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This issue brief is a condensed version of the ACT research report *Comparisons of Student Achievement Levels by District Performance and Poverty*, by Chrys Dougherty and Teresa Shaw (2017).

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Comparisons of Student Achievement Levels by District Performance and Poverty

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Summary

This report compares student achievement levels in above- and below-average Arkansas school districts disaggregated by district poverty. We identified districts as above- and below-average in performance using statistical models that adjusted for student and district demographics and the percentage of students in the analysis.

Our analysis showed that after adjusting for student characteristics, differences in student achievement between above- and below-average districts of similar poverty levels were large enough to be of practical importance—often exceeding the amount that students typically grow in a year. It is worth exploring how differences in educator practices and parent and community support may be contributing to these sizeable differences.[1]

Even in above-average districts, student achievement levels showed substantial room for improvement. For example, in above-average medium- and high-poverty districts, the majority of students did not reach On Track benchmarks in mathematics, reading, and science. Even in lower-poverty districts that were above average in performance, large minorities of students—and sometimes a majority—were not On Track in those three subjects.

In pursuing district-wide improvement, school district and community leaders should consider four basic approaches: (1) focus on getting students on track in the early grades; (2) collect feedback designed to improve practices; (3) form knowledge-sharing networks among practitioners and researchers; and (4) strengthen out-of-school supports for students and their families.

Introduction

School districts are important because they are usually the smallest administrative unit that can align curriculum and oversee improvement strategies spanning preschool through grade 12. This report examines the size of cross-district differences in student learning in districts with similar poverty levels. When these differences are large enough to matter, it becomes worthwhile to explore what might be happening at the district level to influence these differences.

The report used data on four student cohorts for each of grades 4, 8, and 11-12 drawn from data supplied by the Arkansas Department of Education for the 2006-07 through the 2013-14 school years.[2] Districts were classified as above-average, average, and below-average in performance in

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each tested subject in grades 4, 8, and 11-12 using statistical models that adjusted for poverty and other student characteristics. Students were followed longitudinally from four grades earlier (for example, from kindergarten for the 4th grade students) to identify students who were continuously enrolled in the district, whose scores should be a better reflection of the district's performance.

Districts were divided into three poverty categories based on their percentage of low-income students, based on student participation in the free and reduced-price lunch program:

- Lower poverty: >20–50% low-income students[3]
- Medium poverty: >50%–70% low-income students
- High poverty: >70% low-income students

Performance statistics from the statistical models were used to examine differences in student learning between above- and below-average districts in each poverty category.[4]

Districts were also compared based on their percentages of On-Track students. On-Track students in a given subject in grades 11-12 met or exceeded the College Readiness Benchmark for that subject on the ACT. On-Track 8th grade students met the corresponding subject-specific benchmarks on ACT Explore, while On-Track 4th graders met subject-specific targets calculated for the Arkansas Benchmark Exam (ABE).[5]

Student achievement level statistics are expressed in standard deviation units to give them a similar meaning across grade levels using tests with different score scales.

Results

1. After adjusting for student characteristics, differences in student achievement levels between above- and below-average districts in the same poverty category were large, often exceeding a year's typical student growth.

In 4th grade, differences in district performance statistics between above- and below-average districts ranged from 0.36 among medium-poverty districts in literacy to 0.47 in lower-poverty districts in mathematics (Table 1).

To get an idea of the size of these 4th grade differences, they may be compared with average growth per year between grades 4-8 on the ABE ranging from 0.24 to 0.30 of a standard deviation in literacy and from 0.27 to 0.35 of a standard deviation in mathematics. Thus, differences between statistically adjusted student achievement levels in above- and below-average districts in the same poverty category generally exceeded a year's typical student growth.[6]

In 8th grade, the largest difference involving more than one district on each side of the comparison was 0.39 among high-poverty districts in science; in grades 11-12, the largest difference was 0.43 among lower-poverty districts in mathematics (Table 1). These differences in Table 1 may be compared with average growth per year between the ACT Explore and ACT exams of 0.26 standard deviations in English, 0.28 in mathematics, 0.31 in reading, and 0.24 in science. Thus, as in 4th grade, adjusted achievement in above-average districts was often a year or more ahead of that in below-average districts.

Table 1. Differences in Performance between Above- and Below-Average Districts

		Difference in performance statistics			
Grade	Subject	lower-poverty districts	medium-poverty districts	high-poverty districts	comparison: one year's typical growth
4	Literacy	0.47	0.36	0.38	0.24-0.30
	Mathematics	0.42	0.43	0.44	0.27-0.35
8	English	0.30	0.27	0.26	0.26
	Mathematics	0.38	0.37	0.36	0.28
	Reading	0.29	0.28	0.44*	0.31
	Science	0.37	0.33	0.39	0.24
11-12	English	0.41	0.33	0.34	0.26
	Mathematics	0.43	0.32	0.36	0.28
	Reading	0.34	0.24	#N/A**	0.31
	Science	0.38	0.29	0.31	0.24

* Only one high-poverty district was above average in 8th grade reading.

** No high-poverty districts were above average in grades 11-12 reading.

2. Increasing the percentages of On-Track students in below-average districts to match those in above-average districts would put many more students On Track.

To assess the importance of differences in the percentage of On-Track students, we simulated how many additional students in the below-average districts would have been On Track had those districts had the same On-Track rates as the above-average districts in the same poverty category.

Results of these simulations for 4th grade are shown in Table 2. For example, increasing the percentage of students On Track in 4th grade literacy in the below-average high-poverty districts from 22% to 43% to match the percentage in the eight above-average high-poverty districts would result in 286 additional students On Track. Matching the percentage of On-Track students for medium-poverty districts in mathematics would put an additional 1,183 students On Track.

In 8th grade, results from these simulations (not shown in the table) ranged from 274 additional students in lower-poverty districts to 1,206 students in medium-poverty districts, both in English. In 11th and 12th grades, differences ranged from 27 additional students in science in high-poverty districts to 871 students in mathematics in medium-poverty districts.

Table 2. Percentage of On-Track Students in Above- and Below-Average Districts by District Poverty: Grade 4

Subject	District poverty category	% On Track in above-average districts	% On Track in below-average districts	Difference in On-Track rates	Number of students in below-average districts	Simulated additional On-Track students in below-average districts*
Literacy	Lower	61%	37%	24%	2,285	540
	Medium	47%	37%	10%	5,259	537
	High	43%	22%	21%	1,356	286
Mathematics	Lower	51%	29%	22%	1,259	276
	Medium	45%	32%	13%	8,843	1,183
	High	41%	16%	25%	2,190	537

* Equals the number of students in the analysis in below-average districts multiplied by the difference in On-Track rates between above- and below-average districts. These numbers cannot be added up across subjects without double-counting students who would change their status in more than one subject. They can, however, be added up across groups of districts in the same subject.

3. Student achievement levels showed substantial room for improvement, particularly in literacy/reading, mathematics, and science.

Comparing performance across subjects, the highest success rates in getting students On Track were in English, where On-Track percentages of students exceeded 60% for most groups of lower- and medium-poverty districts (Tables 3-5). In lower poverty above-average districts, a majority of students were On Track in seven out of ten grade-subject combinations (Table 3).

In comparison, no group of medium- or high-poverty districts had the majority of students On Track in literacy/reading, mathematics, or science, and On-Track percentages were frequently below 40% on those subjects (Tables 4 and 5). Those percentages were especially low in below-average high-poverty districts (Table 5). Even if the lower-poverty, above-average districts, between 39% (in 4th grade literacy) and 56% (in 8th grade reading) were not On Track in those subjects.

Table 3. Percentages of On-Track Students in Lower-Poverty Districts*

		District Performance		
Grade	Subject	Above average	Average	Below average
4	Literacy	61	55	37
	Mathematics	51	45	29
8	English	76	73	64
	Mathematics	51	43	31
	Reading	44	41	31
	Science	47	37	27
11-12	English	82	76	61
	Mathematics	57	50**	30
	Reading	57	50**	34
	Science	47	42	24

* Cells in Tables 3-5 are shaded based on the scenario that a community sets goals that at least 60% (dark blue) or 50% (light blue) of students reach On Track benchmarks in each grade and subject.

**Prior to rounding, slightly fewer than 50% of students were On Track.

Table 4. Percentages of On-Track Students in Medium-Poverty Districts*

		District Performance		
Grade	Subject	Above average	Average	Below average
4	Literacy	47	44	37
	Mathematics	45	34	32
8	English	70	61	57
	Mathematics	44	32	24
	Reading	37	30	28
	Science	36	29	26
11-12	English	70	63	53
	Mathematics	45	36	25
	Reading	45	39	31
	Science	38	30	19

* Cells in Tables 3-5 are shaded based on the scenario that a community sets goals that at least 60% (dark blue) or 50% (light blue) of students reach On Track benchmarks in each grade and subject.

Table 5. Percentage of On-Track Students in High-Poverty Districts*

		District Performance		
Grade	Subject	Above average	Average	Below average
4	Literacy	43	30	22
	Mathematics	41	24	16
8	English	61	49	40
	Mathematics	34	23	16
	Reading	46	21	9
	Science	30	20	10
11-12	English	41**	50**	22
	Mathematics	26	20	9
	Reading	N/A***	24	17
	Science	18	17	5

* Cells in Tables 3-5 are shaded based on the scenario that a community sets goals that at least 60% (dark blue) or 50% (light blue) of students reach On Track benchmarks in each grade and subject.

** Demographic differences within the high-poverty category account for two districts being rated above-average in English despite their lower On-Track percentage (41%) than was the case in the average districts (just under 50%).

*** No high-poverty districts were above average at the .05 significance level or better in grades 11-12 reading.

The low percentage of On-Track students in literacy/reading, mathematics, and science points to the need to focus on improvement in student learning in these areas in the early grades, establishing knowledge, behaviors, and skills that will better prepare students for high school and college.

Promising Improvement Approaches

After adjusting for student characteristics, differences in student achievement across districts of similar poverty levels were large enough to be of practical importance. However, even in above-average districts, student achievement levels showed substantial room for improvement. Only in lower-poverty above-average districts were the majority of students On Track in most of the grades and subjects shown, and in a majority of the remaining cases in those districts, more than 40% of student were not On Track.

In pursuing district-wide improvement aimed at getting more students On Track, school district and community leaders should consider four basic approaches (see box, “Three Key Reports on Educational Practices” for additional information):

1. Focus on improvement in the early grades. Gaps in student learning begin in early childhood and are well established by kindergarten.[7] To narrow these gaps, educators can strengthen the early reading and mathematics program, promote better student behaviors and non-academic skills, and teach a content-rich curriculum including science, history/social studies, and the fine arts from early childhood through the elementary grades.[8]

2. Monitor and improve implementation of practices in key areas. These areas should be chosen based on their ability to improve a district's capacity to address a wide range of problems related to student learning. District leaders should systematically gather information on what practices are actually being implemented and how implementation correlates with gains in student learning, treating teachers and school leaders as partners.[9]

3. Form networks among practitioners and researchers to share learning about improvement. These networks can connect educators in different districts working on the same problem, in addition to connecting educators in different schools in the same district. Creation of these networks can be facilitated by researchers and practitioners in a state education agency, university, regional education laboratory, or nonprofit organization.[10]

4. Work with policymakers and community leaders to strengthen out-of-school supports for students and their families. This approach can be particularly valuable in high-poverty communities, where students face out-of-school challenges that distract them from learning.[11] Strengthening support for students and their families can require better coordination among social service agencies and between social service agencies and schools (Broader, Bolder Approach to Education, 2016).[12]

By using these four approaches and keeping track of associations between well-implemented practices and improvements in student outcomes, educators and policymakers can increase their effectiveness in improving student learning.

Three Key Reports on Educational Practices

ACT. (2012). Rising to the challenge of college and career readiness: A framework for effective practices. Iowa City, IA: ACT. (See endnote 1)

Dougherty, C. (2013). College and career readiness: The importance of early learning. Iowa City, IA: ACT. (See endnote 8)

Dougherty, C. (2016). Keeping track of improvement in educational practices. Iowa City, IA: ACT. (See endnote 9)

Notes

[1] ACT. (2012). *Rising to the challenge of college and career readiness: A framework for effective practices*. Iowa City, IA: ACT. Retrieved from www.act.org/content/dam/act/unsecured/documents/RisingToChallenge.pdf.

[2] These students were enrolled in 202 Arkansas K-12 non-charter school districts in grades 4 and 8 and 169 districts in grades 11-12 that met requirements for having at least 20 continuously enrolled students in the analysis and for having accurate data on the percentage of low-income students based on a comparison with Census data. Because the Census definition of poverty is different from the definition based on free and reduced price lunch eligibility used in education data, a regression analysis was used to identify the relationship between district poverty rates under the two definitions.

[3] Arkansas had no districts with 20% or fewer low-income students.

[4] A district in a given poverty category might be above average in one grade and subject and below average in another. See Chrys Dougherty & Teresa Shaw. (2016). *Size and consistency of relative performance measures of school districts across models, subjects, and grade levels*. Iowa City, IA: ACT.

[5] The ACT College Readiness Benchmarks, updated in 2013, identify the ACT scores associated with a 50% probability of earning a B or approximately a 75% chance of earning a C in entry-level college courses corresponding to the ACT subject tested. In turn, the ACT Explore Benchmarks identify the scores on that test associated with a 50% probability of reaching the Benchmark in the corresponding subject on the ACT. For more information on the ACT Benchmarks, see Jeff Allen. (2013). *Updating the ACT College Readiness Benchmarks*. Iowa City, IA: ACT. For a discussion of 4th grade targets on the ABE, see Dougherty & Shaw (2016).

Because On-Track status was calculated subject-by-subject for each student, a student could be On Track in one subject but not in another. Correspondingly, a district could have very different On-Track percentages in different subjects for the same grade level.

[6] Dougherty & Shaw, 2016.

[7] Hart, B., & Risley, T. R. (1995). *Meaningful differences in everyday experience of young American children.* Baltimore, MD: Brookes Publishing; West, J., Denton, K., & Germino-Hausken, E. (2000). *America's kindergartners* (NCES 2000-070). Washington, DC: US Department of Education, National Center for Education Statistics. Retrieved from nces.ed.gov/pubs2000/2000070.pdf.

[8] Dougherty, C. (2013). *College and career readiness: The importance of early learning*. Iowa City, IA: ACT. Retrieved from www.act.org/content/dam/act/unsecured/documents/ImportanceofEarlyLearning.pdf.

[9] Chrys Dougherty. (2016). *Keeping track of improvement in educational practices.* Iowa City, IA: ACT; and Jim Knight. (2007). *Instructional Coaching: A Partnership Approach to Improving Instruction*. Thousand Oaks, CA: Corwin Press.

[10] Anthony S. Bryk, Louis M. Gomez, Alicia Grunow, & Paul G. LeMahieu (2015). *Learning to Improve: How America's Schools Can Get Better at Getting Better*. Cambridge, MA: Harvard Education Press.

[11] Daniel T. Willingham (2012). Why Does Family Wealth Affect Learning? *American Educator 36*(1), 33-39.

[12] "Bright Futures (Pea Ridge, AR)." Broader, Bolder Approach to Education. 2016.