest 5 percent of achievement as indicated by statewide assessments and high schools with graduation rates below 60 percent, based on 3 years of data. The goal was to increase student academic achievement and move the school into higher performance categories. Participants partnered with the Department to implement an evidence-based intervention model approved by the U.S. Department of Education. Title I is a federal program that supports low-income students in elementary and secondary education. The Tiered Intervention Grant Program identified and granted awards from 2010–2014, but is no longer being implemented.

- **Connect for Success Grant Program** – Provides an opportunity for schools identified for support and improvement to learn from the findings of comprehensive studies of high-achieving elementary and secondary schools conducted by the Department in 2014 and 2018. Schools participating in this grant program receive a diagnostic site visit from a Department-led team. Participating schools identify and/or hire an implementation coach who works with the school to help replicate effective strategies and practices common across high-achieving schools and monitor the implementation of those strategies and practices.

- **Transformation Network (formerly "Turnaround Network") Grant Program** – Uses a guiding framework to support schools in developing a rigorous improvement plan around four research-based conditions (culture shift, instructional transformation, talent development, and leadership) to improve school performance and student achievement. Participating schools undergo enhanced diagnostic reviews and planning support, including personalized, professional learning opportunities with a cohort of peer schools, and have access to on-site performance management sessions and other regular participant events.

- **School Turnaround Leaders Development Grant Program** – Establishes and promotes professional development specifically for teachers, principals, and district staff who directly work in or who support schools with identified Priority Improvement Plan or Turnaround Plan performance ratings. Provides support through leadership development training, activities geared towards instructional transformation.

These four optional state-supported intensive intervention programs are not an exhaustive list of the myriad supports and resources the Department and others provide to low performing schools and districts. We chose to focus specifically on these four state-supported intervention programs for analysis because some schools apply for grants to participate in these interventions and some schools do not apply for these grants or do not receive grant funding. Thus data are available for comparisons of schools that participate and those that do not participate. Other interventions are offered to all Priority Improvement/Turnaround schools. Additionally, according to existing research, these programs also have generally shown positive results, including small positive effects on academic achievement, gains in school performance ratings, and reversals of negative performance trends.

Work Performed

We obtained data for all Priority Improvement/Turnaround schools from 2011–12 through 2018–19. Achievement data were available beginning in 2014–15, growth data were available beginning in 2015–16, and graduation rates were available beginning in 2011–12. We examined changes in the schools' academic achievement (mean scale scores), academic growth (median growth percentiles), and graduation rates over time and compared the results for those Priority Improvement/Turnaround schools participating in one or more of the four state-supported interventions with the results for those Priority Improvement/ Turnaround schools that did not participate in one of the four state-supported interventions. We refer to these as participating schools and non-participating schools, respectively, throughout our analysis. The term non-participating schools is not intended to imply that these schools are failing to address their students' needs; they may be engage in other state and local supports directed at improving student outcomes.

What We Found

Our analysis showed that between 2014–15 and 2018–19, participating schools generally experienced more gains or fewer losses in academic achievement, academic growth, and graduation rates than non-participating schools. However, this result did not always hold across all grades, subjects, or student groups. Of note are changes in math achievement among grades 4 through 10, in which participating schools tended to gain less or lose more than non-participating schools from 2015–16 through 2018–19. At the high school level, the results of our comparative analysis using graduation rates show that, in all years, participating schools had higher graduation rates than non-participating schools.

Academic Achievement and Academic Growth Comparisons

In the following tables, we use a dashboard-like presentation to convey the general results of our comparisons between participating and non-participating schools. **Green** upward arrows indicate that students in participating schools experienced more gains or fewer losses in academic achievement or growth compared to non-participating schools. **Orange** downward arrows indicate that students in participating schools experienced fewer gains or more losses in academic achievement or growth compared to non-participating schools.

↑ Participating schools **gained more** or **lost less** than non-participating schools.

↓ Participating schools **gained less** or **lost more** than non-participating schools.

Tables 30 and 31 summarize the overall results when comparing academic achievement and academic growth outcomes between participating and non-participating schools. Participating schools saw improvements in academic achievement and academic growth measures in ELA at the elementary and middle school levels, and improvements in academic growth in math at all grade levels. However, we also note that participating schools saw *declines* in academic achievement and academic growth in ELA for grades 10 and 11, as well as declines in academic achievement in math for grades 4 through 10. Appendices F and G provide tables with the data underlying the presentation of results in Tables 30 and 31, respectively.

Table 30. Summary of Academic Achievement Comparisons by Grade Level and Subject for Participating and Non-Participating Priority Improvement/Turnaround Schools, 2014–15 Through 2018–19

	Academic Achievement	
	ELA	Math
Grade 3	↑	↑
Grade 4	↑	↓
Grade 5	↑	↓
Grade 6	↑	↓
Grade 7	↑	↓
Grade 8	↑	↓
Grade 10[1]	↓	↓
Grade 11[1]	↓	↑

Source: HumRRO's analysis of data from the Colorado Department of Education.

↑ Participating schools gained more or lost less than non-participating schools.

↓ Participating schools gained less or lost more than non-participating schools.

[1]Grade 10 and 11 data include PSAT and SAT, respectively, and are only available from 2017–18 through 2018–19.

Table 31. Summary of Academic Growth Comparisons by Grade Level and Subject for Participating and Non-Participating Priority Improvement/Turnaround Schools, 2015–16 Through 2018–19

	Academic Growth	
	ELA	Math
Elementary School	↑	↑
Middle School	↑	↑
High School[1]	↓	↑

Source: HumRRO's analysis of data from the Colorado Department of Education.

↑ Participating schools gained more or lost less than non-participating schools.
↓ Participating schools gained less or lost more than non-participating schools.

[1]High school data include grade 10 PSAT and grade 11 SAT and are only available from 2017–18 through 2018–19.

A stronger pattern of positive results of participating in one or more of the four state-supported interventions emerges when breaking out the analysis for those Priority Improvement/ Turnaround schools that serve a high percentage of economically disadvantaged students (75 percent or more free or reduced lunch students), students of color (75 percent or more Black students and/or Hispanic students), and/or students with disabilities (more than 13 percent students with disabilities). Tables 32 and 33 show that, with few exceptions, participating schools experienced more gains in academic achievement and academic growth across all grades and content areas compared to non-participating schools. Appendices H and I provide tables with the data underlying the presentation of results in Tables 32 and 33, respectively.

Table 32. Summary of Academic Achievement Comparisons by Grade Level and Subject for Participating and Non-Participating Priority Improvement/Turnaround Schools Serving a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, 2014–15 Through 2018–19

	Academic Achievement	
	ELA	Math
Grade 3	↑	↑
Grade 4	↑	↑
Grade 5	↑	↑
Grade 6	↑	↓
Grade 7	↑	↑
Grade 8	↑	↑
Grade 10[1]	↑	↑
Grade 11[1]	↓	↑

Source: HumRRO's analysis of data from the Colorado Department of Education.

↑ Participating schools gained more or lost less than non-participating schools.
↓ Participating schools gained less or lost more than non-participating schools.

[1]Grade 10 and 11 data include PSAT and SAT, respectively, and are only available from 2017–18 through 2018–19.

Table 33. Summary of Academic Growth Comparisons for Participating and Non-Participating Priority Improvement/Turnaround Schools Serving a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, 2015–16 to 2018–19

	Academic Growth	
	ELA	Math
Elementary School	↑	↑
Middle School	↑	↑
High School[1]	↓	↑

Source: HumRRO's analysis of data from the Colorado Department of Education.

↑ Participating schools gained more or lost less than non-participating schools.
↓ Participating schools gained less or lost more than non-participating schools.

[1]High school data include grade 10 PSAT and grade 11 SAT and are only available from 2017–18 through 2018–19.

While Tables 32 and 33 present comparisons of participating and non-participating schools that serve a high percentage of underrepresented student groups, Tables 34 and 35 focus specifically on the performance of the economically disadvantaged students and students with disabilities groups at all participating and non-participating schools. These tables show that economically disadvantaged students and students with disabilities in participating schools at the elementary and middle school levels tended to experience more gains or fewer losses in academic achievement (Table 34) and academic growth (Table 35) in ELA when compared with similar students in non-participating schools. Similarly, economically disadvantaged students and students with disabilities in participating schools tended to experience more gains or fewer losses in academic growth in math across all grade levels (Table 35). Appendices J and K provide tables with the data underlying the presentation of results in Tables 34 and 35, respectively.

Table 34. Summary of Academic Achievement Comparisons for Economically Disadvantaged Students and Students with Disabilities in Participating and Non-Participating Priority Improvement/Turnaround Schools by Subject and Grade Level, 2014–15 Through 2018–19

		All Students	Economically Disadvantaged Students	Students with Disabilities
Academic Achievement ELA	*Grade 3*	↑	↑	↑
	Grade 4	↑	↑	↑
	Grade 5	↑	↑	↓
	Grade 6	↑	↑	↑
	Grade 7	↑	↑	↑
	Grade 8	↑	↑	↑
	Grade 10[1]	↓	↓	↑
	Grade 11[1]	↓	↓	↓
Academic Achievement Math	*Grade 3*	↑	↑	↓
	Grade 4	↓	↑	↑
	Grade 5	↓	↑	↓
	Grade 6	↓	↓	↑
	Grade 7	↓	↓	↑
	Grade 8	↓	↓	↓
	Grade 10[1]	↓	↓	↓
	Grade 11[1]	↑	↓	↑

Source: HumRRO's analysis of data from the Colorado Department of Education.

↑ Participating schools gained more or lost less than non-participating schools.
↓ Participating schools gained less or lost more than non-participating schools.

[1]High school data include grade 10 PSAT and grade 11 SAT and are only available from 2017–18 through 2018–19.

Table 35. Summary of Academic Growth Comparisons for Priority Improvement/Turnaround Schools Participating in State-Supported Interventions versus Priority Improvement/Turnaround Schools Not Participating in State-Supported Interventions, 2015–16 Through 2018–19

		All Students	Economically Disadvantaged Students	Students with Disabilities
Academic Growth ELA	*Elementary School*	↑	↑	↑
	Middle School	↑	↑	↑
	High School[1]	↓	↓	↑
Academic Growth Math	*Elementary School*	↑	↑	↑
	Middle School	↑	↑	↑
	High School[1]	↑	↑	↑

Source: HumRRO's analysis of data from the Colorado Department of Education.

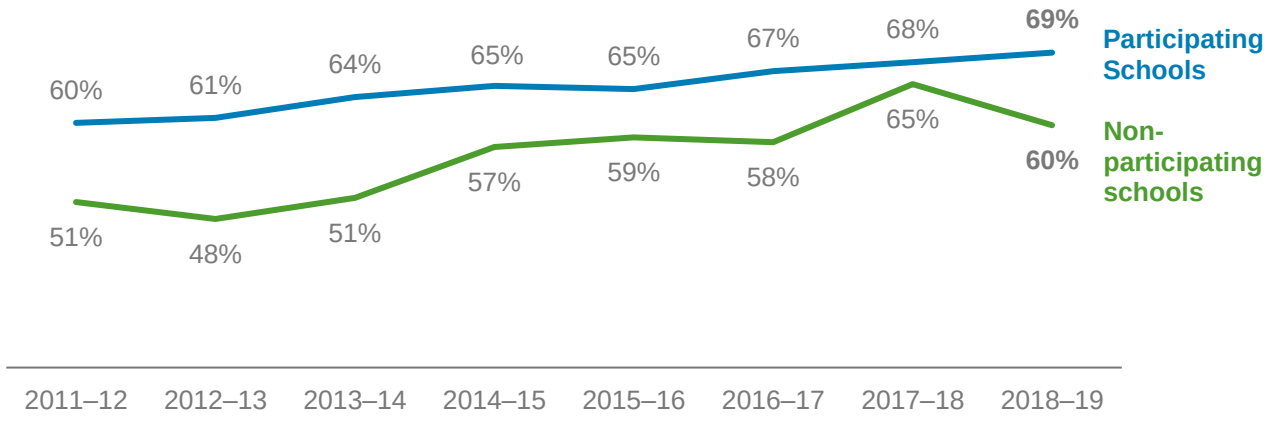
↑ Participating schools gained more or lost less than non-participating schools.
↓ Participating schools gained less or lost more than non-participating schools.

[1]High school data include grade 10 PSAT and grade 11 SAT and are only available from 2017–18 through 2018–19.

Graduation Rate Comparisons

Figure 14 presents comparisons of graduation rate trends of participating and non-participating schools. Graduation rates are shown for the four years prior to the intervention period (2011–12 through 2014–15) and the four years during or following intervention (2015–16 through 2018–19). In all years, participating schools had higher graduation rates than non-participating schools. Non-participating schools showed a larger overall increase in graduation rates through 2017–18 (14 percentage point gain) compared to participating schools (8 percentage point gain). However, the graduation rate for non-participating schools dropped three times during the eight-year period with a decline of five percentage points in 2018–19, which decreased the overall gain across the eight-year span to 9 percentage points, equal to the gain for participating schools. Appendix L provides the data underlying the presentation of results in Figure 14.

Figure 14. Graduation Rate Trends for Participating and Non-Participating Schools, 2011–12 Through 2018–19



Source: HumRRO's analysis of data from the Colorado Department of Education.

List of Terms and Definitions

ACCESS for ELLs – Standardized English language proficiency assessment given annually to students in kindergarten through grade 12 who have been identified as English learners. It provides information about the English language proficiency level in the language domains of listening, speaking, reading, and writing.

Advanced Placement – A program that offers college-level curricula and examinations to high school students. Colleges and universities may grant placement and course credit to students who take Advanced Placement courses and obtain high scores on Advanced Placement examinations.

American College Testing (ACT) Test – Standardized test covering English language arts, math, reading, and scientific reasoning that is used as a postsecondary readiness benchmark and as an entrance exam for some college and university admissions decisions.

Boards of Cooperative Educational Services (BOCES) – Educational service agencies that provide services to two or more member school districts that alone cannot afford the service or find it advantageous and cost-effective to cooperate with other districts. BOCES are an extension of the local member school districts and only provide those programs and services authorized by their members. Examples of BOCES services include school authorization, special education, curriculum and staff development, alternative schools and programs, standards and assessment support, technology support, vocational education, data management, and grant management.

career and technical education – Schools, institutions, and educational programs that specialize in the skilled trades, applied sciences, modern technologies, and career preparation. Career and technical programs (formerly referred to as vocational education) frequently offer both academic and career-oriented courses, and many provide students with the opportunity to gain work experience through internships, job shadowing, on-the-job training, and industry-certification opportunities.

Colorado Academic Standards – Reflect instructional priorities for all Colorado students and provide a grade-by-grade road map for essential skills development across 10 content areas: comprehensive health and physical education; dance; drama and theatre arts; math; music; reading, writing, and communicating; science; social studies; visual arts; and world languages. Voluntary computer science standards are also included at the high school level. The Colorado Academic Standards emphasize critical thinking, creativity, problem solving, and collaboration and communication as essential skills for postsecondary and workforce readiness.

Colorado Alternate Assessments (CoAlt) – Statewide standards-based assessment of student performance in English language arts, math, and science that are designed specifically for students with the most significant cognitive disabilities.

Colorado Growth Model – A statistical model that uses the results of statewide assessments to measure the relative academic growth of individual students from one year to the next.

Colorado Measures of Academic Success (CMAS) – Statewide standards-based assessment of student performance in English language arts, math, and science.

concurrent enrollment – Refers specifically to those dual enrollment programs created through the Concurrent Enrollment Program Act of 2009.

correlation – A statistical measure of the size and direction of the relationship between two variables. The correlation coefficient (*r*) ranges in value from -1.0 to 1.0, with -1.0 representing a perfect negative correlation, zero representing no correlation, and 1.0 representing a perfect positive correlation. Correlation only establishes a relationship between two variables; it does not establish a causal link.

dual enrollment – Refers generally to programs that offer students the ability to take college-level and/or career and technical education courses while they are in high school.

English language arts (ELA) – Students receive instruction in and are assessed on their ability to read, write, and communicate in English, referred to as the English language arts.

English learner – Refers to students who are unable to communicate fluently or learn effectively in English and who typically require specialized or modified instruction in both the English language and in their academic courses.

free or reduced lunch – Refers to students who receive free or low-cost school meals based on household income guidelines. Students' free or reduced lunch status is commonly used in educational research as a proxy measure for socioeconomic status.

International Baccalaureate – A college preparatory program providing students the option of pursuing either the full International Baccalaureate diploma or certificates in one or more areas of selected study. Students may earn college credit or advanced standing for their International Baccalaureate coursework.

mean scale score – The average performance of a group of students on an assessment. A mean scale score is calculated by adding all individual student scores and dividing by the number of individuals. It can also be referred to as an average scale score.

median – The middle number in a set of data sorted in ascending or descending order.

median growth percentile – Used to summarize academic growth outcomes for schools, districts, and disaggregated student groups. The median growth percentile represents the midpoint of the distribution of all the individual student growth percentiles for students enrolled in a school or district during the October 1 census count and the spring testing window.

percentile – On a scale from 0 to 100, a value indicating the percent of a distribution equal to or below it. For example, a school with a median growth percentile of 60 has a growth score equal to or better than 60 percent of the schools in that group of data.

postsecondary and workforce readiness (PWR) – Refers to how well students are prepared with the relevant knowledge, skills, and competencies for success in postsecondary education and career pathways beyond high school.

PSAT – Standardized test covering reading, writing and language, and math that is used as a postsecondary readiness benchmark. PSAT scores are divided into two components: evidence-based reading and writing (reading/writing) and math.

pupil-teacher ratio – The relationship between the number of students enrolled in a school, district, or education system and the number of full-time-equivalent teachers employed by the school, district, or education system. Pupil-teacher ratios are a general way to measure teacher workloads and resource allocations, as well as the amount of individual attention a child is likely to receive.

SAT – Standardized test covering reading, writing and language, and math that is used as a postsecondary readiness benchmark, an indicator of achievement of the Colorado Academic Standards, and an entrance exam for some college and university admissions decisions. SAT scores are divided into two components: evidence-based reading and writing (reading/writing) and math.

statistical significance – Helps to determine whether a result, difference, or effect observed through quantitative data analysis is real or likely to have occurred randomly by chance.

student growth percentile – Used to summarize an individual student's academic growth from one year to the next relative to their academic peers (i.e., students currently in the same grade with a similar score history on the statewide assessments in that subject). This may also be referred to as a growth score.

students with disabilities – Refers to students who are classified as having a disability and receive special education and related services. Each student has an Individualized Education Program (IEP), which is a document uniquely designed to improve educational results for that student. Each IEP must be created in compliance with the federal Individuals with Disabilities Education Act and Colorado's Exceptional Children's Education Act.

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Appendix A: Map of Colorado School Districts

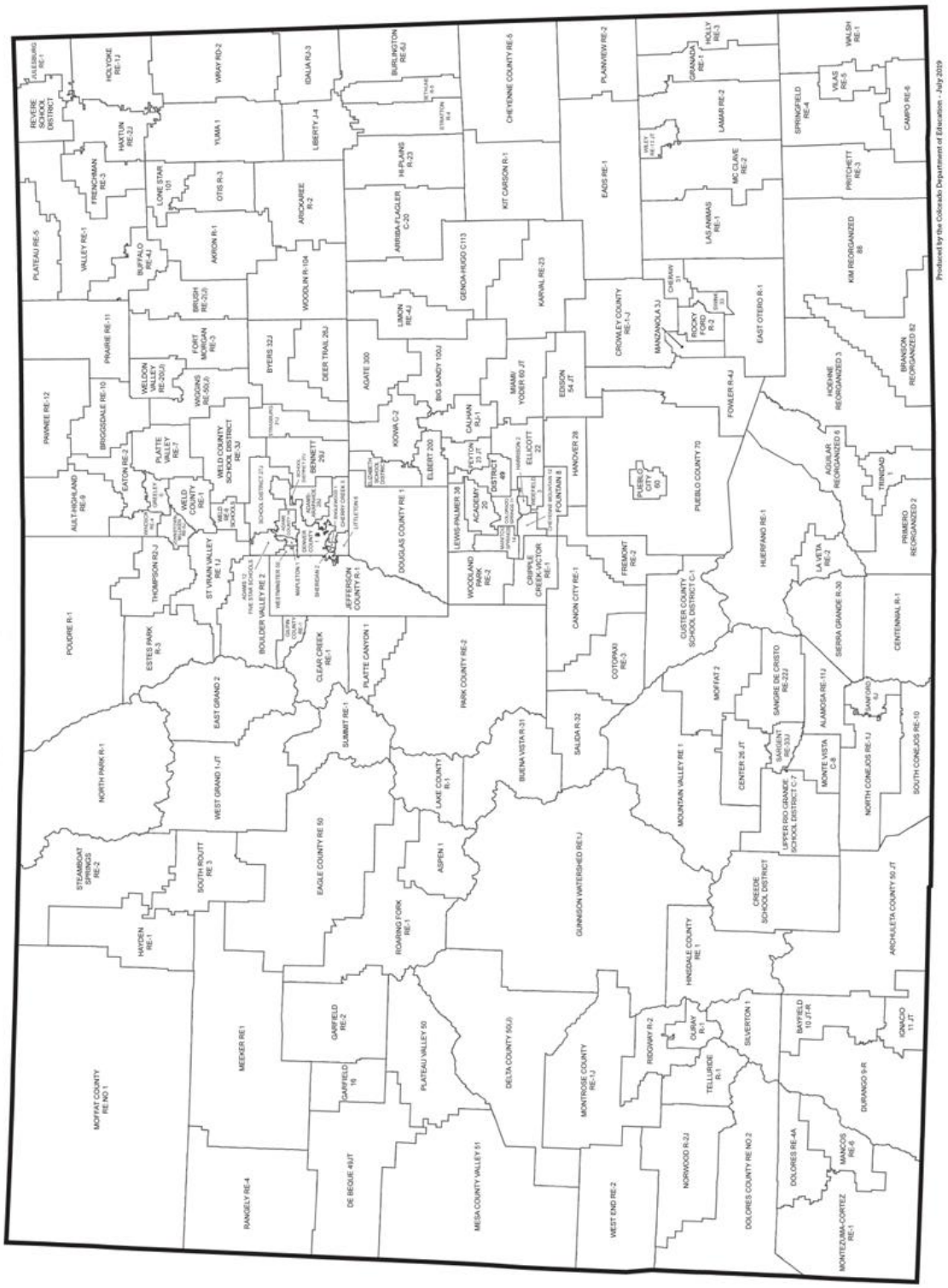


Figure A.1. Colorado School Districts

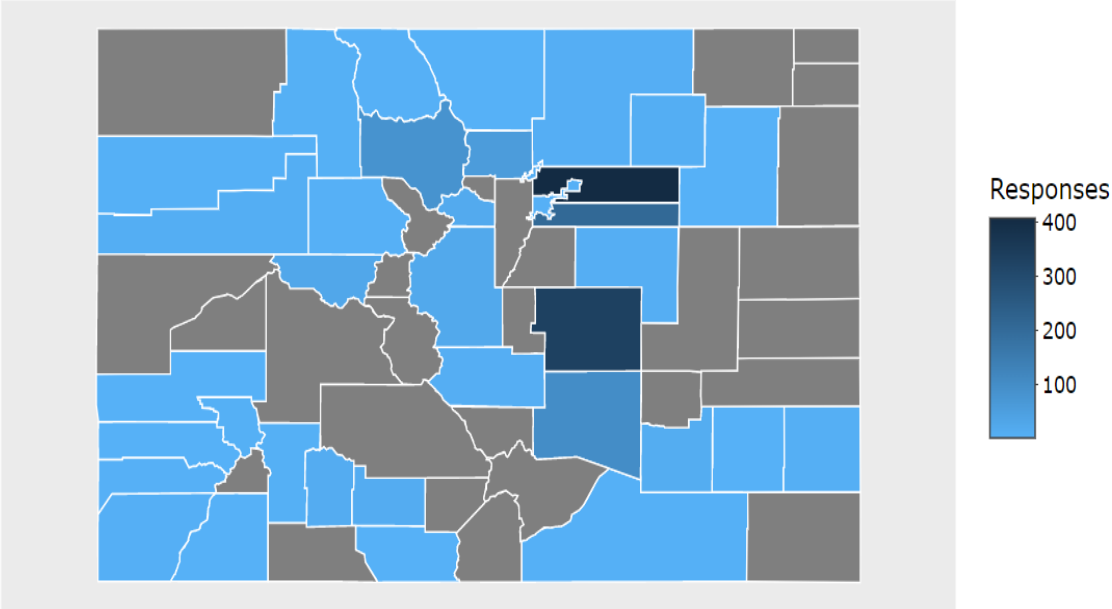
Appendix B: Educator Survey Response Distribution

Figure B.1 shows the distribution of responses to the Educator Survey based on the county where the respondent reported their school or district is primarily located. Gray indicates there were no respondents who reported their district or school is primarily located in that county. Table B.1 provides the number and percentage of respondents by county.

Because of the Educator Survey's design and voluntary nature, the results are only representative of those 1,446 individual educators who responded. The Educator Survey results are not representative of and cannot be projected to any specific school, district, or statewide educator populations.

Of those responding to the Educator Survey, 90 percent were school-level staff, primarily comprised of classroom teachers (57 percent of respondents) in traditional public schools (95 percent of respondents). There was a mix of years of experience among respondents, with a slight skew toward those with less than 6 years of experience (35 percent of respondents).

Figure B.1. Educator Survey Responses by County



Note: Counties not represented in the data are shaded in grey.

Table B.1. Number and Percentage of Educator Survey Responses by County

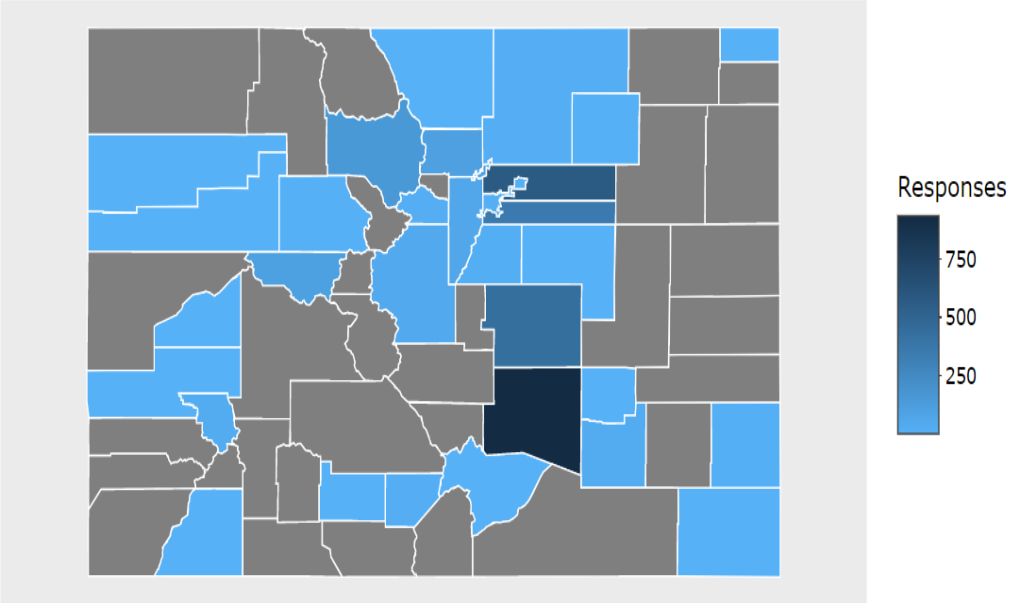
County	n	Percentage
Adams	407	28.7
El Paso	333	23.5
Arapahoe	208	14.7
Pueblo	102	7.2
Grand	84	5.9
Boulder	58	4.1
Pitkin	28	2.0
Park	23	1.6
Clear Creek	19	1.3
Mineral	14	1.0
Rio Grande	14	1.0
Otero	13	1.0
Broomfield	11	0.8
Garfield	10	0.7
Morgan	10	0.7
Elbert	9	0.6
Fremont	9	0.6
Weld	8	0.6
Prowers	7	0.5
Montezuma	6	0.4
Hinsdale	5	0.4
Ouray	5	0.4
Routt	5	0.4
Las Animas	4	0.3
Rio Blanco	4	0.3
Denver	3	0.2
Dolores	3	0.2
Eagle	3	0.2
Jackson	3	0.2
Larimer	2	0.1
Washington	2	0.1
Bent	1	0.1
Conejos	1	0.1
La Plata	1	0.1
Montrose	1	0.1
San Miguel	1	0.1
No County of School or District Provided	29	2.0
Total Respondents	**1,446**	100.0

Appendix C: Parent Survey Response Distribution

Figure C.1 shows the distribution of responses to the Parent Survey based on the county where the respondent reported they live. Gray indicates there were no respondents who reported living in that county. Table C.1 provides the number and percentage of respondents by county.

Because of the Parent Survey's design and voluntary nature, the results are only representative of those 3,130 individual parents who responded. The Parent Survey results are not representative of and cannot be projected to any specific school, district, or statewide parent populations.

Figure C.1. Parent Survey Responses by County.



Note: Counties not represented in the data are shaded in grey.

Table C.1. Number and Percentage of Parent Survey Responses by County

County	n	Percentage
Pueblo	935	29.9
Adams	577	18.4
El Paso	436	13.9
Arapahoe	357	11.4
Grand	155	5.0
Boulder	110	3.5
Broomfield	109	3.5
Pitkin	106	3.4
Jefferson	66	2.1
Park	50	1.6
Otero	36	1.2
Ouray	34	1.1
Douglas	21	0.7
Alamosa	20	0.6
Clear Creek	20	0.6
Weld	19	0.6
Denver	15	0.5

County	n	Percentage
Prowers	11	0.4
Morgan	10	0.3
Eagle	6	0.2
Elbert	3	0.1
Garfield	3	0.1
Larimer	2	0.1
Rio Blanco	2	0.1
Rio Grande	2	0.1
Baca	1	0.1
Crowley	1	0.1
Delta	1	0.1
Huerfano	1	0.1
La Plata	1	0.1
Montrose	1	0.1
Sedgwick	1	0.1
No County of Residence Provided	18	0.6
Total Respondents	**3,130**	100.0

Appendix D: Academic Growth Data for Student Groups in High-Performing Schools

Table D.1. Percentage of Elementary Schools Receiving a Performance Plan Rating with Student Groups Falling into Each Performance Category (Based on Median Growth Percentile[1]) by Subject, 2018–19

CMAS ELA	Does not Meet	Approaches	Meets	Exceeds
Students with disabilities (n=127)	21%	47%	29%	4%
English learners (n=194)	5%	31%	52%	12%
Free or reduced lunch students (n=517)	6%	39%	46%	10%
Students of color (n=611)	3%	36%	48%	13%
All Students (n=771)	2%	30%	54%	14%
CMAS Math				
Students with disabilities (n=127)	6%	51%	35%	8%
English learners (n=207)	4%	30%	48%	18%
Free or reduced lunch students (n=522)	6%	40%	40%	15%
Students of color (n=611)	5%	32%	45%	18%
All Students (n=771)	3%	33%	46%	18%

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Ns represent the number of schools included in the analysis. The Ns of All Students refer to the number of schools with a Performance Plan rating in 2018–19 and is not a sum of the student group Ns because students may belong to more than one group, and these groups do not include all students. Percentages may not sum to 100 due to rounding.

[1]These data did not include median growth percentiles for the CMAS science assessment.

Table D.2. Percentage of Middle Schools Receiving a Performance Plan Rating with Student Groups Falling into Each Performance Category (Based on Median Growth Percentile[1]) by Subject, 2018–19

	Does not Meet	Approaches	Meets	Exceeds
CMAS ELA				
Students with disabilities (n=167)	8%	49%	36%	7%
English learners (n=169)	3%	25%	49%	23%
Free or reduced lunch students (n=308)	9%	37%	43%	11%
Students of color (n=306)	4%	33%	47%	15%
All Students (n=400)	5%	32%	48%	16%
CMAS Math				
Students with disabilities (n=167)	3%	61%	34%	2%
English learners (n=170)	4%	28%	52%	17%
Free or reduced lunch students (n=308)	6%	38%	45%	11%
Students of color (n=309)	3%	36%	47%	14%
All Students (n=771)	4%	33%	50%	14%

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Ns represent the number of schools included in the analysis. The Ns of All Students refer to the number of schools with a Performance Plan rating in 2018–19 and is not a sum of the student group Ns because students may belong to more than one group, and these groups do not include all students. Percentages may not sum to 100 due to rounding.

[1]These data did not include median growth percentiles for the CMAS science assessment.

Table D.3. Percentage of High Schools Receiving a Performance Plan Rating with Student Groups Falling into Each Performance Category (Based on Median Growth Percentile[1]) by Subject, 2018–19

PSAT/SAT Reading/Writing	Does not Meet	Approaches	Meets	Exceeds
Students with disabilities (n=82)	26%	55%	18%	1%
English learners (n=74)	18%	60%	20%	3%
Free or reduced lunch students (n=198)	9%	59%	29%	3%
Students of color (n=190)	4%	49%	44%	3%
All Students (n=297)	6%	45%	47%	2%
PSAT/SAT Math				
Students with disabilities (n=110)	4%	50%	43%	4%
English learners (n=104)	6%	43%	38%	14%
Free or reduced lunch students (n=228)	7%	43%	42%	8%
Students of color (n=224)	7%	39%	41%	13%
All Students (n=302)	5%	41%	44%	11%

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Ns represent the number of schools included in the analysis. The Ns of All Students refer to the number of schools with a Performance Plan rating in 2018–19 and is not a sum of the student group Ns because students may belong to more than one group, and these groups do not include all students. Percentages may not sum to 100 due to rounding.

[1]These data did not include median growth percentiles for the CMAS science assessment.

Appendix E: Colorado Growth Model References

Table E.1. Colorado Growth Model References and Brief Description

Reference	Description
Costellano, K.E. & Ho, A. (2013). "A Practitioner's Guide to Growth Models." Council for Chief State School Officers.	A paper commissioned by the Technical Issues in Large-Scale Assessment and Accountability Systems & Reporting State Collaboratives on Assessment and Student Standards. This guide provides a brief description of most growth models used by state education agencies (or being considered by them at the time of the guide's publication). The guide uses the Colorado Growth Model as a specific example when covering student growth percentiles.
Betebenner, D. (2009). "Norm- & Criterion-Referenced Student Growth." Educational Measurement: Issues and Practice, Vol. 28, No. 4, pp. 42-51.	This paper describes norm- and criterion-referenced student growth and how student growth percentile models address both characterizations of growth simultaneously.
Betebenner, D.W. (2011). "New Directions in Student Growth: The Colorado Growth Model." Paper presented at the National Conference on Student Assessment, Orlando, FL, June 19, 2011.	This presentation describes Colorado's growth model. It contains visualizations of how the growth model data might be presented and interpreted.
Wells, C. S. & Sireci, S. G. (2020). "Evaluating Random and Systematic Error in Student Growth Percentiles." Applied Measurement in Education, Vol. 33, No. 4, p349-361.	This paper describes several concerns with using student growth percentiles to measure student growth at the individual and aggregate levels. It highlights concerns about the very high levels of random error associated with student growth percentile models.
Lockwood, J. R. & Castellano (2017). "Estimating True Student Growth Percentile Distributions Using Latent Regression Multidimensional IRT Models." Educational and Psychological Measurement, Vol. 77, No. 6, p917-944.	This paper investigates alternative ways of estimating true growth score distributions that can be compared to estimates made with student growth percentiles. It provides several cautions for using student growth percentiles to estimate individual student growth.
Reeger, A., Gaasedelen, O., Welch, C. & Dunbar, S. (2016). "Using Student Growth Percentiles to Measure Teacher Effectiveness: Accountability Concerns." Paper presented at the Annual Meeting of the American Educational Research Association, Washington, DC, April 8-12, 2016.	This presentation describes concerns with using student growth percentiles for accountability. It highlights concerns with persistent growth score differences among student sub-populations (e.g., students of color, students with disabilities, English language learners, economically disadvantaged) and the potential fairness issues that are raised by those differences.

Appendix F: Supplemental Intervention Results for Table 30

Table F.1. Mean ELA Achievement Scores: Grade 3

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	93	715.5	13.9	95	716.3	11.5	96	718.2	11.7	96	719.6	11.3	96	720.4	12.0
Non-Participating Schools	109	722.3	14.7	112	721.8	13.8	118	722.4	14.2	128	722.4	14.6	129	723.8	15.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.2. Change in Mean ELA Achievement Scores: Grade 3

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.06	0.16	0.12	0.07	0.38
Non-Participating Schools	-0.04	0.04	0.00	0.09	0.10

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.3. Mean ELA Achievement Scores: Grade 4

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	93	722.8	10.2	94	722.6	9.2	95	722.4	9.0	96	725.3	8.2	96	726.7	9.8
Non-Participating Schools	107	726.5	11.8	113	727.9	12.8	116	729.1	10.0	123	730.1	10.6	128	728.0	11.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.4. Change in Mean ELA Achievement Scores: Grade 4

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.02	-0.02	0.34	0.15	0.39
Non-Participating Schools	0.11	0.10	0.10	-0.19	0.13

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.5. Mean ELA Achievement Scores: Grade 5

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	92	723.1	9.6	93	721.5	8.6	93	724.1	9.1	94	727.5	8.8	95	728.7	7.9
Non-Participating Schools	105	726.7	9.8	109	725.7	9.2	116	730.0	9.9	120	731.8	11.8	124	732.1	11.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.6. Change in Mean ELA Achievement Scores: Grade 5

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.18	0.29	0.38	0.14	0.64
Non-Participating Schools	-0.11	0.45	0.17	0.03	0.51

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.7. Mean ELA Achievement Scores: Grade 6

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	45	724.4	12.0	46	721.9	10.0	42	723.8	8.2	42	726.0	11.4	43	726.2	9.0
Non-Participating Schools	89	725.6	14.0	92	725.2	11.5	95	727.3	11.6	97	728.8	10.2	99	727.4	15.7

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.8. Change in Mean ELA Achievement Scores: Grade 6

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.23	0.21	0.22	0.02	0.17
Non-Participating Schools	-0.03	0.18	0.14	-0.11	0.12

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.9. Mean ELA Achievement Scores: Grade 7

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	36	718.3	12.6	37	718.9	11.6	36	722.1	11.5	36	722.8	14.6	36	725.1	10.0
Non-Participating Schools	82	723.5	15.5	82	723.3	15.2	82	726.7	14.2	88	728.1	14.3	93	727.8	17.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.10. Change in Mean ELA Achievement Scores: Grade 7

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.05	0.28	0.05	0.18	0.60
Non-Participating Schools	-0.01	0.23	0.10	-0.02	0.26

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.11. Mean ELA Achievement Scores: Grade 8

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	37	719.2	12.3	37	719.8	12.0	36	723.8	11.0	35	724.0	13.4	36	726.5	12.1
Non-Participating Schools	81	724.3	17.4	83	726.5	14.5	85	725.3	14.2	86	724.9	14.1	92	728.7	14.8

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.12. Change in Mean ELA Achievement Scores: Grade 8

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.05	0.35	0.02	0.20	0.60
Non-Participating Schools	0.14	-0.08	-0.03	0.26	0.27

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.13. Mean Reading/Writing Achievement Scores: Grade 10

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	21	412.3	23.7	23	413.8	23.9	22	409.0	26.4
Non-Participating Schools	75	418.6	40.6	78	421.1	38.8	80	414.8	42.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.14. Change in Mean Reading/Writing Scores: Grade 10

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.06	-0.19	-0.13
Non-Participating Schools	0.06	-0.16	-0.09

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.15. Mean Reading/Writing Achievement Scores: Grade 11

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	442.3	33.1	23	443.2	29.8	23	431.6	27.2
Non-Participating Schools	69	447.5	38.9	77	450.0	44.3	79	442.5	42.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.16. Change in Mean Reading/Writing Achievement Scores: Grade 11

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.03	-0.41	-0.35
Non-Participating Schools	0.06	-0.17	-0.12

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.17. Mean Math Achievement Scores: Grade 3

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	93	719.0	12.0	95	718.4	11.1	96	720.3	12.1	96	720.7	12.0	96	720.9	11.0
Non-Participating Schools	109	724.6	12.8	112	723.2	12.1	118	722.4	14.2	128	722.4	14.6	129	723.8	15.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.18. Change in Mean Math Achievement Scores: Grade 3

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.05	0.16	0.03	0.02	0.17
Non-Participating Schools	-0.11	-0.06	0.00	0.09	-0.06

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.19. Mean Math Achievement Scores: Grade 4

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	93	717.5	9.0	94	714.0	9.3	95	714.9	10.3	96	714.2	9.4	96	717.6	9.5
Non-Participating Schools	107	720.9	10.6	113	719.9	11.9	116	729.1	10.0	123	730.1	10.6	128	728.0	11.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.20. Change in Mean Math Achievement Scores: Grade 4

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.38	0.09	-0.07	0.36	0.01
Non-Participating Schools	-0.09	0.84	0.10	-0.19	0.65

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.21. Mean Math Achievement Scores: Grade 5

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	92	716.3	8.9	93	715.1	8.7	93	714.7	9.5	94	717.1	9.3	95	718.1	8.7
Non-Participating Schools	105	720.2	9.9	109	718.6	8.6	116	730.0	9.9	120	731.8	11.8	124	732.1	11.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.22. Change in Mean Math Achievement Scores: Grade 5

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.14	-0.04	0.26	0.11	0.20
Non-Participating Schools	-0.17	1.23	0.17	0.03	1.11

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.23. Mean Math Achievement Scores: Grade 6

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	45	718.2	8.8	46	714.5	9.6	42	713.2	9.2	42	715.3	8.5	43	714.8	6.1
Non-Participating Schools	89	721.7	10.9	92	718.1	11.8	95	727.3	11.6	97	728.8	10.2	99	727.4	15.7

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.24. Change in Mean Math Achievement Scores: Grade 6

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.40	-0.14	0.24	-0.07	-0.45
Non-Participating Schools	-0.32	0.79	0.14	-0.11	0.42

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.25. Mean Math Achievement Scores: Grade 7

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	36	717.5	8.0	37	715.8	7.2	36	715.2	6.6	36	716.7	9.5	36	717.5	6.2
Non-Participating Schools	82	723.1	10.3	82	720.4	9.5	82	726.7	14.2	88	728.1	14.3	93	727.8	17.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.26. Change in Mean Math Achievement Scores: Grade 7

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.22	-0.09	0.18	0.10	0.00
Non-Participating Schools	-0.27	0.52	0.10	-0.02	0.33

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.27. Mean Math Achievement Scores: Grade 8

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	37	712.0	9.7	37	707.5	10.1	36	710.1	7.1	35	709.0	9.9	36	711.6	12.5
Non-Participating Schools	83	715.2	15.9	83	713.6	14.0	85	725.3	14.2	86	724.9	14.1	92	728.7	14.8

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.28. Change in Mean Math Achievement Scores: Grade 8

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.45	0.30	-0.13	0.23	-0.04
Non-Participating Schools	-0.11	0.83	-0.03	0.26	0.88

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.29. Mean Math Achievement Scores: Grade 10

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	21	413.2	16.8	23	399.2	51.6	22	400.8	25.4
Non-Participating Schools	75	415.5	30.6	78	406.2	35.6	80	402.4	32.0

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.30. Change in Mean Math Achievement Scores: Grade 10

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.36	0.04	-0.58
Non-Participating Schools	-0.28	-0.11	-0.42

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table F.31. Mean Math Achievement Scores: Grade 11

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	425.2	23.7	23	427.4	27.8	23	416.7	30.9
Non-Participating Schools	69	431.6	38.4	77	430.6	43.3	79	423.4	42.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table F.32. Change in Mean Math Achievement Scores: Grade 11

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.01	-0.36	-0.03
Non-Participating Schools	-0.02	-0.17	-0.20

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Appendix G: Supplemental Intervention Results for Table 31

Table G.1. Mean ELA Growth Scores: Elementary School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	94	43.8	7.0	95	44.3	7.7	96	46.3	7.6	96	47.0	6.8
Non-Participating Schools	116	44.7	9.3	120	46.4	9.6	126	46.2	9.8	130	45.6	8.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table G.2. Change in Mean ELA Growth Scores: Elementary School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.07	0.26	0.10	0.46
Non-Participating Schools	0.18	-0.02	-0.07	0.10

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table G.3. Mean ELA Growth Scores: Middle School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	37	43.6	7.1	36	47.0	9.4	36	48.0	10.4	36	47.6	6.1
Non-Participating Schools	86	45.8	11.4	88	45.1	10.7	91	45.6	10.1	94	45.7	10.0

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table G.4. Change in Mean ELA Growth Scores: Middle School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.41	0.10	-0.05	0.60
Non-Participating Schools	0.15	0.06	0.01	0.24

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table G.5. Mean Reading/Writing Growth Scores: High School

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	43.4	10.5	23	42.3	5.7	23	42.8	3.7
Non-Participating Schools	69	41.4	9.1	79	42.2	8.3	81	42.9	7.9

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table G.6. Change in Mean Reading/Writing Growth Scores: High School

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.13	0.10	-0.08
Non-Participating Schools	0.09	0.09	0.18

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table G.7. Mean Math Growth Scores: Elementary School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	94	41.1	8.1	95	43.3	10.2	96	44.3	8.6	96	45.7	8.8
Non-Participating Schools	116	41.9	10.0	120	44.7	9.9	126	43.5	8.8	130	43.7	9.9

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table G.8. Change in Mean Math Growth Scores: Elementary School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.24	0.11	0.16	0.54
Non-Participating Schools	0.28	-0.13	0.02	0.18

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table G.9. Mean Math Growth Scores: Middle School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	37	42.2	5.3	36	43.7	7.9	36	45.4	6.4	36	46.4	6.0
Non-Participating Schools	85	43.8	7.6	88	44.5	10.0	91	44.9	7.5	94	43.6	9.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table G.10. Change in Mean Math Growth Scores: Middle School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.22	0.24	0.16	0.74
Non-Participating Schools	0.08	0.05	-0.15	-0.02

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table G.11. Mean Math Growth Scores: High School

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	39.0	7.7	23	43.0	8.8	23	45.1	6.5
Non-Participating Schools	69	39.6	7.7	79	41.9	7.6	81	43.1	6.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table G.12. Change in Mean Math Growth Scores: High School

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.48	0.27	0.86
Non-Participating Schools	0.30	0.17	0.50

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Appendix H: Supplemental Intervention Results for Table 32

Table H.1. Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 3

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	86	713.9	13.6	86	716.1	11.2	86	717.5	11.7	86	719	11.2	86	719.8	11.5
Non-Participating Schools	63	719.6	13.8	64	719.8	12.3	66	720.1	12.3	67	718.6	10.8	68	720	13.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.2. Change in Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 3

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.18	0.12	0.13	0.07	0.47
Non-Participating Schools	0.01	0.03	-0.13	0.11	0.03

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.3. Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 4

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	86	722.5	10	86	722.6	9.5	86	723.3	8.7	86	725.3	8.2	86	726.6	10
Non-Participating Schools	63	723.4	11.3	65	727.4	11.1	65	727.8	8.9	66	727.6	9.6	67	725.8	9.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.4. Change in Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 4

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0	0.08	0.25	0.14	0.41
Non-Participating Schools	0.36	0.03	-0.01	-0.2	0.23

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.5. Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 5

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	85	721.9	8.8	85	722.2	8.2	85	724.2	9.7	85	727.3	8.4	85	728.3	8.1
Non-Participating Schools	63	725.3	8.8	65	724.8	8.6	67	729.5	8.4	67	729.9	9.9	68	729.2	11.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.6. Change in Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 5

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.03	0.22	0.35	0.12	0.76
Non-Participating Schools	-0.06	0.55	0.05	-0.07	0.39

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.7. Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 6

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	42	722.5	11.3	42	721.4	10.9	38	723.2	5.3	37	724.1	7.9	37	725.1	7.6
Non-Participating Schools	54	722.6	15.4	54	723.2	11.2	51	726.2	12.1	51	726.8	9.8	51	725.2	12.7

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.8. Change in Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 6

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.1	0.2	0.14	0.14	0.27
Non-Participating Schools	0.05	0.25	0.06	-0.15	0.18

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.9. Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 7

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	33	718	11.9	34	718.4	11.4	34	722.3	11.9	33	721	9.1	33	725.1	7.8
Non-Participating Schools	46	720.4	14.8	45	722.1	15.7	42	723.8	14.3	43	724.5	12.8	44	721	16.7

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.I0. Change in Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 7

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.03	0.33	-0.12	0.48	0.71
Non-Participating Schools	0.11	0.11	0.05	-0.23	0.40

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.11. Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 8

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	34	718.6	12.7	34	720.8	10.4	34	723.7	10.3	33	725.1	12.5	33	726.2	8.8
Non-Participating Schools	45	720.3	18.6	46	724.3	15.3	44	722.9	15.9	42	723.1	14.2	44	724.3	14.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.12. Change in Mean ELA Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 8

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.19	0.28	0.12	0.1	0.70
Non-Participating Schools	0.24	-0.09	0.01	0.08	0.24

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.13. Mean Reading/Writing Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 10

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	21	416.1	33.7	23	413.5	23.2	22	414.4	34.1
Non-Participating Schools	44	402.6	32.9	46	405.2	31.1	46	396	31.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.14. Change in Mean Reading/Writing Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 10

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.09	0.03	-0.05
Non-Participating Schools	0.08	-0.3	-0.21

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.15. Mean Reading/Writing Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 11

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	446.3	24.5	23	441.1	26	23	434.4	26.4
Non-Participating Schools	43	436.9	34.5	46	434.9	36.8	46	425.2	35

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.16. Change in Mean Reading/Writing Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 11

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.21	-0.26	-0.46
Non-Participating Schools	-0.06	-0.27	-0.34

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.17. Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 3

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	86	717.9	11.8	86	718.6	10.6	86	719.3	11.6	86	719.3	10.8	86	719.8	10.3
Non-Participating Schools	63	724.7	12.5	64	722.6	11.2	66	721.8	13.7	67	721	11.6	68	721.5	12.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.18. Change in Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 3

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.06	0.07	0	0.05	0.17
Non-Participating Schools	-0.18	-0.06	-0.07	0.04	-0.26

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.19. Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 4

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	86	717.9	9.4	86	714	9.4	86	716.1	10.1	86	714.7	9.5	86	717.6	9.4
Non-Participating Schools	63	720.5	9.2	65	720.4	10.1	65	719.8	9.5	66	718.1	10.6	67	717.1	9.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.20. Change in Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 4

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.41	0.22	-0.14	0.31	-0.03
Non-Participating Schools	0	-0.06	-0.17	-0.1	-0.37

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.21. Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 5

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	85	715.5	8.5	85	716.1	8.9	85	715.2	9.8	85	717.9	9.4	85	718.5	8.6
Non-Participating Schools	63	720.5	8.8	65	718.7	8.3	67	720.9	8.6	67	720.1	9.3	68	719.7	11.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.22. Change in Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 5

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.07	-0.09	0.27	0.08	0.35
Non-Participating Schools	-0.21	0.26	-0.09	-0.04	0.05

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.23. Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 6

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	42	718.3	8.1	42	714.3	9	38	713	5.9	37	713.8	5.1	37	714.3	5.8
Non-Participating Schools	54	719.7	11.6	54	716.6	11.7	51	714.5	14.4	51	716.5	8	51	714.5	11.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.24. Change in Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 6

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.47	-0.17	0.15	0.1	-0.57
Non-Participating Schools	-0.27	-0.16	0.17	-0.2	-0.45

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.25. Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 7

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	33	717.9	7	34	715.6	7.2	34	715.9	6.2	33	715.5	5.8	33	717.1	4.8
Non-Participating Schools	46	721	10.4	45	719.5	9.8	42	718.5	9.3	43	718.9	7.8	44	716.8	9.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.26. Change in Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 7

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.31	0.04	-0.08	0.31	-0.13
Non-Participating Schools	-0.15	-0.1	0.04	-0.25	-0.43

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.27. Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 8

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	34	712.4	10	34	707.4	10.3	34	709.9	7.2	33	710.2	8.2	33	711.3	10.4
Non-Participating Schools	45	714.8	13.4	46	711.4	14.4	44	712	13.6	42	712.5	14.1	44	711.4	12.6

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.28. Change in Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 8

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.49	0.28	0.05	0.12	-0.11
Non-Participating Schools	-0.24	0.04	0.03	-0.08	-0.26

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.29. Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 10

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	21	413.9	23.5	23	399.8	21	22	402.8	27.8
Non-Participating Schools	44	405.1	23.5	46	391.7	29.4	46	388.5	26.6

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.30. Change in Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 10

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.63	0.12	-0.43
Non-Participating Schools	-0.5	-0.11	-0.66

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table H.31. Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 11

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	426.4	23.4	23	424.7	27.3	23	417.7	27.9
Non-Participating Schools	43	425.3	35.5	46	418.7	36.5	46	410.9	36.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table H.32. Change in Mean Math Achievement Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Grade 11

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.07	-0.25	-0.34
Non-Participating Schools	-0.18	-0.21	-0.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Appendix I: Supplemental Intervention Results for Table 33

Table I.1. Mean ELA Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Elementary School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	98	43.2	8.9	97	44	11.2	97	46.2	10.6	97	46.1	10.0
Non-Participating Schools	67	45	11.6	69	47.1	12.4	70	45.8	13.3	71	45.4	12.8

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table I.2. Change in Mean ELA Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Elementary School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.08	0.21	-0.01	0.31
Non-Participating Schools	0.18	-0.10	-0.03	0.03

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table I.3. Mean ELA Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Middle School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	42	45.3	11.3	40	47.4	12.5	39	47.1	11.4	39	47.7	9.3
Non-Participating Schools	47	46.4	13.7	44	47	12.8	43	44.8	11.7	44	44.6	12.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table I.4. Change in Mean ELA Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Middle School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.18	-0.02	0.05	0.23
Non-Participating Schools	0.04	-0.17	-0.02	-0.14

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table I.5. Mean Reading/Writing Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, High School

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	24	41.5	11.8	25	43.4	12.3	25	39.9	6.3
Non-Participating Schools	42	36.2	15.2	44	39.7	11.2	45	38.4	12.6

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table I.6. Change in Mean Reading/Writing Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, High School

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.16	-0.36	-0.17
Non-Participating Schools	0.27	-0.11	0.16

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table I.7. Mean Math Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Elementary School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	98	40.8	11.6	97	44.2	15	97	44.7	12.5	97	45.7	11.1
Non-Participating Schools	67	41.6	12.3	69	44.5	13.4	70	43.1	11.9	71	43.3	13.7

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table I.8. Change in Mean Math Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Elementary School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.26	0.04	0.09	0.43
Non-Participating Schools	0.22	-0.11	0.02	0.13

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table I.9. Mean Math Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Middle School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	42	41.2	7.9	40	41.9	11.2	39	42.6	8.1	39	44.4	8.4
Non-Participating Schools	47	40.7	11.5	44	41.9	12.1	43	41.9	9.1	44	41.5	11.8

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table I.10. Change in Mean Math Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, Middle School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.07	0.07	0.21	0.39
Non-Participating Schools	0.10	0.00	-0.04	0.07

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table I.11. Mean Math Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, High School

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	24	36.8	9.5	25	39.7	7.3	25	41.3	7.9
Non-Participating Schools	42	35.3	10.8	44	37.5	10.7	45	40	10.3

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table I.12. Change in Mean Math Growth Scores: Schools That Serve a High Percentage of Economically Disadvantaged Students, Students of Color, and/or Students with Disabilities, High School

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.34	0.22	0.52
Non-Participating Schools	0.21	0.24	0.45

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Appendix J: Supplemental Intervention Results for Table 34

Table J.1. Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 3

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	92	711.9	12.3	95	713.2	10.1	96	715.3	10.8	95	716.5	10.3	95	717.4	11.3
Non-Participating Schools	108	716.9	13.6	112	717.4	14	117	717.4	12.8	124	717.2	13.4	128	718.9	15.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.2. Change in Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 3

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.12	0.20	0.11	0.08	0.47
Non-Participating Schools	0.04	0.00	-0.02	0.12	0.14

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.3. Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 4

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	93	720.4	8.9	93	719.6	8.2	94	719.6	8.1	95	722.5	7.9	95	723.9	9.6
Non-Participating Schools	104	722.7	10.5	112	723.6	11.5	115	724.4	9.3	120	725.9	10.3	126	723.1	10.7

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.4. Change in Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 4

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.09	0.00	0.36	0.16	0.38
Non-Participating Schools	0.08	0.08	0.14	-0.26	0.04

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.5. Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 5

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	92	720.6	8.6	92	718.9	8.1	92	721.7	8.3	94	725.2	9.3	94	725.8	7.2
Non-Participating Schools	103	722.6	8.7	109	722.4	9.9	113	726.2	10	118	727.5	10.9	124	727.1	11.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.6. Change in Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 5

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.20	0.34	0.40	0.07	0.66
Non-Participating Schools	-0.01	0.38	0.13	-0.04	0.44

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.7. Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 6

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	43	722.0	11.8	46	719.3	8.9	41	720.7	5.1	42	724.7	14.9	42	725.2	12.2
Non-Participating Schools	87	722.2	14.3	91	720.6	10	94	722.8	11.1	95	724	8.2	95	723.7	13.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.8. Change in Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 6

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.26	0.19	0.36	0.04	0.27
Non-Participating Schools	-0.13	0.2	0.12	-0.03	0.11

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.9. Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 7

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	36	715.7	12.6	37	716.6	10.3	36	718.6	9.6	35	718.4	8.5	36	720.8	7.0
Non-Participating Schools	78	717.2	15.5	81	718.3	13	80	721.2	12.3	87	722.3	14	89	721.2	14.3

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.10. Change in Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 7

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.08	0.20	-0.02	0.31	0.50
Non-Participating Schools	0.08	0.23	0.08	-0.07	0.27

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.11. Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 8

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	37	716.3	10.6	37	717.2	11.1	36	721.6	10.1	35	721.7	12.2	35	722.3	8.1
Non-Participating Schools	78	719.9	16.8	82	721.3	15.5	83	719.1	12.5	84	718.4	14.4	89	722.6	13.2

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.12. Change in Mean ELA Achievement Scores: Economically Disadvantaged Students, Grade 8

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.08	0.41	0.01	0.06	0.64
Non-Participating Schools	0.09	-0.16	-0.05	0.3	0.18

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.13. Mean Reading/Writing Achievement Scores: Economically Disadvantaged Students, Grade 10

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	21	404.8	19.1	23	406.8	22.3	22	401.4	23.9
Non-Participating Schools	74	405.6	34.0	76	407.7	29.0	78	404.2	40.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.14. Change in Mean Reading/Writing Achievement Scores: Economically Disadvantaged Students, Grade 10

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.10	-0.23	-0.16
Non-Participating Schools	0.07	-0.10	-0.04

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.15. Mean Reading/Writing Achievement Scores: Economically Disadvantaged Students, Grade 11

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	433.9	31.8	23	438.2	29.4	23	425.2	21.4
Non-Participating Schools	69	437.3	36.8	77	438.4	45.1	79	435.4	47.0

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.16. Change in Mean Reading/Writing Achievement Scores: Economically Disadvantaged Students, Grade 11

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.14	-0.51	-0.32
Non-Participating Schools	0.03	-0.07	-0.05

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.17. Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 3

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	92	716.2	11.3	95	716.1	10.4	96	717.7	11.5	95	717.8	11.1	95	717.8	10.7
Non-Participating Schools	108	720.3	13	112	718.8	12.7	117	719	13.9	124	717.7	14.8	128	718.7	15.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.18. Change in Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 3

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.01	0.15	0.01	0.00	0.15
Non-Participating Schools	-0.12	0.02	-0.09	0.06	-0.11

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.19. Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 4

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	93	715.6	8.4	93	711.5	8.3	94	712.7	9.6	95	711.8	9.1	95	715.2	9.2
Non-Participating Schools	104	717.9	9.3	112	715.9	11.5	115	716.6	9.3	120	715.5	10.9	126	714.2	10.8

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.20. Change in Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 4

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.49	0.13	-0.10	0.37	-0.05
Non-Participating Schools	-0.19	0.07	-0.11	-0.12	-0.37

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.21. Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 5

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	*SD*	*N*	Mean	SD
Participating Schools	92	714.1	8.3	92	712.6	8.3	92	712.7	9.0	94	715.0	8.8	94	716.0	8.7
Non-Participating Schools	102	717.7	9.5	109	715.0	8.5	113	717.7	9.8	117	716.4	9.5	124	716.1	14

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.22. Change in Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 5

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.18	0.01	0.26	0.11	0.22
Non-Participating Schools	-0.29	0.29	-0.13	-0.03	-0.13

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.23. Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 6

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Participating Schools	43	716.7	8.9	46	712.0	8.2	41	710.1	5.5	42	713.5	9.3	42	713.1	6.5
Non-Participating Schools	87	718.8	11	91	713.6	10.3	94	712.3	12.7	95	714.6	7.6	95	713.6	11.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.24. Change in Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 6

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.55	-0.27	0.45	-0.05	-0.46
Non-Participating Schools	-0.49	-0.11	0.22	-0.10	-0.46

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.25. Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 7

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	36	715.8	8.0	37	714.0	6.2	36	713.6	5.2	35	713.6	4.9	36	714.2	4.6
Non-Participating Schools	78	718.8	10.2	81	716.3	8.6	80	716.2	7.4	87	717	9.7	89	716.3	9.9

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.26. Change in Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 7

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.25	-0.07	0.00	0.13	-0.25
Non-Participating Schools	-0.27	-0.02	0.09	-0.07	-0.25

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.27. Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 8

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	37	709.3	8.4	37	705.2	8.3	36	708.0	6.3	35	706.7	8.4	35	707.8	9.8
Non-Participating Schools	80	710.9	15.2	82	709.2	13	83	709.3	11.9	84	710.3	11.6	89	710.4	12.7

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.28. Change in Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 8

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.49	0.38	-0.18	0.12	-0.16
Non-Participating Schools	-0.12	0.0	0.09	0.01	-0.03

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.29. Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 10

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	21	407.9	14.6	23	394.9	18.7	22	394.7	23.8
Non-Participating Schools	74	405.8	26.9	76	399.7	32.5	78	398.2	31.0

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.30. Change in Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 10

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.77	-0.01	-0.67
Non-Participating Schools	-0.20	-0.05	-0.26

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.31. Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 11

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	419.0	22.2	23	420.7	24.3	23	409.8	24.0
Non-Participating Schools	69	422.9	36.8	77	419.3	42.1	79	417.0	44.0

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.32. Change in Mean Math Achievement Scores: Economically Disadvantaged Students, Grade 11

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.07	-0.45	-0.40
Non-Participating Schools	-0.09	-0.05	-0.15

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.33. Mean ELA Achievement Scores: Students with Disabilities, Grade 3

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	89	686.2	15.6	92	686.9	13.4	95	688.9	15.8	96	691.2	16.1	93	689.9	15.1
Non-Participating Schools	105	689.9	17.5	106	692.1	16.5	112	692.1	15.9	120	691.2	15.3	124	694.4	21

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.34. Change in Mean ELA Achievement Scores: Students with Disabilities, Grade 3

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.05	0.13	0.15	-0.08	0.24
Non-Participating Schools	0.13	0	-0.06	0.18	0.23

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.35. Mean ELA Achievement Scores: Students with Disabilities, Grade 4

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	91	694.4	13.4	91	689.6	11.9	92	692.6	12.1	92	697.8	13.5	93	695.8	13.3
Non-Participating Schools	100	697.4	15.5	105	694.5	14.1	113	699.5	16.9	119	701.8	14.7	119	696.3	15.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.36. Change in ELA Math Achievement Scores: Students with Disabilities, Grade 4

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.38	0.25	0.41	-0.15	0.10
Non-Participating Schools	-0.20	0.32	0.15	-0.37	-0.07

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.37. Mean ELA Achievement Scores: Students with Disabilities, Grade 5

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	90	699.2	12.3	92	694.8	12.6	90	695.4	10.9	92	700.5	14.2	94	702.2	10.9
Non-Participating Schools	99	700.6	12.4	101	699.7	11.9	109	698.5	15	113	702.5	15.2	121	705.5	14

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.38. Change in Mean ELA Achievement Scores: Students with Disabilities, Grade 5

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.35	0.05	0.40	0.13	0.26
Non-Participating Schools	-0.07	-0.09	0.27	0.2	0.37

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.39. Mean ELA Achievement Scores: Students with Disabilities, Grade 6

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	43	699.3	12.5	41	698.9	10.2	41	700.4	10.5	37	701.9	10.4	41	701.4	12.5
Non-Participating Schools	78	699.7	17.2	86	699.4	11.5	88	700	9.5	92	700.9	13.7	95	702.5	18

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.40. Change in Mean ELA Achievement Scores: Students with Disabilities, Grade 6

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.04	0.14	0.14	-0.04	0.17
Non-Participating Schools	-0.02	0.06	0.08	0.1	0.16

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.41. Mean ELA Achievement Scores: Students with Disabilities, Grade 7

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	36	691.7	12.1	36	696.4	12.6	35	697.2	10.9	35	693.2	12.2	34	700.2	13.0
Non-Participating Schools	78	697.4	14.1	78	695.3	13.9	78	695.5	14.3	83	696.8	15.7	86	699.2	15

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.42. Change in Mean ELA Achievement Scores: Students with Disabilities, Grade 7

Grade	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.38	0.07	-0.35	0.56	0.68
Non-Participating Schools	-0.15	0.02	0.08	0.16	0.12

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.43. Mean ELA Achievement Scores: Students with Disabilities, Grade 8

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	35	695.7	10.5	37	694.3	9.5	35	697.3	10.3	34	699.3	13.5	36	699.5	11.5
Non-Participating Schools	78	695.3	14.3	78	697.1	13.1	81	697.8	12.9	81	695.7	12.7	86	698.4	14

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.44. Change in Mean ELA Achievement Scores: Students with Disabilities, Grade 8

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.14	0.30	0.17	0.02	0.35
Non-Participating Schools	0.13	0.06	-0.16	0.20	0.22

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.45. Mean Reading/Writing Achievement Scores: Students with Disabilities, Grade 10

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	20	358.9	26.9	23	362.2	23.8	22	360.7	23.0
Non-Participating Schools	66	368.6	25.9	65	376.2	42.1	71	368.5	42.0

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.46. Change in Mean Reading/Writing Achievement Scores: Students with Disabilities, Grade 10

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.13	-0.06	0.07
Non-Participating Schools	0.22	-0.18	0.00

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.47. Mean Reading/Writing Achievement Scores: Students with Disabilities, Grade 11

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	22	384.7	33.4	22	389.9	34.2	23	374.8	30.7
Non-Participating Schools	61	390.9	44.6	65	398.8	45.8	71	387.3	44.3

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.48. Change in Mean Reading/Writing Achievement Scores: Students with Disabilities, Grade 11

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.15	-0.46	-0.31
Non-Participating Schools	0.17	-0.26	-0.08

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.49. Mean Math Achievement Scores: Students with Disabilities, Grade 3

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	89	694.6	19.3	92	689.2	15.9	95	691.7	16.7	96	695.5	17.7	94	691.2	15.6
Non-Participating Schools	104	699.8	17	106	695.9	15.4	112	696.6	16.9	120	697.1	16.3	124	698.4	22.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.50. Change in Mean Math Achievement Scores: Students with Disabilities, Grade 3

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.31	0.15	0.22	-0.26	-0.19
Non-Participating Schools	-0.24	0.04	0.03	0.07	-0.07

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.51. Mean Math Achievement Scores: Students with Disabilities, Grade 4

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	91	698.0	12.9	91	692.4	12.2	92	692.5	12.4	92	693.3	12.2	94	697.9	13.1
Non-Participating Schools	100	700	12.3	105	696.8	13.4	113	698.9	16.7	119	698.1	15.3	119	698.1	14

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.52. Change in Mean Math Achievement Scores: Students with Disabilities, Grade 4

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.45	0.01	0.07	0.36	-0.01
Non-Participating Schools	-0.25	0.14	-0.05	0.00	-0.14

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.53. Mean Math Achievement Scores: Students with Disabilities, Grade 5

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	90	696.0	12.7	93	690.2	13.0	90	691.9	12.2	92	694.5	10.4	94	696.0	10.1
Non-Participating Schools	99	698.2	12.6	101	695.1	11.5	109	695	13.5	113	697	14.9	121	699.9	13.3

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.54. Change in Mean Math Achievement Scores: Students with Disabilities, Grade 5

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.45	0.13	0.23	0.15	0.00
Non-Participating Schools	-0.26	-0.01	0.14	0.21	0.13

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.55. Mean Math Achievement Scores: Students with Disabilities, Grade 6

	2014–15			2015–16			2016–17			2017–18		2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	43	698.1	11.8	41	694.1	9.4	41	691.9	10.8	37	694.9	9.5	41	697.0	8.3
Non-Participating Schools	78	698.9	14.4	86	695.1	13.4	88	692.6	11.1	92	694.2	10.1	95	696.3	15.6

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.56. Change in Mean Math Achievement Scores: Students with Disabilities, Grade 6

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.37	-0.22	0.29	0.24	-0.11
Non-Participating Schools	-0.27	-0.21	0.16	0.16	-0.17

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.57. Mean Math Achievement Scores: Students with Disabilities, Grade 7

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	36	700.3	8.4	36	694.7	7.6	35	697.6	4.9	35	694.7	6.7	34	700.3	12.7
Non-Participating Schools	78	703.6	10.7	78	697.2	10.5	78	697.8	9.7	83	699.7	12.3	86	699.4	11.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.58. Change in Mean Math Achievement Scores: Students with Disabilities, Grade 7

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.70	0.45	-0.49	0.55	0.00
Non-Participating Schools	-0.60	0.05	0.18	-0.03	-0.38

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.59. Mean Math Achievement Scores: Students with Disabilities, Grade 8

	2014–15			2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Participating Schools	35	691.3	8.8	37	687.1	7.4	35	689.8	7.4	34	684.7	7.0	36	686.1	10.2
Non-Participating Schools	79	692.1	13.9	78	690.4	12	81	691	11.3	81	687.6	11.8	86	688.2	14.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.60. Change in Mean Math Achievement Scores: Students with Disabilities, Grade 8

	2014–15 to 2015–16	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.52	0.36	-0.71	0.16	-0.55
Non-Participating Schools	-0.13	0.06	-0.29	0.04	-0.27

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.61. Mean Math Achievement Scores: Students with Disabilities, Grade 10

	2016–17			2017–18			2018–19		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Participating Schools	20	363.8	22.8	23	340.9	27.0	22	350.6	20.3
Non-Participating Schools	66	372.0	35.5	65	364.3	40.1	71	358.1	42.0

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.62. Change in Mean Math Achievement Scores: Students with Disabilities, Grade 10

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.92	0.41	-0.61
Non-Participating Schools	-0.20	-0.15	-0.36

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table J.63. Mean Math Achievement Scores: Students with Disabilities, Grade 11

	2016–17			2017–18			2018–19		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Participating Schools	22	358.3	31.9	22	355.4	14.4	23	358.5	22.6
Non-Participating Schools	61	371.0	37.5	65	369.8	49.3	71	368.9	46.8

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table J.64. Change in Mean Math Achievement Scores: Students with Disabilities, Grade 11

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	-0.12	0.16	0.01
Non-Participating Schools	-0.03	-0.02	-0.05

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Appendix K: Supplemental Intervention Results for Table 35

Table K.1. Mean ELA Growth Scores: Economically Disadvantaged Students, Elementary School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	121	42.2	10.2	121	43.4	11.9	122	45.1	10.8	121	45.4	9.8
Non-Participating Schools	115	42.4	13.2	118	43.6	13.2	124	44.3	14.5	129	42.3	14

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.2. Change in Mean ELA Growth Scores: Economically Disadvantaged Students, Elementary School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.11	0.16	0.03	0.32
Non-Participating Schools	0.09	0.05	-0.14	-0.01

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in d standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.3. Mean ELA Growth Scores: Economically Disadvantaged Students, Middle School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	50	43.4	12.0	49	47.0	13.7	49	46.6	13.6	49	47.2	10.0
Non-Participating Schools	84	43.6	14.9	83	43.8	14.5	89	41.9	14.7	91	43.6	14.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.4. Change in Mean ELA Growth Scores: Economically Disadvantaged Students, Middle School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.28	-0.03	0.05	0.34
Non-Participating Schools	0.02	-0.13	0.12	0.00

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.5. Mean Reading/Writing Growth Scores: Economically Disadvantaged Students, High School

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	32	42.4	13.9	33	43.8	13.2	31	40.3	6.3
Non-Participating Schools	69	37.4	15.8	75	41	13.8	78	41.7	13.8

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.6. Change in Mean Reading/Writing Growth Scores: Economically Disadvantaged Students, High School

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.10	-0.33	-0.19
Non-Participating Schools	0.24	0.05	0.29

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.7. Mean Math Growth Scores: Economically Disadvantaged Students, Elementary School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	121	40.0	11.6	121	43.6	14.9	122	44.0	12.1	121	44.8	12.5
Non-Participating Schools	116	39.1	13.5	118	41.9	13	124	40.5	14.2	129	40	15.4

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.8. Change in Mean Math Growth Scores: Economically Disadvantaged Students, Elementary School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.27	0.03	0.07	0.40
Non-Participating Schools	0.21	-0.1	-0.04	0.06

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.9. Mean Math Growth Scores: Economically Disadvantaged Students, Middle School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	50	40.4	9.2	49	42.9	11.0	49	43.7	9.1	49	44.5	8.6
Non-Participating Schools	84	39.8	12.3	83	41.9	12.2	89	41.9	12.1	91	42.3	13

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.10. Change in Mean Math Growth Scores: Economically Disadvantaged Students, Middle School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.25	0.08	0.09	0.46
Non-Participating Schools	0.17	0.00	0.03	0.20

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.11. Mean Math Growth Scores: Economically Disadvantaged Students, High School

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	32	36.9	11.6	33	40.6	11.4	32	43.3	13.3
Non-Participating Schools	69	35.8	14.1	78	38.3	13	79	40	10.8

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.12. Change in Mean Math Growth Scores: Economically Disadvantaged Students, High School

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.32	0.21	0.51
Non-Participating Schools	0.18	0.15	0.33

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.13. Mean ELA Growth Scores: Students with Disabilities, Elementary School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	120	30.8	11.2	122	33.6	13.5	122	38.0	13.3	122	37.7	14.1
Non-Participating Schools	112	33.7	14.5	116	37.3	15.4	123	38	15.9	126	37.9	17.1

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.14. Change in Mean ELA Growth Scores: Students with Disabilities, Elementary School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.22	0.33	-0.02	0.54
Non-Participating Schools	0.24	0.04	0.00	0.26

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.15. Mean ELA Growth Scores: Students with Disabilities, Middle School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	50	35.8	10.4	49	38.2	11.8	48	40.6	10.8	49	43.2	11.0
Non-Participating Schools	82	36.2	12.8	83	39.7	12.9	86	40	13.2	91	41.7	14.3

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.16. Change in Mean ELA Growth Scores: Students with Disabilities, Middle School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.21	0.22	0.24	0.69
Non-Participating Schools	0.27	0.02	0.12	0.41

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.17. Mean Reading/Writing Growth Scores: Students with Disabilities, High School

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	31	30.9	19.1	31	39.8	17.5	32	32.0	13.2
Non-Participating Schools	55	33.3	21.2	67	40.8	20.3	74	32.5	18.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.18. Change in Mean Reading/Writing Growth Scores: Students with Disabilities, High School

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.49	-0.51	0.07
Non-Participating Schools	0.36	-0.43	-0.04

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.19. Mean Math Growth Scores: Students with Disabilities, Elementary School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	120	34.6	13.8	122	38.6	17.2	122	41.0	13.9	122	41.9	14.5
Non-Participating Schools	112	35	13.3	116	38.8	15.6	123	38.7	15.3	126	37.5	14.9

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.20. Change in Mean Math Growth Scores: Students with Disabilities, Elementary School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.25	0.16	0.07	0.52
Non-Participating Schools	0.26	-0.01	-0.08	0.18

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.21. Mean Math Growth Scores: Students with Disabilities, Middle School

	2015–16			2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	50	32.0	9.9	49	41.2	10.9	48	38.7	10.3	49	43.1	10.1
Non-Participating Schools	82	35.7	15.2	82	40.2	12.1	86	38.7	14	91	42.1	12.3

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.22. Change in Mean Math Growth Scores: Students with Disabilities, Middle School

	2015–16 to 2016–17	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.89	-0.23	0.43	1.11
Non-Participating Schools	0.32	-0.12	0.26	0.46

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Table K.23. Mean Math Growth Scores: Students with Disabilities, High School

	2016–17			2017–18			2018–19		
	N	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Participating Schools	31	26.7	13.8	33	33.8	13.2	32	40.6	17.2
Non-Participating Schools	55	31.7	15.8	70	35	16.5	77	40.6	19.5

Source: HumRRO's analysis of data from the Colorado Department of Education.
N = number of schools; SD = standard deviation.

Table K.24. Change in Mean Math Growth Scores: Students with Disabilities, High School

	2016–17 to 2017–18	2017–18 to 2018–19	Cumulative
Participating Schools	0.52	0.44	0.89
Non-Participating Schools	0.20	0.31	0.50

Source: HumRRO's analysis of data from the Colorado Department of Education.
Note: Change is presented as an effect size (Cohen's D) which is the difference in scores from one year to the next expressed in standard deviation units. The cumulative effect size is the difference in scores from the first year to the last year shown in the table; it is not a sum of the individual effect sizes.

Appendix L: Graduation Rate Data for Figure 14

Table L.1. Graduation Rate Trends for Participating and Non-Participating Schools, 2011–12 Through 2018–19

	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Participating Schools	60.3 (18.7) n=15	60.9 (18.2) n=15	63.5 (16.7) n=16	64.9 (14.8) n=18	64.5 (20.2) n=22	66.7 (17.7) n=22	67.8 (18.3) n=23	69.0 (17.7) n=23
Non-participating Schools	50.5 (28.2) n=10	48.4 (28.4) n=10	51.0 (22.0) n=12	57.3 (28.2) n=15	58.5 (24.6) n=17	57.9 (21.2) n=18	65.1 (22.3) n=18	60.0 (23.2) n=19

Source: HumRRO's analysis of data from the Colorado Department of Education.

Note: Cells contain graduation rate, standard deviation (in parentheses), and number of schools.