

What You Need to Know About On-Time High School Graduation

*A research brief developed for the
Virginia Department of Education
Office of School Quality*

SWAILLANDIS
Solutions for Student Success

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Part I: What You Need to Know About On-Time High School Graduation

Introduction/Background

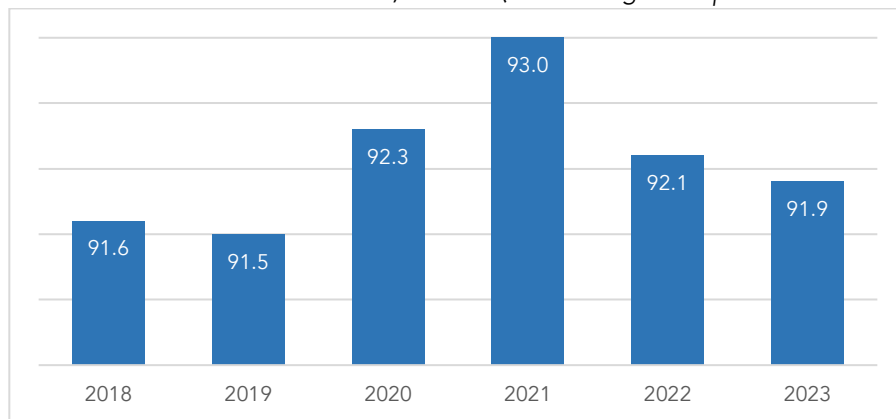
High school graduation is an essential indicator of school success and one of the most significant indicators of student college and career readiness. Moreover, according to the U.S. Department of Education's National Center for Education Statistics (NCES), high school graduates experience long-term economic benefits compared to non-graduates (Irwin et al., 2023).

In 2008, the U.S. Department of Education (USDE), via the Elementary Secondary Education Act (ESEA), required states to calculate the percentage of students who graduate on time with a regular high school diploma based on a cohort method to calculate the adjusted four-year cohort graduation rate (ACGR). A cohort consists of first-time 9th graders in a particular school year. A cohort is "adjusted" by adding any students who subsequently transfer into the cohort and subtracting any students who subsequently transfer out, emigrate to another country, or die during 9th, 10th, 11th, or 12th grade. The ACGR is "the number of students who graduate in four years (on time) with a regular high school diploma divided by the number of students who form the adjusted cohort for the graduating class."¹ Unfortunately, the guidance did not require reporting by sub-group.

In 2016, the [Every Student Succeeds Act](#) (ESSA) replaced the 2008 statutory graduation rate requirements. The ESSA High School Graduation Rate Non-Regulatory Guidance (U.S. Department of Education, 2017), first implemented in the 2017-18 school year, requires each State and Local Education Agency (LEA) to calculate and report the percentage of students in this adjusted cohort who graduate within four years of starting 9th grade with a regular high school diploma or, for students with the most significant cognitive disabilities, a state-defined alternate high school diploma. The guidance includes exceptions for special populations who may require additional years in high school (e.g., children with disabilities, English learners, children who are homeless, and children who are in foster care). In addition, for accountability and support, each State determines long-term goals and measures of interim progress toward high school graduation for all students and each subgroup. The Act encourages States and LEAs to work together to identify and implement supports and interventions for dropout prevention. Like many states, Virginia has made great strides in increasing on-time graduation under ESSA. Exhibit 1 shows the on-time graduation rates for Virginia students between 2018-23.

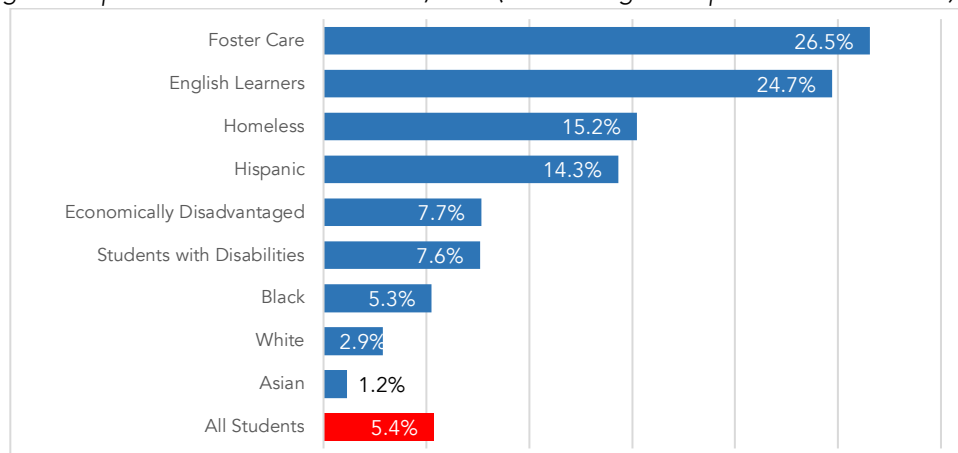
¹ NCES description of adjusted cohort graduation rate (<https://tinyurl.com/5eu4ehvw>).

Exhibit 1. Virginia On-Time Graduation: All Students, 2018-23 (Source: Virginia Department of Education)



As illustrated above, the graduation rates vacillate by year, with the highest rate of 93 percent posted in 2021, but a decrease to 92 percent in 2023, which is similar to the 2018 rate. The Virginia on-time graduation data for the class of 2023 reveal high dropout rates for several student groups, including students in foster care (27 percent), English learners (25 percent), homeless (15 percent), Hispanic (12 percent), and students described as “economically disadvantaged” (8 percent). These figures compare with the statewide cohort dropout rate of 5 percent.

Exhibit 2. Virginia Dropout Rates: Selected Students, 2023 (Source: Virginia Department of Education)



What is the Impact of High School Dropout?

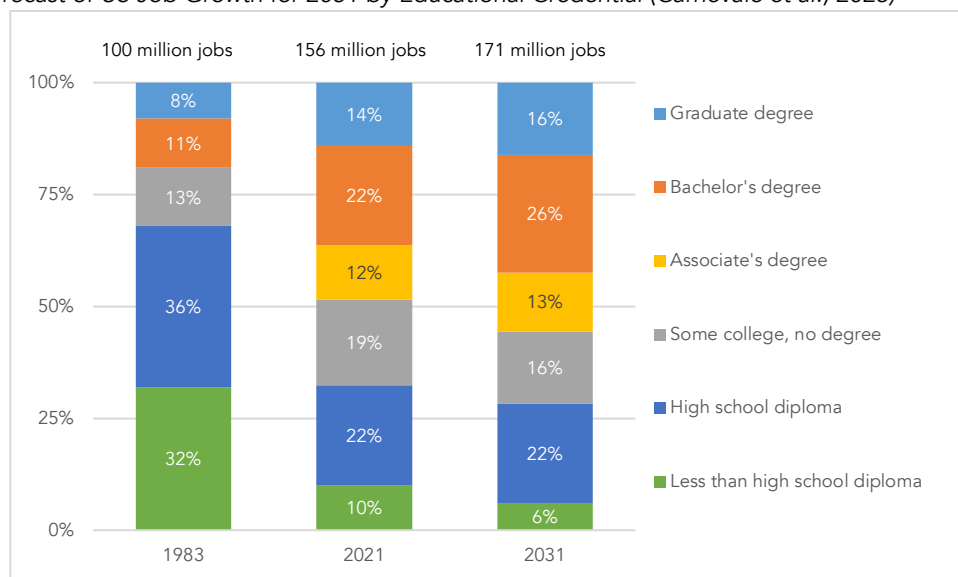
In 2021, there were 2.0 million status dropouts between the ages of 16 and 24 across the country.² Dropping out of high school has clear and measurable adverse consequences for individuals and society. Individually, students who do not complete high school face economic and social challenges throughout their lifetimes. They are more likely to be unemployed, and those employed have lower earnings than high school graduates of the same age (Chapman et al., 2011; Levin & Belfield, 2007). According to the NCES, the employment rate for young adults who had completed high school was higher than that for those who had not finished high school in 2015. Data for 2014 show that the median annual earnings of young adult high school completers (\$30,000) was 20 percent higher than those without a high school credential

² <https://nces.ed.gov/programs/coe/indicator/coj>.

(\$25,000).³ Dropouts are more likely to have poor physical and mental health problems (Lantz et al., 1998; Muennig et al., 2010), are at a higher risk of incarceration (Blomberg, 2011; Ewert et al., 2014), and experience more teenage pregnancies than their graduating peers (Marcotte, 2013).

Dropout consequences result in negative impacts on society as a whole. Levin & Belfield (2007) calculated that each high school dropout cost the United States economy \$266,000 (in 2023 dollars) due to lower tax payments, higher health costs, higher welfare payments, and higher criminal justice costs. The nation suffers not only because of the loss in revenue but also as a result of the overall education level of the workforce. According to the Georgetown University Center on Education and the Workforce, by 2031, 72 percent of all jobs will require workers to have at least some postsecondary credential or training beyond high school (Carnevale et al., 2023). Only 28 percent will go to workers with a high school diploma or less.

Exhibit 3. Forecast of US Job Growth for 2031 by Educational Credential (Carnevale et al., 2023)



What Factors Influence High School Graduation Rates?

The Dropout Prevention Center reported that dropping out is a "long process of disengagement" in which risk factors accumulate, interact, and compound over time. Hammond et al. (2007) summarized that, while there is no singular risk factor that predicts dropout, they can be classified in four areas: individual, family, school, and community factors. Exhibit 5 on page 6 illustrates various individual and family factors associated with dropout for students.

Research from the University of Chicago’s Consortium of School Research, based on work in the Chicago Public Schools (CPS), suggests that whether students graduate from high school or not is primarily determined during their freshman year. Their research found that less than 25 percent of students who are off-track in their freshman year graduate from high school in four years (Bill & Melinda Gates Foundation, 2017).

³ NCES Conditions of Education: <https://nces.ed.gov/programs/coe>.

The U.S. Department of Education’s (Department) Office of Safe and Supportive Schools (the Title IV, Part A Technical Assistance Center) presented findings from seven nationally representative studies spanning more than 50 years regarding factors related to high school dropout (U.S. Department of Education, n.d.). These factors are related to the individual student and broader institutional factors such as family and school (Exhibit 4).

Exhibit 4. Factors related to high school dropout (U.S. Department of Education, n.d.)

Student Factors	Family Factors	School Factors
<ul style="list-style-type: none"> • Drug Addiction • Pregnancy • Mental Illness • Job/scheduling issues 	<ul style="list-style-type: none"> • Low socioeconomic status • Low education level of parents • Family disruption • Siblings who have dropped out of school • Early adult responsibilities (caregiver, income producer) 	<ul style="list-style-type: none"> • Academic: Course Failure • Attendance • Student Engagement • Exclusionary/ Discipline Experiences • Lack of a caring adult • School Safety

Individual student factors that contribute to this process include but are not limited to: drug abuse, teen pregnancy, student mental illness, and job-related factors caused by student’s employment interfering with attending school. For example, in 2021, 42 percent of students felt persistently sad or hopeless and nearly one-third (29 percent) experienced poor mental health. Twenty-two percent of students seriously considered attempting suicide, and 1-in-10 (10 percent) attempted suicide (Centers for Disease Control and Prevention, 2023).

Family factors that impact school dropout include low socioeconomic status, low education level of parents, family disruption (e.g., divorce, homelessness, frequent mobility, and death of a parent, etc.), and siblings who dropped out of school. Students from low-income families often have less access to supportive resources and tend to live in communities with underperforming schools. In 2016, the number of young people ages 16-to-24 years who did not complete high school or were not enrolled in high school was 3.7 times higher in low-income families compared to high-income families (McFarland et al., 2020).

School factors include course failure influenced by difficulty keeping up with schoolwork and the inability to read at grade level by 3rd grade (Hernandez, 2011). Chronic absenteeism is a primary factor associated with suspension/expulsion and a lack of engagement or liking for school. School climate factors are linked to higher student dropout rates and include teachers’ lack of interest and students’ perception of an ineffective and unfair discipline system. Additionally, dropout rates are higher in schools with higher rates of violence and safety issues. Relatedly, lesbian, gay, bisexual, transgender, and queer (LGBTQ) students report that physical and verbal abuse in school often influences their decision to drop out (Kosciw et al., 2018).

Exhibit 5. Significant Risk Factors by School Level (Hammond et al., 2007)

Risk Category and Risk Factor	Elementary School	Middle School	High School
Individual Background Characteristics			
• Has a learning disability or emotional disturbance		✓	✓
Early Adult Responsibilities			
• High number of work hours		✓	✓
• Parenthood			✓
Social Attitudes, Values, & Behavior			
• High-risk peer group		✓	✓
• High-risk social behavior		✓	✓
• Highly socially active outside of school			✓
School Performance			
• Low achievement	✓	✓	✓
• Retention/over-age for grade	✓	✓	✓
School Engagement			
• Poor attendance	✓	✓	✓
• Low educational expectations		✓	✓
• Lack of effort		✓	✓
• Low commitment to school		✓	✓
• No extracurricular participation		✓	✓
School Behavior			
• Misbehavior	✓	✓	✓
• Early aggression	✓	✓	
Family Background Characteristics			
• Low socioeconomic status	✓	✓	✓
• High family mobility		✓	
• Low education level of parents	✓	✓	✓
• Large number of siblings	✓		✓
• Not living with both natural parents	✓	✓	✓
• Family disruption	✓		
Family Engagement/Commitment to Education			
• Low educational expectations		✓	
• Sibling has dropped out		✓	✓
• Low contact with school		✓	
• Lack of conversations about school		✓	✓

Part II: Letting the Data Speak

This brief provides a review of trend data regarding the Adjusted Cohort Graduation Rate (ACGR), or on-time graduation, for students across the US with a particular eye towards Virginia.⁴ The data used for this brief were obtained from the US Department of Education via their Digest of Education Statistics tables and include data from 2010-11 to 2019-20, the latest publicly-available dataset.⁵

Overall, Virginia compares well against other states in terms of on-time graduation rates and typically ranks highly among peers. However, we find that, like in many other states, there are major gaps in completion by subgroups, including non-White students, those with limited English proficiency (LEP) or disabilities, and students who live in some form of economic disadvantage, including those who are homeless or in foster care. This brief will illustrate some of these gaps and provide more recent information on the relationships of both homelessness and foster care on graduation propensity.

On-Time Graduation Rates

In 2019-20, the US average on-time graduation rate was 87 percent (Exhibit 1; Exhibit 8). West Virginia (92), Iowa (92), Kentucky (91), New Jersey (91), Indiana (91), and Alabama (91) led the nation, while Virginia was tied for fourth with 89 percent, three points back of the top and slightly above the national average. The poorest performing states/territories include the District of Columbia (73), New Mexico (77), Arizona (77), Alaska (79), and Oklahoma (81).

Between 2010-11 and 2019-20, the US average on-time graduation rate rose 8 points from 79 to 87 percent. During this period, Virginia's average on-time graduation rate rose 7 percent from 82 to 89 percent. Exhibit 1 illustrates the upward trend for the nation and for Virginia, with a slight closing of the gap between the two as the decade progressed, from 3 percent in 2010-22 to 2 percent in 2019-20. The Commonwealth has consistently outperformed the US average by 2-3 percent each year. Nevada posted the largest increase of on-time graduation rates between 2010-11 and 2019-20 with a 21 percent increase, followed by Florida (19), Alabama (19), Georgia (17), and Oregon (15). Oklahoma (-4), Vermont (-4), and Arizona (-1) exhibited on-time graduation rate decreases over the decade.

⁴ As defined by the US Department of Education: "The adjusted cohort graduation rate (ACGR) is the percentage of public high school freshmen who graduate with a regular diploma or a state-defined alternate high school diploma for students with the most significant cognitive disabilities within 4 years of starting 9th grade. Students who are entering 9th grade for the first time form a cohort for the graduating class. This cohort is "adjusted" by adding any students who subsequently transfer into the cohort and subtracting any students who subsequently transfer out, emigrate to another country, or die. Before 2017-18, the definition of ACGR included regular high school diplomas only... In 2019-20, some states may have changed their requirements for a regular high school diploma to account for the impact of the coronavirus pandemic. These changes are at the discretion of each state but may have resulted in less comparability in the ACGRs between 2019-20 and prior school years."

⁵ The data used in this brief were downloaded from the U.S. Department of Education, Office of Elementary and Secondary Education Digest of Education Statistics website: <https://nces.ed.gov/programs/digest/index.asp>. Specifically, these data are provided in Table 219.46 of the Digest in each particular year and is updated annually. The latest version of this table at the time this brief was written was created by the Department in December 2022.

Exhibit 6. Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR), National and Virginia, 2010-11 through 2019-20 (Source: US Department of Education)

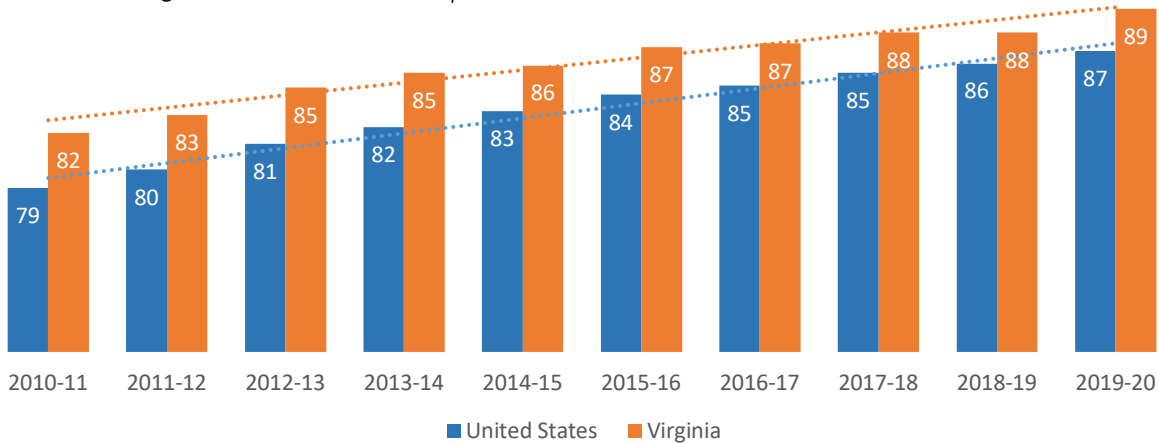
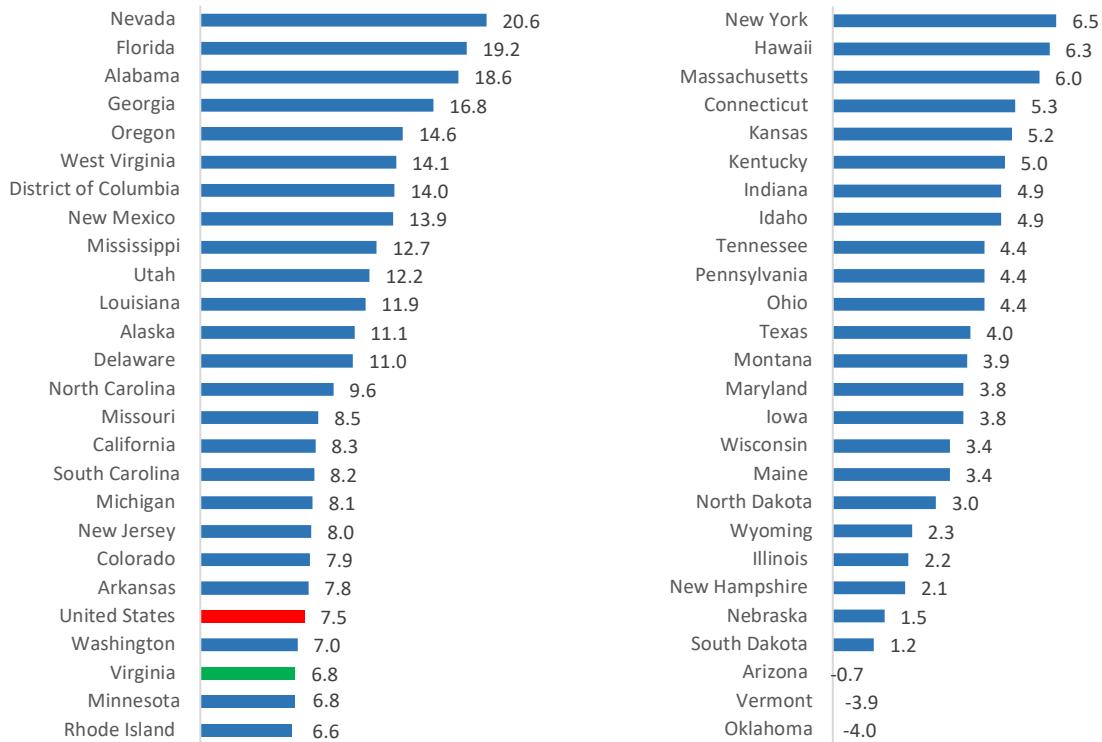


Exhibit 7. Net Change in Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR), by State, 2010-11 to 2019-20 (Source: US Department of Education)⁶



⁶ Data were not available for all states for all years; commensurate data were used to allow for comparability.

We examined states by their quartile ranking between 2010-11 and 2019-20 (Exhibit 8). Six of the states in the top quartile in 2019-20 were also represented in the top quartile in 2010-11, and include Iowa, Kentucky, Indiana, Tennessee, Wisconsin, and Texas. The remaining six states in the top quartile rose from lower quartiles in 2010-11. For instance, Alabama and Florida rose from the lowest to the highest quartile during this period, while West Virginia and Delaware rose two quartiles (second to highest).

Of states in the lowest quartile in 2019-20, 9 of 13 resided in the lowest quartile a decade earlier, illustrating how difficult it can be to rise from the bottom. One state, Oklahoma, dropped from the highest quartile in 2010-11 to the bottom in 2019-20. Wyoming dropped two quartiles and Idaho and Arizona dropped one quartile. Overall, 12 states rose at least one quartile between 2010-11 and 2019-20, 10 states dropped, and 39 remained the same.

Exhibit 8. Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR), by State, with State Rank, Quartile, and Net Change, 2010-11 to 2019-20 (Source: US Department of Education)

STATE	2010-11			2019-20			CHANGE (Δ)		
	%	RANK	QUARTILE	%	RANK	QUARTILE	Δ%	ΔRANK	ΔQUARTILE
United States	79			87					
West Virginia	78	31	SECOND	92	1	HIGHEST	14	30	2
Iowa	88	1	HIGHEST	92	2	HIGHEST	4	-1	0
Kentucky**	86	5	HIGHEST	91	3	HIGHEST	5	2	0
New Jersey	83	18	THIRD	91	4	HIGHEST	8	14	1
Indiana	86	4	HIGHEST	91	5	HIGHEST	5	-1	0
Alabama	72	43	LOWEST	91	6	HIGHEST	19	37	3
Tennessee	86	9	HIGHEST	90	7	HIGHEST	4	2	0
Wisconsin	87	3	HIGHEST	90	8	HIGHEST	3	-5	0
Florida	71	44	LOWEST	90	9	HIGHEST	19	35	3
Texas	86	10	HIGHEST	90	10	HIGHEST	4	0	0
Missouri	81	24	THIRD	90	11	HIGHEST	9	13	1
Delaware	78	29	SECOND	89	12	HIGHEST	11	17	2
Massachusetts	83	17	THIRD	89	13	THIRD	6	4	0
North Dakota	86	8	HIGHEST	89	14	THIRD	3	-6	-1
Arkansas	81	23	THIRD	89	15	THIRD	8	8	0
Virginia	82	22	THIRD	89	16	THIRD	7	6	0
Connecticut	83	14	THIRD	88	17	THIRD	5	-3	0
Kansas	83	15	THIRD	88	18	THIRD	5	-3	0
Utah	76	37	SECOND	88	19	THIRD	12	18	1
New Hampshire	86	7	HIGHEST	88	20	THIRD	2	-13	-1
Mississippi	75	39	LOWEST	88	21	THIRD	13	18	2
North Carolina	78	30	SECOND	88	22	THIRD	10	8	1
Nebraska	86	6	HIGHEST	88	23	THIRD	2	-17	-1
Maine	84	13	THIRD	87	24	THIRD	3	-11	0
Pennsylvania	83	19	THIRD	87	25	THIRD	4	-6	0
Maryland	83	16	THIRD	87	26	SECOND	4	-10	-1
Hawaii	80	25	SECOND	86	27	SECOND	6	-2	0
Illinois	84	12	HIGHEST	86	28	SECOND	2	-16	-2
Montana	82	21	THIRD	86	29	SECOND	4	-8	-1
Ohio	80	26	SECOND	84	30	SECOND	4	-4	0
California	76	36	SECOND	84	31	SECOND	8	5	0
South Dakota	83	20	THIRD	84	32	SECOND	1	-12	-1
Georgia	67	48	LOWEST	84	33	SECOND	17	15	1
Minnesota	77	33	SECOND	84	34	SECOND	7	-1	0
Rhode Island	77	35	SECOND	84	35	SECOND	7	0	0
New York	77	34	SECOND	84	36	SECOND	7	-2	0
Vermont	87	2	HIGHEST	83	37	SECOND	-4	-35	-2
Washington	76	38	SECOND	83	38	SECOND	7	0	0
Louisiana	71	45	LOWEST	83	39	LOWEST	12	6	0
Nevada	62	50	LOWEST	83	40	LOWEST	21	10	0
Oregon	68	47	LOWEST	83	41	LOWEST	15	6	0
Wyoming	80	27	THIRD	82	42	LOWEST	2	-15	-2
Idaho*	77	32	SECOND	82	43	LOWEST	5	-11	-1
South Carolina	74	42	LOWEST	82	44	LOWEST	8	-2	0
Michigan	74	41	LOWEST	82	45	LOWEST	8	-4	0
Colorado	74	40	LOWEST	82	46	LOWEST	8	-6	0
Oklahoma**	85	11	HIGHEST	81	47	LOWEST	-4	-36	-3
Alaska	68	46	LOWEST	79	48	LOWEST	11	-2	0
Arizona	78	28	SECOND	77	49	LOWEST	-1	-21	-1
New Mexico	63	49	LOWEST	77	50	LOWEST	14	-1	0
District of Columbia	59	51	LOWEST	73	51	LOWEST	14	0	0

Overall, on-time graduation rate is a positive story told through data. All but three states (Vermont, Oklahoma, and Arizona) realized an increase in on-time graduation rates. Fourteen states increased their on-time rates between 10 and 21 percent, 19 increased between 5 and 9 percent, and 15 states increased 1 to 4 percent.

At-Risk Students

The prior analysis focused on overall on-time graduation rate status by state. Averages are helpful in providing a quick understanding of a particular issue. However, they also tend to cover up important details for subgroups. Historically, students from various race/ethnic backgrounds, low-income students, limited English proficiency, and students with disabilities tend to fall behind other students. This is the case with regard to on-time graduation as well. Exhibit 9 below provides comparative data for selected criteria on ACGR outcomes. It is worth noting that only recently have some of these data been collected, such that our ability to measure over time is limited. Certain important categories, like students in foster care or homeless situations, were unavailable nationally prior to 2017-18.

Exhibit 9. Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR), by State and Selected Student Criteria, including Race/Ethnicity, Limited English Proficiency, Disability Status, and Economic Disadvantaged, 2012-13 to 2019-20 (Source: US Department of Education)

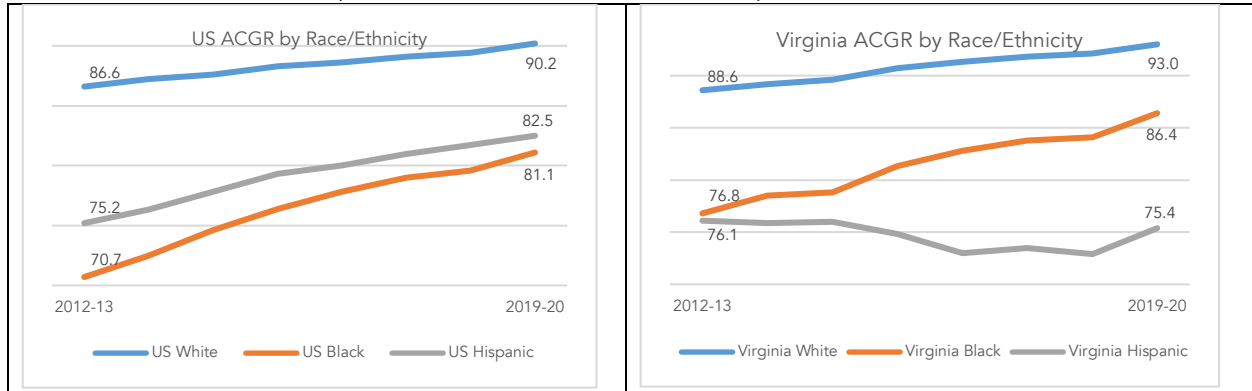
YEAR	White		Black		Hispanic		Limited English Proficient		Students with Disabilities		Economically Disadvantaged	
	US	Virginia	US	Virginia	US	Virginia	US	Virginia	US	Virginia	US	Virginia
2012-13	86.6	88.6	70.7	76.8	75.2	76.1	61.1	51.8	61.9	51.5	73.3	74.0
2013-14	87.2	89.2	72.5	78.5	76.3	75.9	62.6	48.2	63.1	53.2	74.6	75.1
2014-15	87.6	89.6	74.6	78.8	77.8	76.0	65.1	44.6	64.6	52.6	76.1	75.4
2015-16	88.3	90.7	76.4	81.3	79.3	74.8	66.9	45.4	65.5	53.9	77.6	78.1
2016-17	88.6	91.3	77.8	82.8	80.0	73.0	66.4	57.3	67.1	59.8	78.3	77.8
2017-18	89.1	91.8	79.0	83.8	81.0	73.5	68.3	57.2	67.1	61.2	79.5	79.6
2018-19	89.4	92.1	79.6	84.1	81.7	72.9	69.2	56.0	68.2	62.9	80.0	79.6
2019-20	90.2	93.0	81.1	86.4	82.5	75.4	71.3	63.4	70.6	67.5	81.3	82.5
CHANGE	3.6	4.4	10.4	9.6	7.3	(0.7)	10.2	11.6	8.7	16.0	8.0	8.5

Race/Ethnic Outcomes

Even though gaps in on-time graduation rates have risen for all race/ethnic groups nationally, there remain gaps between Black, Hispanic, and White students (Exhibit 10). In 2012-13, the average on-time graduation rate was 71 percent for Hispanic students and 75 percent for Black students, compared to 87 percent for White students. While all three groups realized increases by 2019-20, there were still considerable, if smaller, gaps in graduation rates. Hispanic on-time graduation rates rose from 71 to 81 percent and Black rates from 75 to 83 percent. Meanwhile, White on-time graduation rates rose 3 points to 90 percent. The gap between White and Hispanic/Black students decreased to 7 and 9 percent, respectively.

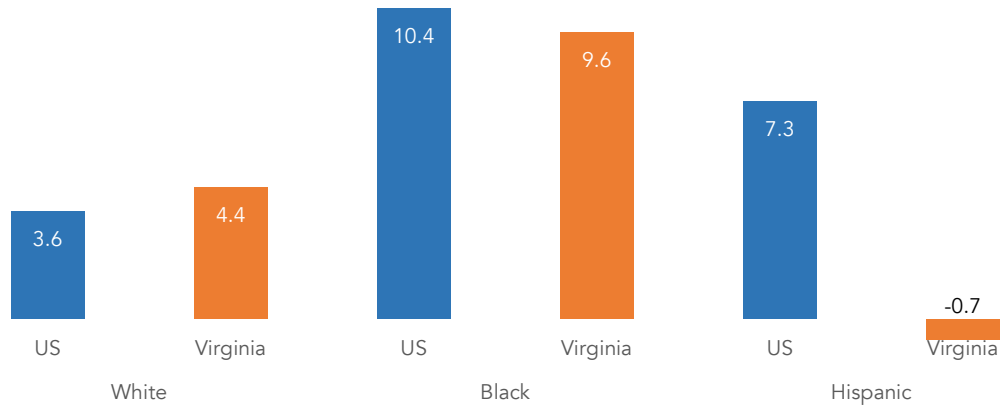
In Virginia, the trend is more complex. White students mirrored the national trend by rising from 89 percent in 2012-13 to 93 percent in 2019-20. Similarly, Black students jumped from 77 percent to 86 percent, far above the national average. Hispanics, however, remained relatively static between those years and, in fact, dropped slightly. In 2012-13, 76 percent of Hispanics graduated on time. Seven years later (2019-20) their graduation rate fell almost a full percentage point to 75 percent.

Exhibit 10. Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR), National and Virginia, by Race/Ethnic Groups, 2012-13 to 2019-20 (Source: US Department of Education)



As described above and illustrated clearly in Exhibit 11, the graduation rates for Black students increased the most of those depicted below, posting 10 point national and Commonwealth increases. The change for White students was on a small scale (4 percent) but similar nationally and in Virginia. Hispanic rates were vastly different, with a 7.3 percent positive change at the national level while a negative (-0.7) percent decrease in Virginia.

Exhibit 11. Net Change in Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR), National and Virginia, for White, Black, and Hispanic Groups, 2012-13 to 2019-20 (Source: US Department of Education)

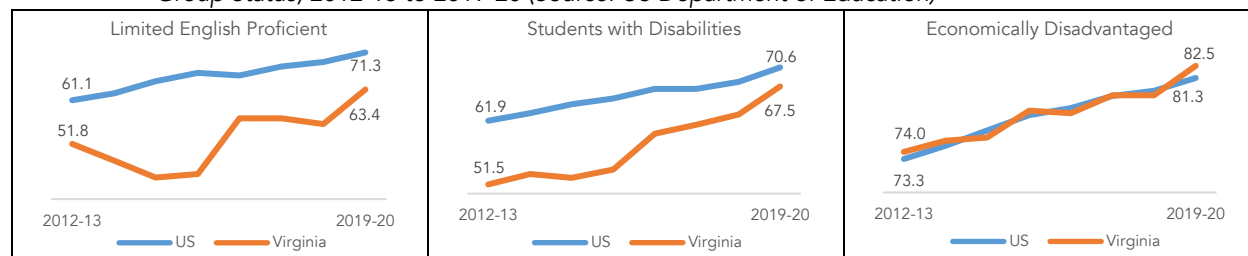


Special Population Outcomes

Nationally, the percentage of students designed as Limited English Proficient (LEP) who graduated on time increased 10 percent, from 61 to 71 percent, between 2012-13 and 2019-20 (Exhibit 12). In Virginia, the net increases were slightly higher but the graduation rates were overall lower than the national figures. In 2012-13, the LEP graduation rate was 52 percent and increased 11 percent to 63 percent by 2019-20. Of interest is the mercurial changes in Virginia during this period, where the graduation rates for LEP students decreased to 45 percent in 2014-15, increased to 57 percent in 2016-17, and then decreased slightly before rising to 63 percent in

2019-20. Such variability suggests possible data issues that could have arisen due to data definitions or data collection issues.

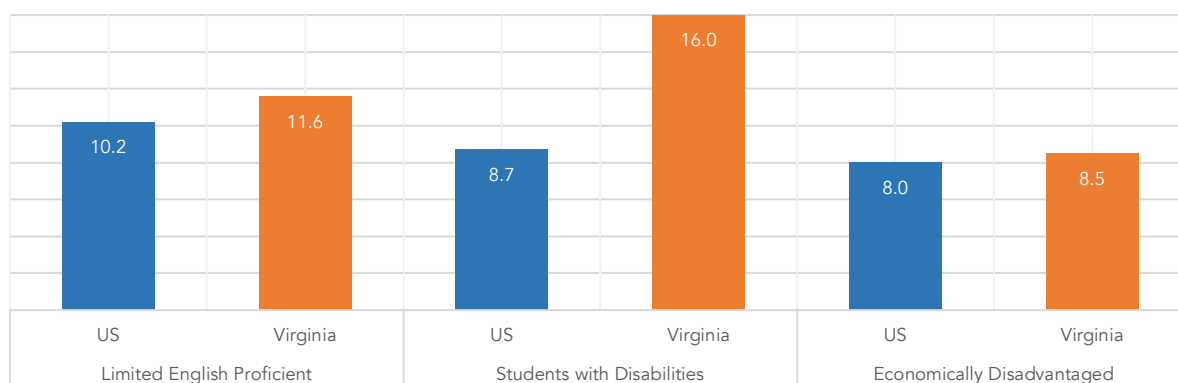
Exhibit 12. Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR), National and Virginia, by Special Group Status, 2012-13 to 2019-20 (Source: US Department of Education)



The on-time graduation rates of Students with Disabilities rose 9 percent nationally, from 62 percent in 2012-13 to 71 percent in 2019-20. As with LEP students, the Virginia case had a similar trend with lower rates than nationally posted. In 2012-13, the on-time graduation rate of students with disabilities in Virginia was 52 percent. By 2019-20, this increased 16 percent to 68 percent, or 7 percent more than the national figures. Thus, Virginia largely closed the gap with the national average in graduation rates, moving from a 10 percent gap in 2012-13 to 3 points in 2019-20.

Students who are “economically disadvantaged” are defined as those who are eligible for Free/Reduced Meals, receive Temporary Assistance for Needy Families (TANF), or are eligible for Medicaid.⁷ The trends in on-time graduation rates in Virginia for this group mirrored the national averages. In 2012-13, the national average graduation rate for economically-disadvantaged students was 73 percent versus 74 percent for Virginia students. By 2019-20, both had risen approximately 9 percent to 81 and 83 percent, respectively.

Exhibit 13. Net Change in Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR), National and Virginia, by Special Group Status, 2012-13 to 2019-20 (Source: US Department of Education)



⁷ <https://www.doe.virginia.gov/about-vdoe/glossary-of-education-terms#E>.

Exhibit 13 illustrates the net change for these three populations nationally and in Virginia between 2012-13 and 2019-20. Virginia’s net increase was slightly higher for LEP students (1.4 percent) and economically disadvantaged students (0.5 percent). For students with disabilities, Virginia’s net increase was 7 percent higher than the national average (16 versus 9 percent).

Beyond 2020

While the federal data stops at 2019-20, the Virginia Department of Education has collected and released data up to 2022-23, adding an additional three years to our review. While we can’t compare this nationally, it does provide an interesting opportunity to extend the trend analysis within the Commonwealth.

One important caveat: the Virginia Department of Education defines on-time graduation rates differently than the federal government.⁸ Virginia’s definition allows more flexibility in the type of diploma or certificate earned by students as well as additional time allowances for special education and LEP students. The result of this distinction is a slightly higher rate when compared with the federally-required rates. However, Virginia provides both calculations in their releases. For comparative reasons, we’ve used the federal definition consistently throughout this brief.

Exhibit 14 and the accompanying table provide on-time graduation data in Virginia for the five-year period from 2018-19 to 2022-23 for selected subgroups, including the at-risk groups analyzed previously. The purpose of the line graph is not to confuse the reader; rather, it is designed to illustrate the hierarchical averages for these subgroups and their relativity to each other. A rank order, per se.

Looking at the graphic, it is largely unsurprising, based upon historical data, that White students are at the top of the list with a 93 percent on-time graduation rate in 2022-23.⁹ Overall, the Virginia on-time graduation rate averaged 89 percent in 2022-23, and has been reasonably steady since 2018-2019.

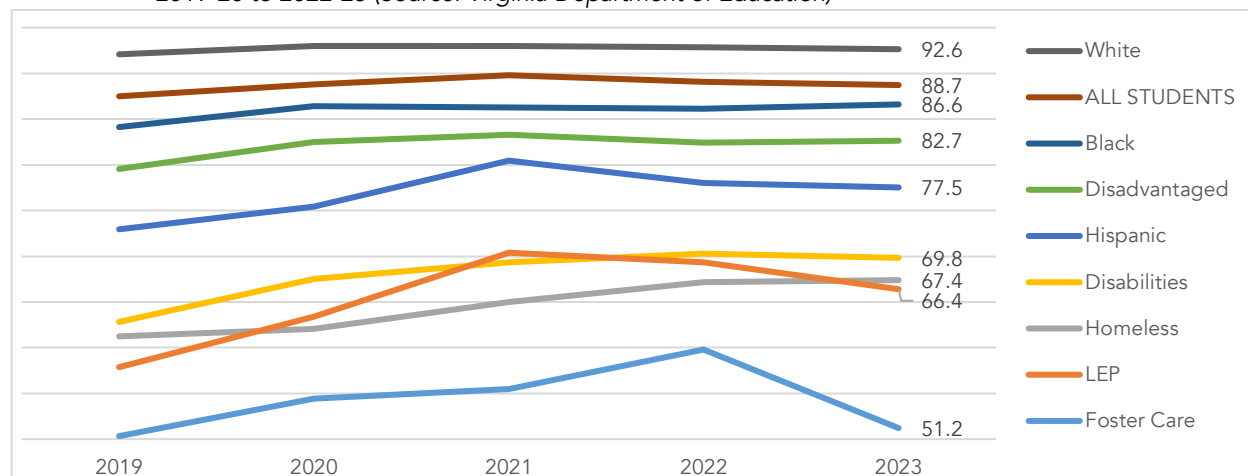
Readers can work their way through the graphic to see how various subgroups fair by on-time graduation rate. Note the slight break between what we will bifurcate into an upper group and a bottom group. The former includes the three race groups as well as the economically-disadvantaged group. The bottom group includes four key subgroups—disabilities, homelessness, LEP, and foster care students. These groups graduate at far lower rates than the upper groups. Foster care youth graduate almost 40 percent lower than the state average, and LEP, homeless, and students with disabilities graduate between 19 and 23 percent lower than

⁸ “Virginia On-Time Graduation Rate, Virginia’s official graduation rate which expresses the percentage of students in a cohort who earned any Board of Education-approved diploma within four years of entering high school for the first time and allowances for special education and English Learners whose educational plans allow for additional years in high school. Federal Graduation Indicator, used for federal accountability which expresses the percentage of students in a cohort who earned only a Standard, Advanced Studies, or IB diploma within four years of entering high school for the first time (<https://www.doe.virginia.gov/data-policy-funding/data-reports/statistics-reports/graduation-completion-dropout-postsecondary-data/virginia-cohort-reports-713>).

⁹ We limited the analysis to certain groups in order to simply the discussion, but Asian students (not depicted) have an on-time graduation rate of 96 percent in Virginia (and a 98 percent rate using Virginia’s definition).

average. The takeaway is that serious social issues have a large impact on the ability of these students to graduate on time, let alone, ever.

Exhibit 14. Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR) for Selected Subgroups, Virginia, 2019-20 to 2022-23 (Source: Virginia Department of Education)



	2019	2020	2021	2022	2023
ALL STUDENTS	87.5	88.8	89.8	89.1	88.7
Foster Care	50.3	54.4	55.5	59.8	51.2
LEP	57.9	63.4	70.4	69.3	66.4
Homeless	61.2	62.1	65.0	67.2	67.4
Disabilities	62.8	67.5	69.3	70.3	69.8
Disadvantaged	79.6	82.5	83.3	82.4	82.7
Black	84.1	86.4	86.3	86.1	86.6
Hispanic	73.0	75.4	80.5	78.0	77.5
White	92.1	93.0	93.0	92.8	92.6

Summary

Overall, graduation rates, almost unilaterally, have increased across the country since 2010-11. While there are a few anomalies along the way, most states have posted steady increases over the data, with an average national increase of 8 percent between 2010-11 and 2019-20. Special populations, including our review of race/ethnic groups, economically disadvantaged, students with disabilities, and English language learners, have shown increases nationally and in Virginia, beyond our notation of a slight decline for Hispanic learners in Virginia. The recent data for students who are homeless or in foster care sheds a very important light on how social conditions impacts educational progress for youth. Even these groups are making headway, but the headway is more challenging for these groups given their difficult circumstances.

The takeaway for readers may be simply having these data as a reference and to continue thinking about where the biggest challenges are at the state and local levels. For practitioners, these data can serve to focus discussions on how to best serve the most vulnerable children in our educational pipelines. These data can effectively inform the improvement and implementation science processes, which are discussed in a further brief.

Part III: Why a Systems Perspective is Important for On-Time Graduation Rate Improvement

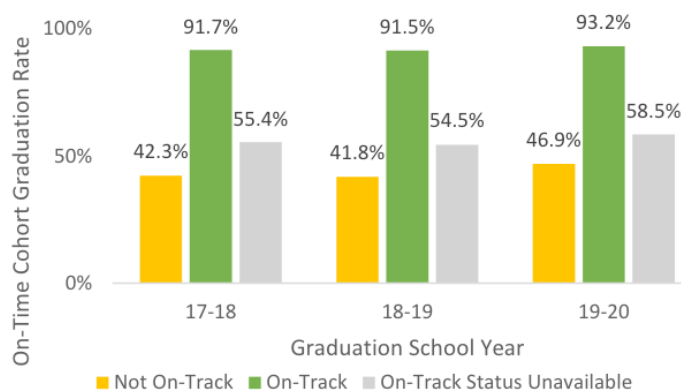
On-time graduation is a complex problem that impacts students who often have less human capital than other students. Other briefs have identified the populations who are less likely to graduate on time than other students, and these include economically disadvantaged students, those with disabilities, homeless and foster care students, and ESL students, among others.

The period between the eighth and ninth grades is a particularly important time period in the academic and social development of youth. This can manifest itself in both attendance and behavioral problems for students. Allensworth (2013) found that unexcused absences quadrupled between the eighth and ninth grades, from 4 days to 16 days. With consideration of excused absences as well, students missed an average of 21 days of school in the ninth grade. Study habits declined as well as grades, which were due largely to a decline in monitoring and support during high school compared to middle school, highlighting the “critical need to closely monitor students’ course performance and provide support before students fall too far behind to catch up. In fact, some of the high schools in the study had systems set up to monitor students based around the early warning indicators. In these schools, grades and attendance were higher than in other schools serving similar students.”

A study by the Oregon Department of Education found that students who were on-track to graduate by the end of their freshman year were more than twice as likely as their off-track peers to graduate within four years of entering high school. Only 48 percent of students who were off-track at the end of the ninth grade graduated on time. The study also found that on track students were more likely to attend school regularly (a 7.4 percent increase over off-track students in freshman year and a 5.3 percent increase in the senior year). Attendance in Year 2 was associated with a 50 percent increase in the likelihood of graduation for off-track students (E. M. Allensworth & Easton, 2005).

A more recent study by the Oregon Department of Education found that ninth graders who were on-track for graduation was a strong predictor. Key focus points include regular attendance, course enrollment, mobility, and discipline factors. As illustrated in Exhibit 15 below, in 2019-20, 93.2 percent of students who were on track in the ninth grade graduated on-time four-years later. This compares to 46.9 percent who were not on track. The exhibit shows the relative steadiness of these data over three years.

Exhibit 15. Students Who Are On-Track in 9th Grade are Consistently Twice as Likely to Graduate (Jacoby, 2021)



Seattle Public Schools (SPS) also tracked students in ninth grade similar to Oregon and found that students who were on-track at the end of ninth grade were three times more likely to graduate on-time than students who were off-track (Seattle Public Schools, 2020). As well, they found that only 9 percent of on-track ninth-grade students transferred out of the district compared to 69 percent of off-track students. SPS identified chronic absenteeism, low course grades, under enrollment, and late entry (transfer in) as predictors of end-of-year on-track outcomes for ninth-grade students. Student disciplinary events did not predict off-track outcomes. Of interest, 50 percent of students who accrued four or more absences within the first six weeks of classes ended the year off track. Additionally, 46 percent of students who recorded an “E” or two or more “D” grades in the first quarter were off-track at the end of the year. Sixty-four percent of late entry students were off-track at the end of the ninth-grade.

A study by the US Department of Education found that the variable that consistently predicted graduation outcomes for students in grades 8 and 9 was attendance rate (Stuit et al., 2016). The study also found that failing more than one class and being suspended one or more times were strong predictors of failure to graduate on time.

Neild (2009) posited that there are four general explanations or theories about off-track students. First is a series of life-course changes, where the transition from middle-to-high school coincides with a lowering of parental supervision at a time when peer influence increases. Second is a transition to a new school, where social bonds may be broken with teachers and peers. The task of developing new relationships and adapting to the rules and expectations of a new school can be difficult for students. Third is the inadequate preparation for high school, suggesting that some students simply enter high school without the requisite academic skills needed to stay on track. As described by Neild, these students were able to stay afloat, but it catches up to them in high school when the content gets more difficult. Finally, the fourth explanation is the climate and organization of the high school itself. Studies have shown that students can feel alienated and anonymous by the nature of subject-specific and compartmentalized classes. As for teachers, they are less likely to be prepared for or have the time to deal with students the way they were dealt with in middle school due to the nature of high school schedules and classes.

The System Approach

There are no silver bullets or easy fixes for these issues. Thus, schools and districts must be creative about how to provide interventions to students. As Senge (2006) states, school systems are complex organizations that require system thinking to make sense of this complexity. A system school improvement approach allows for teachers and school leadership to walk along the same path with a clear purpose (Jansen et al., 2011; Krawec). This requires the alignment of strategies and vision.

A systemic approach—one in which the school district aligns its resources and strategies to confront common challenges and support effective solutions—might best address the needs of struggling schools (Knudsen, Joel et al., 2011).

According to Garland et al., (2018), “a systems thinking approach aligns organizational structures and processes to effectively and efficiently improve performance. Identifying the different components of organizational change is helpful when thinking about the dynamics and interconnectedness of the moving and shifting components (p. 9).” This approach helps academic leaders at the district and school levels deal with the chaotic and overwhelming nature of change.

In 2017, the Oregon Department of Education (ODE) partnered with six Education Service Districts (ESDs) and 30 Local Education Agencies (LEAs) to implement the Multi-Tiered System of Supports (MTSS). The system was to focus on five specific targets: reading at grade level by 3rd grade; improved attendance; improved disciplinary issues; 9th grade on-track to graduation identification, and support improved engagement (Oregon Department of Education, 2017). The information derived from this effort, utilizing their Response to Instruction and Intervention (ORTii), was used with school districts and schools for technical assistance. ODE identified four key systemic pieces to support the improvement of graduation rates (Graduation Improvement: Systems, 2024):

1. **Quality Data Systems.** Building a system for collecting and analyzing a variety of data—beyond test scores—to identify students before they fall behind and discover root causes of emerging problems is a critical element to improving graduation outcomes. This includes real-time information about attendance and disciplinary/behavioral actions.
2. **Clear Education Pathways.** Students are required to build an education plan and profile each year starting in the 7th grade. This highlights a student's strengths and sets goals and pathways to meet those goals.
3. **P-20 Seamless Education System.** Students are most at risk during the transition points in education. Thus, a focus on successful transition experiences is important for continued enrollment. Oregon continues to work on creating our seamless education system by encouraging and investing in partnerships, inclusive of stakeholders, students, teachers, families, and community organizations.
4. **Leadership.** Strong visionary leadership is necessary to improve outcomes for students. Successful school leaders work with community members to create a strategic vision for graduating students and then focus policies and supports to create a plan targeted to ensuring all students have what they need to achieve that vision. Leaders in the schools, districts,

tribes, and communities can foster a safe and nurturing climate conducive to learning. Leaders at all levels can ensure that students have the relationships, engagement and supports necessary to succeed. It is important to grow leadership capacity across the state to support this critical work.

The California Collaborative on District Reform, in their study of poor performing schools, found that too many served a disproportionate number of low-income students, students of color, and ESL students (Knudsen, Joel et al., 2011). The Collaborative worked with eight low-performing school districts that each designed their own approaches to improving academic performance. Their primary findings were:

- Long-term and widespread school turnaround often requires systemic, district-level (not just school-level) approaches.
- Systems attempting to reverse chronic underperformance must customize their efforts to meet the individual needs and conditions of each specific school.

The system approach required schools to align district resources and strategies with the particular needs of their struggling schools and customizing improvement efforts with the specific context of each school. Commonalities of approaches among the eight schools included:

- Establishing a district culture that supports school turnaround
- Developing and deploying strong leadership
- Fostering and deploying strong teaching
- Using data to identify effective and ineffective practices
- Involving the community
- Piloting promising ideas (Knudsen, Joel et al., 2011).

Early Warning Systems

A central component of any systemic effort for on-time graduation and school reform is the development and use of an Early Warning System (EWS). These are used to collect and analyze critical information about students who are at-risk of dropping out of school (National Forum on Education Statistics, 2018). EWS typically use predictive analytics to determine the risk level for students based on performance indicators, including academic performance as well as behavioral, including attendance.

The scope of an early warning system is influenced by an education agency's priorities, resources, and policies. Early warning systems may focus on students who are at imminent risk of dropping out, students who are at future risk of dropping out, or both. Agencies may be constrained in whether they can focus on students who are at imminent or lesser and/or future risk. Ideally, an agency would have staff teams who can address the needs of, and design interventions for, both populations. (National Forum on Education Statistics, 2018, p. 2)

In addition, EWS systems may also identify risk activities including on-time graduation and college and career readiness. The purpose of the EWS is to provide timely information to

intervention teams so that specific measures can take place. Key to the successful use of EWS systems is the accuracy of data, as well as the security, utility, and timeliness of the data.

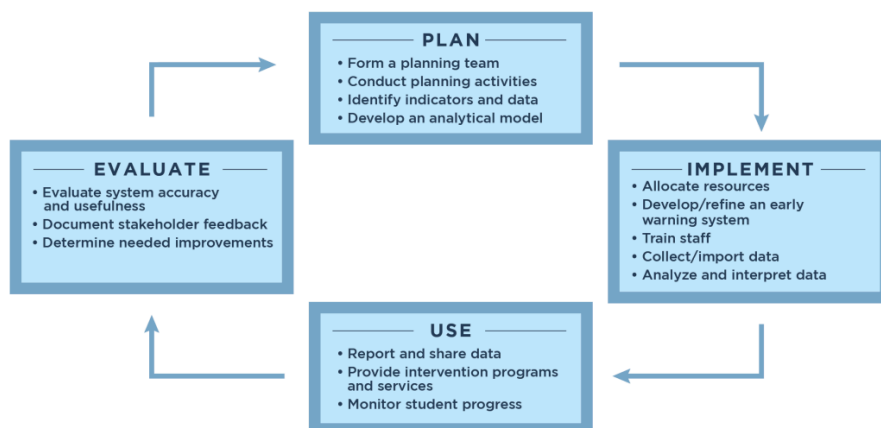
Common indicators in an EWS include assessment performance (e.g., tests), attendance, behavior (disciplinary actions), course performance, mobility (between schools, districts, or states), and progression (on-time advancement) (National Forum on Education Statistics, 2018). In addition, the collection of demographic data, such as gender, ethnic background, free/reduced-price lunch eligibility, English language learner status, and special education status, are also important (Jobs for the Future, 2014).

Critical to the successful development and implementation of an EWS are the following four characteristics:

- **Empirically created.** Indicators are most accurate and powerful when they are based on analyses of longitudinal data that track individual student progress over time. In essence, indicators use the experience of previous student cohorts to intervene when students in current cohorts begin to show behaviors associated with dropping out among their older peers. Studies in a number of states and districts and more sophisticated statistical analyses conducted by researchers have confirmed the consistency of such indicators in predicting who will drop out of high school.
- **Simple and easily collected.** Early warning indicators use readily available data that schools typically maintain already (e.g., grades, attendance, classroom behavior and disciplinary action).
- **Include only a few key variables.** A few key indicators are easier for teachers to monitor than a large set of predictors. K-12 analyses have demonstrated that although the underlying issues that produce a poor grade or weak attendance may be complex and vary from student to student, a small number of consistent flags alert educators to a student who is potentially falling off track. By extension, a good indicator system also makes clear which variables are not strong predictors of dropping out.
- **Efficient and effective.** A good set of indicators accurately identifies which students are likely to drop out of high school so that additional resources can be focused on preventing their dropping out. At the same time, a good set of indicators captures a broad swath of students who may eventually become dropouts, avoiding the “1 percent problem”—that is, indicators that are highly predictive but only identify a small percentage of potential dropouts. (Jobs for the Future, 2014)

Exhibit 16 illustrates a four-component process for EWS planning, including planning, implementation, use, and evaluation.

Exhibit 16. Early Warning System Planning Process (National Forum on Education Statistics, 2018, p. 4)



Questions for Consideration in Forming an EWS Planning Team

When forming an early warning system planning team, it is helpful to consider who will be represented on the team, which activities the team will undertake, and how team members will be expected to contribute to the planning process.

- 1. What factors are motivating your agency to consider an early warning system?**
- 2. Will the early warning system be created as part of a program, grant, or agency initiative?**
- 3. What types of planning activities will your team undertake before developing the early warning system?**
 - Conduct a needs analysis.
 - Engage stakeholders.
 - Identify and validate indicators, elements, and analytical models.
 - Evaluate in-house development or vendor purchase options.
 - Create a system development plan.
 - Plan for end-user access.
 - Develop a budget.
- 4. Which staff role(s) will be involved in the early warning system planning process?**
 - Administrators
 - Teachers
 - Research staff
 - Data management staff
 - Student intervention and support staff
 - Financial decisionmakers

5. Will agency staff create the system, or will your agency work with an external group (e.g., a vendor, consultant, or other education agency) to create the early warning system?

- If agency staff will create your system, which departments and staff will be responsible for developing, implementing, and maintaining the system?
- If an external vendor or organization will create your system, which departments and staff will be responsible for overseeing procurement, implementation, and maintenance? (National Forum on Education Statistics, 2018, p. 6)

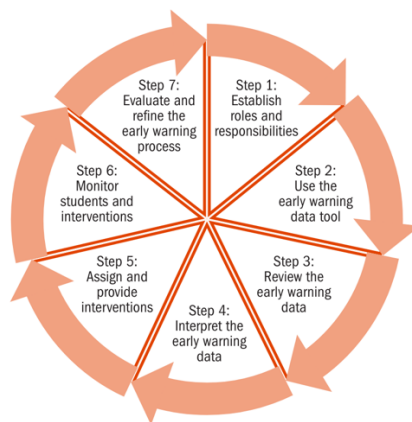
The Early Warning Intervention and Monitoring System (EWIMS)

The REL Midwest Dropout Alliance looked at the impact and implementation of the Early Warning Intervention and Monitoring System (EWIMS) on student outcomes (Faria et al., 2017). The EWIMS was developed by the US Department of Education via funding of the National High School Center at the American Institutes for Research in Washington, DC.

The EWIMS uses a systematic approach to identify students who are at risk of not graduating on time. The system flags students based on validated indicators (based on prior research) and provides schools with the guidance to implement a seven-step process (see Exhibit 17) and assign students to interventions. The indicators used to flag at-risk students in the tool include:

- chronic absence (missed 10 percent of instructional time or more)
- course performance (failed any course, grade point average [GPA] below 2.0)
- behavioral problems (suspended once or more), and
- an off-track indicator (failed two or more semester-long or three or more trimester-long core courses or accumulated fewer credits than required for promotion to the next grade).

Exhibit 17. *The Early Warning Intervention and Monitoring System (EWIMS) Seven-Step Implementation Process* (Faria et al., 2017, p. i).



The research study, which tracked over 37,000 students, found that the effectiveness of EWIMS depended largely on the quality and appropriateness of the support provided. As well, they noted

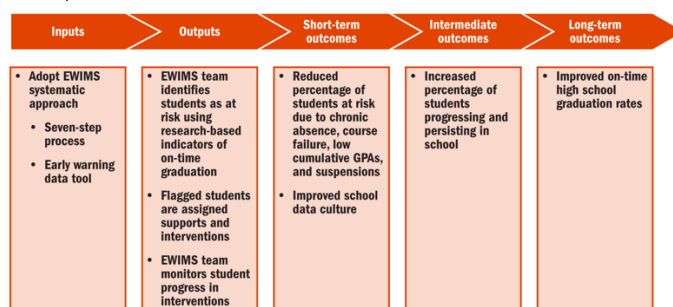
that EWIMS did not have a “detectable impact” on school data culture. The overall implementation of the seven-step process was low” (Faria et al., 2017, p. ii).

When implemented properly, EWIMS is expected to change how schools use data to identify and support at-risk students, leading to improvements in some aspects of school data culture: for example, improvements in the context for data use (for example, goals and professional climate for data use), concrete supports for data use (for example, allocated time for using data or professional development on data use), data-driven student support (for example, data-based decisions about how to best target limited supports for students), and reduced barriers to data use (for example, lack of time to review data). Other aspects of school data culture (for example, professional climate for data use) may require several years to show improvement.

At the student level, EWIMS implementation should result in short-term reductions in the prevalence of students being flagged by indicators related to chronic absence (missing 10 percent or more instructional time), course failure (one or more course failures, GPAs of 2.0 or lower), and behavioral problems (for example, suspensions). These short-term reductions are then expected to lead to improved intermediate outcomes, including improvements in students’ progress in school (by earning sufficient credits to remain on track toward on-time graduation) and persistence in school (by remaining continuously enrolled). Over the long term, EWIMS schools should see improved on-time graduation rates as a result of improvements in students’ progress. (Faria et al., 2017, p. 5)

Other studies have noted that implementation is critical to success. Bullmaster (2005), in her study of districtwide reform, offered this: “How change is put into effect determines how well it fares—the right reforms wrongly implemented will not accomplish intended goals”

Exhibit 18. The Early Warning Intervention and Monitoring System (EWIMS) Seven-Step Implementation Process (Faria et al., 2017, p. i).



What states do in working with districts and schools is critical to future success of on-time graduation efforts and early warning systems. According to Therriault (2015), there are several challenges and considerations with regard to implementing EWS:

- **Local control.** You can’t make districts and schools use the information. You can provide guidance, tools, and indicators. But you can’t force them to use them.
- **State and LEA capacity to use data and support the use of data in schools.** Schools have different levels of data access. For instance, while a school collects attendance data,

teachers may not be privy to that level of information. Conversely, some schools and teachers have very sophisticated understandings of and access to student data.

- **Availability and allocation of resources.** How are you going to use money, time, and people? EWSs takes all of these things put together. States can consider trying to engage schools and provide a funding stream to help create and implement. Schools need time to be able to look and analyze the data to take action. And it takes people. It adds on a role to an existing committee or to an individual, who then helps facilitate these discussions.
- **Dropout prevention may not be either a state or district priority.** Sometimes it is a state priority, sometimes a district, and sometimes neither.

This brief provides information on why a systems perspective is important for on-time graduation rate improvement. Using a system process helps organize teams while also alleviating additional pressures from the chaos of change management. In addition, this brief provides information on early warning systems, which remain a critical component of helping students graduate on time by providing early notification to instructional leaders about the progress of students so that they can, in turn, create interventions to bring students back on track.

Part IV: Engaging Improvement and Implementation Sciences in Systems Design to Improve On-Time Graduation

To increase on-time graduation rates for our most needy subgroups, we must improve how our systems function. A system’s performance is a result of its design and operation (Bryk et al., 2015). Work is needed to create a shared understanding of how systems work, where breakdowns occur, and what actions can be taken to improve overall performance.

What we know about effective systems and system improvement initiatives is often set aside when faced with the sense of urgency created by the persistence of a problem. A typical first approach to challenges is to immediately focus on solutions: "Have you reviewed What Works Clearinghouse? What did other districts do? What does the research say?" Ultimately, educators may cycle through multiple initiatives or “highly effective” programs that everyone in the system will use regardless of need. Educational interventions, programs, and curricula are selected without a clear, shared understanding of the “problem” to be solved and without attending to (a) what is needed to implement them well and support practitioners; and (b) intentional processes to optimize the environment in which they are implemented (Fixsen et al., 2005; Lyon & Bruns, 2019).

After years of improvement attempts, we have found that adding more people, tools, material resources, research-based programs, and perfect processes does not guarantee improvement but can contribute to system failure and, in many cases, result in additional problems (e.g., initiative fatigue, teacher burnout, and depleted resources, etc.). This can ultimately lead to poor student outcomes.

How Do We Design a System to Improve On-Time Graduation?

School leaders and practitioners can leverage the tenets of two fields of inquiry—*implementation science* and *improvement science*—to develop a system-wide framework empowering the system and supporting the implementation process so that every part of the system works effectively.

By focusing on the systems level, *improvement science* empowers educational leaders to actively identify change interventions that address the “problem” and ultimately change structures that perpetuate inequities for their children in the context of classrooms, schools, and districts. *Implementation science* complements improvement science by focusing on how innovation is put into practice and diffused throughout the system. Their common goals are to identify what works well for whom, under what conditions, and what is required to help equip people to perform better (i.e., resources, time, training, etc.), and their tenets offer guidance to address complex issues and yield the results hoped for without creating new problems.

Improvement Science

Improvement science refers to a methodology that uses cycles of inquiry to learn what is needed to improve practice (Bryk et al., 2015) and encourage schools to prioritize the most critical

challenges affecting student on-time graduation. This continuous process of inquiry is guided by three questions:

- What is the problem we are trying to address?
- What change ideas might we introduce and why?
- How will we know whether a change is an improvement?

Instead of adopting generic or one-size-fits-all solutions, educators using improvement science engage in a deliberate process to identify gaps and address root causes of specific issues related to students' on-time graduation. With accurate problem identification and prioritization, attention is directed to innovation and adaptation based on evidence-based practices to achieve improved outcomes and sustainable changes.

In [*Learning to Improve: How America's Schools Can Get Better at Getting Better*](#), Burk et al. (2015) translate the major ideas of improvement science to educational settings. Six key principles define the methodology and are foundational to the application of improvement science to the work of school improvement:

1. **Make the work problem-specific and user-centered.** It starts with a single question: “What specifically is the problem we are trying to solve?” This enlivens a co-development orientation and engages key participants early and often.
2. **Variation in performance is the core problem to address.** The critical issue is not what works but rather what works, for whom, and under what set of conditions. Aim to advance efficacy reliably at scale.
3. **See the system that produces the current outcomes.** It is hard to improve if you do not fully understand the problem. Go and see how local conditions shape work processes. Make your hypotheses for change public and clear.
4. **We cannot improve at scale what we cannot measure.** Embed measures of key performance indicators (KPIs) and processes to track if change is an improvement. Anticipate unintended consequences and measure these as well.
5. **Anchor practice improvement in disciplined inquiry.** Engage rapid cycles of Plan, Do, Study, Act (PDSA) to learn fast, fail fast, and improve quickly. That failures may occur is not the problem; that we fail to learn from them is critical.
6. **Accelerate improvements through networked communities.** Embrace the wisdom of crowds. We can accomplish more together than even the best of us can accomplish alone.

In short, improvement science is a comprehensive and systematic framework with processes and tools to unite system stakeholders toward a coherent theory of action for continuous improvement. The focus is a user-centered and problem-solving approach centered on continuous cycles of inquiry and learning-by-doing to determine what is needed to improve practice. Change ideas are tested in rapid cycles, enabling quick learning, nimble adjustments, and valuable feedback to help organizations build a shared understanding of how their systems work, where breakdowns occur, and what actions can be taken to improve overall performance.

Implementation Science

Implementation science is the scientific study of methods and strategies that support the uptake of evidence-based practices into regular use (Eccles & Mittman, 2006). Prior research has determined the alignment to principles of child and adolescent development and revealed evidence supporting the effectiveness of the intervention. Implementation science tends to focus on the conditions (contextual factors and methods of implementation) that support fidelity to evidence-based or evidence-informed practices to achieve an intervention's intended outcomes. For example, implementation science concentrates on the multiple decisions, actions, and corrections to change the structures and conditions necessary for adoption, application, and practice, leading to scale-up and sustainability of new practices and programs. This field of inquiry can help explain why only some education improvement efforts succeed and why only some improvements are sustained over time (Fixsen et al., 2013; Metz et al., 2020).

We can continue to research and develop evidence-informed practices, programs and policies, and implementation theories, frameworks, strategies, and tools, but until we get better at applying them in practice, outcomes will not improve (Metz et al., 2020, p. 3).

According to the National Implementation Research Network (NIRN), implementation is not an event but rather “a specified set of activities designed to put into practice an activity or program” (Fixsen et al., 2005, p. 6). These activities take intentional planning and time and occur over time in discernible stages that overlap and are revisited as needed. For example, there are times when an organization will move among stages due to changes in staff, funding, leadership, or unsuccessful attempts at employing the program or practice with high fidelity. NIRN defines four stages foundational to the application of implementation science to the work of school improvement:¹⁰

1. **Exploration** involves an assessment of the assets and needs of the focus population, the fit of the program or practice with those needs and assets, and the feasibility of implementation. At the exploration stage, activities lead to identifying the need for a new practice or structure to create readiness and buy-in. Teams would then select the intervention and decide whether to move forward with a particular practice.
2. **Installation** involves building the infrastructure necessary to implement the program or practice, including practitioner and organizational capacity. Installation activities may include acquiring or repurposing resources needed to implement the selected practice, such as identifying sources for training and coaching, providing initial staff training, finding or developing assessment tools, and providing access to needed materials, data systems, and equipment.
3. **Initial implementation** includes the initial efforts of staff to use the program or practice with attention to using data for continuous improvement. Teachers and staff are beginning to use agreed-on strategies or actions. NIRN described initial implementation as “the most fragile stage,” where the perseverance required to use new practices sometimes results in team

¹⁰ National Implementation Research Network (2020). [Implementation Stages Planning Tool](#). Chapel Hill, NC: National Implementation Research Network, FPG Child Development Institute, University of North Carolina at Chapel Hill.

members giving up and returning to the status quo. It is critical at this stage for the full and effective use of new practices to be supported and accomplishments celebrated.

4. **Full implementation** occurs when staff successfully use the program or practice and population-level outcomes are achieved. When the “new” practice becomes the standard practice or, more simply, how business is routinely done, teams have achieved full implementation status. According to NIRN, full implementation is reached when 50 percent or more of the team uses the practice as intended (i.e., with fidelity) and desired outcomes are realized.

Implementation science aims to study the adoption, application, and implementation strategies (e.g., training, coaching, teams, and leadership) to improve the integration of evidence-based interventions into real-world practice. Understanding the conditions for implementation, in context and practice, can support scaling and more sustainable outcomes.

How the Sciences Work Together for System Improvement: Commonalities and Differences

Although different methods frame the two sciences, they aim to use scientific methods to understand and explain system improvement. Researchers have examined the similarities and differences between improvement and implementation sciences in education (Bryk et al., 2015; Fixsen et al., 2005; Metz et al., 2020; Proctor et al., 2011). The findings indicate that with the common aim of understanding the conditions under which improved outcomes are achieved and sustained, implementation science and improvement science are inherently compatible frameworks. An emphasis on infusing a culture of inquiry and improvement in an organization and a de-emphasis on fidelity to or compliance with particular practices is what primarily distinguishes improvement science from implementation science. They share several common tenets and minimal differences. The following displays common focus areas and differences between the implementation and improvement sciences.

Commonalities in Improvement and Implementation Science

- Describe problems in terms of a gap or chasm between current student outcomes and desired outcomes and consider similar strategies to address the problems.
- Apply various analytical tools to analyze problems and processes to identify improvement efforts.
- Enhance the use (adoption, implementation, and sustainment) of effective practices or programs to improve outcomes for students (Proctor et al., 2011).
- Promote the use of data to assess their respective outcomes of interest. Like improvement science, implementation science emphasizes the importance of using data early and often (within iterative PDSA improvement cycles) to allow team members to adjust program components and/or implementation supports when initially developing an intervention when implementing an evidence-based intervention in a new context, and/or when implementing at scale.
- Address policy and practice simultaneously to ensure effective change throughout the entire system.

- Create networks for collaborative learning to ensure the voice and needs of teachers and experts in the field. Team structures provide opportunities for personal growth through problem-solving and collaborative thinking.
- Focus on the context. Both sciences recognize that evidence-based practices do not work the same way in all contexts or for all individuals.

Differences in Improvement and Implementation Science

- Implementation science tends to focus on the conditions that support fidelity to evidence-based programs or evidence-informed practices to achieve an intervention's intended outcomes. Consequently, long-term outcomes may not be evident until full implementation of an evidence-based intervention has been achieved, which could take two to four years (Fixsen et al., 2005). In contrast, improvement science aims to make improvements in outcomes rapidly—for example, over the span of 12 to 18 months—as they empower PDSA cycles of inquiry (McPherson et al., 2015).
- Improvement science aims to develop practice-based evidence in addition to evidence-based practice (Bryk et al., 2015). Educator action is valued and data is collected to determine the effectiveness of their practices to optimize students' learning outcomes.
- Improvement science is problem-specific and user-focused, while implementation science is context and practiced focused explaining why programs might work in one place but not another.
- Improvement science begins the inquiry process as soon as a viable intervention has been identified rather than developing formal implementation plans to outline each stage. This might be explained by the intentional use of PDSA testing designed to learn if a change improved the identified aim or outcome. The goal is to engage in rapid cycles of Plan, Do, Study, Act (PDSA) to learn fast, fail fast, and improve quickly. Implementation science acts under the premise that once a need for change or new practice has been identified, it is critical not to jump straight to implementation efforts. Proper planning and capacity-building upfront will not only save time but also increase the likelihood that the evidence-based practice will have a sustained impact on students, families, or the community.

Table 1. Comparison of areas of focus and main aims for implementation science and improvement science.

Areas of focus	Implementation Science	Improvement Science
Systematic study of practices to achieve improvements in outcomes	√	√
Local context	√	√
Real-world settings	√	√
Adaptation	√	√
Innovation	√	√
Intervention fidelity	√	
Implementation fidelity	√	√
Aims		

Bridging the gap between research (i.e., the evidence base) and practice	√	√
Developing the evidence base for evidence-based implementation practices	√	
Supporting and sustaining evidence-based practice outcomes	√	√
Building practice-based evidence		√
Achieving intended outcomes	√	
Achieving improved outcomes	√	√
Identifying mechanisms that support achieving improved outcomes	√	√
Identifying individuals for whom the intervention results in improved outcomes	√	√
Identifying the conditions under which improved outcomes are achieved	√	√
Achieving improvements in outcomes quickly (PDSA)		√

Adapted from Halle (2020).

What Do the Sciences Look Like in Practice to Address Issues Related to On-Time Graduation?

Research has revealed some system-wide interventions needed to improve high school graduation rates. These interventions address factors that lead students to drop out: student, family, school, and the larger community. Interventions include developing tracking systems to monitor academic success, attendance, and behavior; strategies to foster positive relationships; Freshman On-Track; and relevant academic programming, to name a few. What improvement and implementation science tenets should be leveraged to strengthen how the system functions to improve high school graduation? How have other districts used the sciences to improve programs and processes tackle improvement?

In 2016, The Baltimore City School District worked with the Mid-Atlantic Regional Educational Laboratory (REL) to develop an early warning system focused on attendance, behavior, and academic performance (factors that impact high school graduation).¹¹ Instead of adopting a generic or one-size-fits-all evidence-based program or solution, the district leaned heavily on the improvement science tenet: make the work problem-specific and user-centered. Schools were free to focus on their school's context to identify the problems and make changes. Three schools participated and change designs relied upon the insights of front-line workers' experiences. Schools were charged to go deep into the data and identify and prioritize problem areas to make tiny changes.

The use of implementation science was limited throughout their experiences. There was evidence of exploration as staff reviewed data and discussed possible problems to address; coaching staff

¹¹ REL Mid-Atlantic provided technical assistance to support the implementation of continuous improvement processes in three Baltimore City Schools. Sep 21, 2016 <https://www.youtube.com/watch?v=NytY0Vkglos&t=312s>.

was also used to support the school’s use of the process for continuous improvement efforts. Planning took place when the change idea had been tested, adapted, and was ready to scale up. The lack of implementation methods was named among the most significant challenges. For example, the Baltimore City School District had a robust data collection and management system that included early warning data around the ABCs of early warning systems—attendance, behavior, and course performance. Despite having a solid data management system, a major challenge to system improvement was revealed. Data use was based on the knowledge and functioning of school-level instructional leadership teams. Studying the data system from a user-centered focus of improvement science revealed that those who needed to use the data lacked adequate training to understand how to use the system, did not understand the purpose of the data, or found that the data was not in a usable format— all essential tenets of implementation science.

What follows are highlights from two schools captured through interviews conducted by the REL with school staff. The examples explain the problems the schools were trying to solve, some challenges, and lessons learned.

Example 1: Patterson High School

Patterson High School was concerned about course failure in algebra and English. With support from REL coaches, they were encouraged to think about the problem differently by looking at the data differently. They knew how to reference the data for accountability—for things like the number of kids failing courses or not showing up for school but did not access the data to guide improvement.

This data review process led them to discover that course failure resulted from kids being absent. They quickly moved to focus on attendance because of the relationship between chronic absenteeism and course failure, a contributing factor to student dropout.

They realized that data needed to be reported in a different format for this to happen. It was decided that they needed to develop a better tracking system for data collection to identify kids at risk of chronic absenteeism early in the school year, in September. The plan explained who would do the work, what data would be reviewed and with what frequency, and what they would do to understand why kids were absent. The revised data report was formatted differently so they could look at daily attendance by class. The work led them through a process of inquiry, and eventually, patterns emerged. Three major categories of attendance issues were identified: 1) students who were chronically absent—missing entire days of school; 2) students who were class cutting—going missing between their class periods; and 3) a subgroup of chronically-absent students—ESL students.

To better understand the problem, they conducted a root cause process, asking those “why” questions. Questions were developed to guide the teams in a **disciplined inquiry process**: Who are these kids? When are they absent? Why are they absent? They found that one student had an overall 78 percent attendance rate. However, during one class, the student’s attendance fell to 35 percent. That class happens to be the third class, not the first or last one. Through their change in process, they could sit down with the student to figure out the issue. The student struggles in his English class and does not want to go, so he hides. They found that ESL students have various

responsibilities at their jobs, homes, and many other distractors. Through the inquiry process, they identified real problems to address.

Challenges

- Getting buy-in from all the stakeholders—not just the principal, but also the administrative staff, teachers, and students.
- Part of their challenge was how to go into schools that are operating. Teachers already have all the concerns of just the daily work. How can teachers who are concerned about their next class also engage with this sustained ongoing process of thinking about improvement?
- The data system was inadequate to capture and report the data in a way we needed.

Lessons Learned:

- Improvement isn't as simple as it sounds, it can be messy and complicated. Think about the system that creates the problem, propose ideas, implement them, and see what happens. In practice, that is very hard to do.
- Data must be available to deeply engage people in asking tough questions to understand the problem before rushing to an intervention. The early identification of the real problem and working quickly to get to the root causes are essential for timely improvement. The perceived problem was course failure but the real problem was student attendance.
- Building “buy-in” from all participants is critical to the change process and to sustain the work. Teachers and administrators need to understand why the change is needed, how the change idea can work to solve the problem, and how the change ideas can help them do their job better. “Buy-in” can be supported when early wins are revealed. People can see that positive change is happening.

Example 2: Mergenthaler Vocational School

Mergenthaler Vocational School, or “MerVo,” started their journey with a problem of practice identified—violence among 9th-grade girls. Data revealed physical issues and physical fights had been happening over the past several years. It was not impacting girls in the 10th, 11th, or 12th grade, just 9th-grade students. Attendance was a byproduct of the physical issues and physical fights. It was unclear if girls feared coming to school, getting suspended for fights, or just not coming to school. The aim was to implement a change intervention to decrease the number of physical confrontations and fights amongst 9th-grade girls from last year to this year and, in turn, to see an improvement in student attendance.

Teachers and administration realized they lacked a good freshman transition approach to connecting these girls to the school community. There was no program to build relationships with the girls. Using a team approach consisting mainly of teachers, the team sat down and

discussed ways to address the problem and came up with a change idea to try. It is important to point out that this was not a top-down decision but from teachers of 9th grade girls.

The teachers and administrators did not seek out an evidence-based program to address their need, instead the idea emerged from their perceived need to create and foster positive relationships between students and teachers. A decision was made to create a mentoring program. Teachers and a small group of 9th grade girls would meet in small, personalized communities during “advisory class” (roughly 35 minutes every other week already in the school’s daily schedule). Each teacher who had agreed to participate in the change idea became the “mentor” to between 10 and 15 girls.

Without any change to the existing schedule, the teachers met with the girls twice a month to sit and discuss some issues that were taking place in their lives—at school, within their homes, and in the community. The implementation plan included support from the REI coach assigned to assist in the change idea—the mentoring program. She supported the team with communication, discussed how sessions were going, and monitored the attendance to see the correlation between attendance and fighting, as well as attendance and grades.

The results were encouraging. Fighting went from 20 fights over the past year to only one fight amongst two young ladies. Through the mentoring program, they could isolate some of the issues the young ladies were going through to address why they were fighting. Thus, the mentoring program was helping the girls by building relationships and providing them a space to discuss their issues. The freshman girls’ attendance improved, and the number of referrals for fighting decreased. Despite a lack of complete understanding of the mentoring intervention, the girls and the teachers had a good experience. The mentoring program would continue with some revision and perhaps take it from the 9th-grade teachers and do it in the 10th grade. Something consistent so our students see the support they get from their teachers.

Challenges

- The buy-in of both students and teachers was a challenge.
 - Some of the 9th-grade girls did not fully understand their commitment to the program resulting in limited participation.
 - Some teachers agreed to participate because of their strong relationship with the two teachers and the administrator who came up with the idea. With limited knowledge about the program’s outcome, their efforts to build relationships with the girls were inconsistent.
- There was not official implementation plan to guide their planning. The idea was to go for a semester but it lasted the entire year. Long-term planning was needed to develop topics and activities to connect and build off ideas from week to week and not just jump from one topic to the next. Lack of planning may have contributed to the girls’ and the teachers’ lack of buy-in.

Lessons Learned

- Better communication about the significance and purpose of program is needed.
- It is important to understand the systems in place and how change to one part of the system might impact another part of the system. Also, some parts of the system contribute towards a positive outcome to the change idea and others do not. For instance:
 - The school advisory, scheduled to meet twice per month, is embedded in the school schedule. The advisory period gets skipped if there is something happening in the school, like a pep assembly or testing,
- A method to include more people is needed. Some teachers and other adults supported the efforts and wanted to be a part of it but there was no way to include them after the groups were formed.
- For a system to work, every part of that system needs to be working towards yielding the desired results.

Summary

In summary, improvement and implementation sciences have been leveraged to increase students' academic, behavioral, and social-emotional outcomes. Moreover, schools can tailor improvement efforts to their specific needs, considering factors such as students' socioeconomic background, cultural context, and community dynamics. Improvement science recognizes the importance of context and the user-centered to promote a focus on the specific tasks people do, the processes and tools they use, and how prevailing policies, organizational structures, and norms affect how the system works. However, moving either practice-based or evidence-based practices into routine use is challenging without a viable plan for implementation and support (e.g., training, coaching, teams, and leadership). Furthermore, implementation science often starts with exploration activities, including identifying the need for a new practice or structures to support existing programs and creating readiness and buy-in. Schools and districts need to determine which tenets work best in their context, given the problem to be solved and the immediacy of the problem solution.

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