
Academic Preparedness in Tennessee



Spring 2009

Introduction to the Academic Preparedness Report

Are Tennessee students prepared for the future's high-growth, high-performance jobs? A recent report by the American Diploma Project Network stresses the link between a student's primary education, particularly in high-level math and science courses, and later success in college and the workforce.¹ With this critical need in mind, the Academic Preparedness Report was created as an individual guide to the math and science ACT achievement of students in Tennessee districts. While this report contains statewide information, districts received customized reports that also had their own district's data.

This report was prepared as a collaboration between the Tennessee Department of Education (TDOE) and SAS Institute Inc.* It is provided to districts as an information resource as they wrestle with the challenges of preparing students to be competitive in math and science in a global economy. The ultimate goal is to provide as many life choices for students as possible.

The annual ACT High School Profile Report provides varying levels of descriptive information from a single year snapshot of ACT results. It reports where students performed without knowing their earlier achievement. The Academic Preparedness Report seeks to enhance that snapshot with the benefit of longitudinal student level analyses. This report summarizes the likelihood of 2008 sixth grade students' future ACT success. Furthermore, it looks back in time from the 2008 ACT performance of the district's students to their performance as sixth graders. Thus, in the Academic Preparedness Report, Tennessee educators have both proactive and reflective assessments of students in their district.

More specifically, this report focuses on two analyses:

- Future ACT achievement in the state
- Previous ACT achievement in the state

The future ACT achievement section has two parts. First, it reports the number and percentage of 2008 sixth graders who have at least a 50% chance of reaching various levels of ACT achievement based on TVAAS student projections. The state-level predictions are shown on pages 2 – 3. Second, it reports the probability of reaching various levels of ACT achievement for 2008 sixth graders scoring at various levels within the TCAP Proficient level: low, middle and high. These probabilities are reported on pages 4 – 5.

The previous ACT achievement section compares 2008 ACT scores by district for all school districts in the state. The Academic Preparedness Report provides a mean district ACT score for students at four levels of sixth grade achievement. These district means are indicated on pages 7 – 10.

¹ Achieve, Inc., *Closing the Expectations Gap 2008* (Washington, D.C.: Achieve, Inc., 2008).

* SAS provides the TVAAS reporting for Tennessee's districts, schools, students and teachers. More data on ACT projections are available on the website, including ACT projections on individual students as early as fourth grade, which are updated annually with new data.

Future ACT Achievement Levels²

The future ACT projections were calculated for students who were sixth graders in the 2007 – 2008 school year.³ Using all their longitudinal TCAP data and assuming that each student will have a state average schooling experience in the future, all Tennessee students received an individual projection for their eleventh or twelfth grade ACT scores. From these TVAAS projections, it is possible to determine an estimate of how many students from in Tennessee have at least a 50% chance to reach various levels of ACT achievement at the end of their high school experience.

Projected Eligibility for Tennessee Hope Scholarships

ACT COMPOSITE 21

Projections	N	%
Statewide	29,574	42%

The Tennessee Hope Scholarships are available to in-state students who have a minimum ACT composite score of 21. Based on TVAAS projections, 42% of last year’s sixth graders in Tennessee (representing 29,574 students) have at least a 50% chance to reach the Tennessee Hope Scholarship cutoff score of

21.

Projected Eligibility for Freshman-Level Math

The Tennessee Board of Regents requires an ACT Math score of 19 to enroll in freshman-level math courses.⁴ Students who do not reach this score are required to take remedial math courses in college. Based on TVAAS projections, 55% percent of last year’s sixth graders in Tennessee (representing 38,693 students) have at least a 50% chance of reaching the TBR cutoff score of 19 in Math.

ACT MATH 19

Projections	N	%
Statewide	38,693	55%

² More information on college proficiency and ACT cutoffs is available in the TVAAS Resource Guide, which is available under the Help link online at <https://tvaas.sas.com/evaas/login.jsp>.

³ More information on projection methodology can be found in “Measurement of Academic Growth of Individual Students toward Variable and Meaningful Academic Standards,” which is available at www.sas.com/govedu/edu/wrightsandersrivers.pdf.

⁴ The University of Tennessee system does not use this cutoff.

Projected Success in College Math

ACT MATH 22

Projections	N	%
Statewide	18,975	27%

ACT research establishes cutoff scores for a 50/50 probability of an “A” or a “B” in freshmen courses at the average college or university in the country.⁵ For first-year college algebra, the cutoff score is an ACT Math score of 22 or higher. Based on TVAAS projections, 27% of last year’s sixth graders in Tennessee (representing 18,975 students) have at least a 50% chance of reaching the college algebra cutoff score.

ACT MATH 26

Projections	N	%
Statewide	3,089	4%

The average ACT Math score for Math, Science, Engineering and Technical field college graduates in Tennessee was 26.⁶ Based on TVAAS projections, 4% of last year’s sixth graders in Tennessee (representing 3,089 students) have at least a 50% chance of reaching this average.

Projected Success in College Science

The average ACT Science Reasoning score for all Tennessee Board of Regents and University of Tennessee System graduates was 21. Based on TVAAS projections, 39% of last year’s sixth graders in Tennessee (representing 27,382 students) have at least a 50% chance of reaching this average.

ACT SCIENCE 21

Projections	N	%
Statewide	27,382	39%

The ACT benchmark score for projected success in first-year college biology is an ACT Science Reasoning score of 24. Based on TVAAS projections, 12% of last year’s sixth graders in Tennessee (representing 8,674 students) have at least a 50% chance of reaching the college biology cutoff score.

ACT SCIENCE 24

Projections	N	%
Statewide	8,674	12%

⁵ ACT Assessment © 2001 Results, Summary Report, Tennessee, Table 5, page 7.













⁶ Math and science averages provided by Tennessee Higher Education Commission.

Projected Probability of ACT Achievement for Students at the Low, Middle and High Range of the Proficient Level

The second set of ACT projections also uses students who were sixth graders in the 2007 – 2008 school year. Using TCAP data from grades 3 through 6 for the math, reading and science tests and assuming that each student will have a state average schooling experience in the future, these projections provide the probability of reaching various ACT benchmarks in eleventh or twelfth grade for the average student in the state who consistently scored at either the low, the middle or the high range of the Proficient level.

ACT Math Achievement

The chart below provides the probabilities for ACT Math scores of 19, 22 and 26.

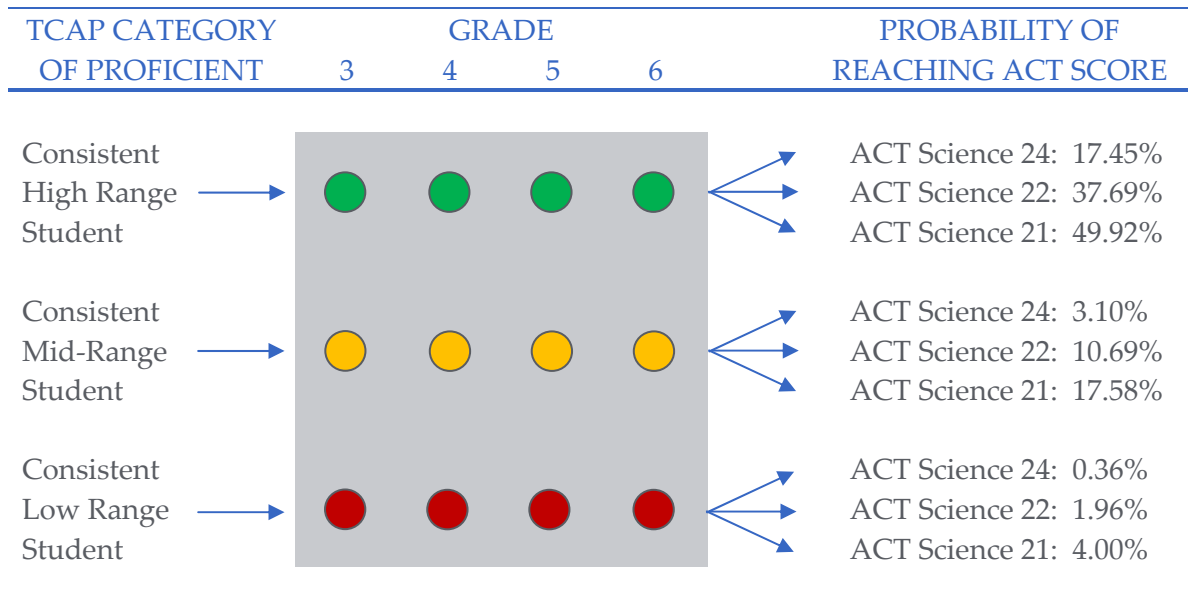
TCAP CATEGORY OF PROFICIENT	GRADE				PROBABILITY OF REACHING ACT SCORE
	3	4	5	6	
Consistent High Range Student					ACT Math 26: 2.62% ACT Math 22: 29.22% ACT Math 19: 69.07%
Consistent Mid-Range Student					ACT Math 26: 0.11% ACT Math 22: 4.65% ACT Math 19: 26.26%
Consistent Low Range Student					ACT Math 26: 0.10% ACT Math 22: 0.39% ACT Math 19: 5.32%

Interpreting the Diagram

As an example, a student who scores consistently at the high range of proficient on the TCAP tests will have a 69.07% chance of reaching 19 on the ACT Math test, a 29.22% chance of reaching 22 on that same test, and a 2.62% chance of reaching 26.

ACT Science Achievement

The chart below provides the probabilities for ACT Science scores of 21, 22 and 24.



Interpreting the Diagram

As an example, a student who scores consistently at the high range of proficient on the TCAP tests will have a 49.92% chance of reaching 21 on the ACT Science test, a 37.69% chance of reaching 22 on that same test, and a 17.45% chance of reaching 24.

Using the Projections

This graph may be useful to educators who are concerned with the college preparedness of students, even if they consistently score Proficient on TCAP tests and even if they consistently score at the highest levels of the Proficient range.

Previous ACT Achievement in Tennessee by District

The graphs on the following pages use ACT scores from students who graduated at the end of the 2007 – 2008 school year. In these calculations, the students were divided into statewide quartiles based on their *sixth* grade math or science scores. Students within a subject quartile were implicitly assumed to be at the same level of achievement relative to other students in the state when they were sixth graders.

Each dot represents a district mean for that quartile's ACT scores. Districts with higher scores for the indicated quartile appear to the left, while districts with lower scores appear to the right. In other words, students who attended districts to the left outperformed students who attended districts to the right when they took the ACT even though these students had comparable sixth grade achievement.

The horizontal lines across the graph represent key cutoff scores for Tennessee students. For math and science, the key cutoff scores are as follows:

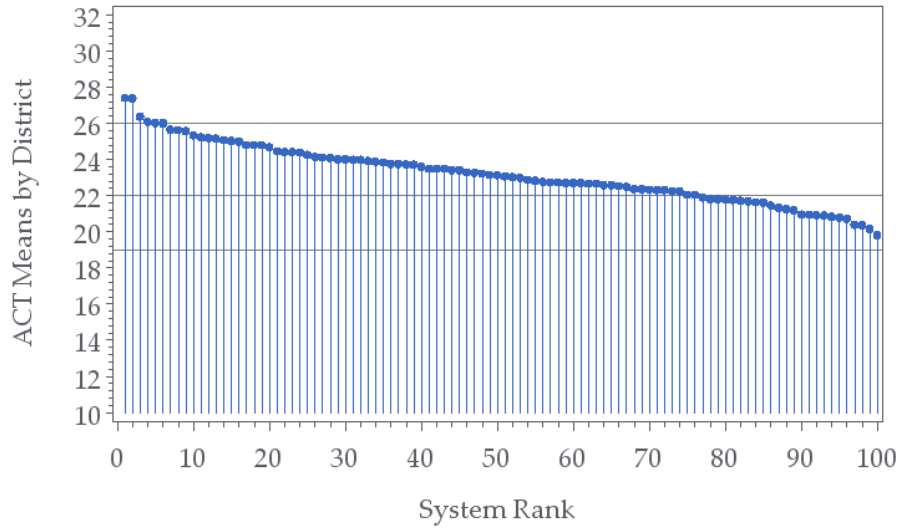
Math Score	Explanation
19	Minimum score to be exempt from mandatory remedial math for the Tennessee Board of Regents.
22	ACT cutoff score for a 50/50 chance of an "A" or a "B" in first-year college Algebra at the average college or university in the country.
26	Average ACT Math score for Tennessee Math, Science, Engineering, and Technical field college graduates.

Science Score	Explanation
21	Average ACT Science Reasoning score for all Tennessee Board of Regents and University of Tennessee System graduates.
22	Average ACT Science Reasoning score for Tennessee Board of Regents and University of Tennessee System <i>nursing</i> graduates.
24	ACT cutoff score for a 50/50 chance of an "A" or a "B" in first-year college biology at the average college or university in the country.

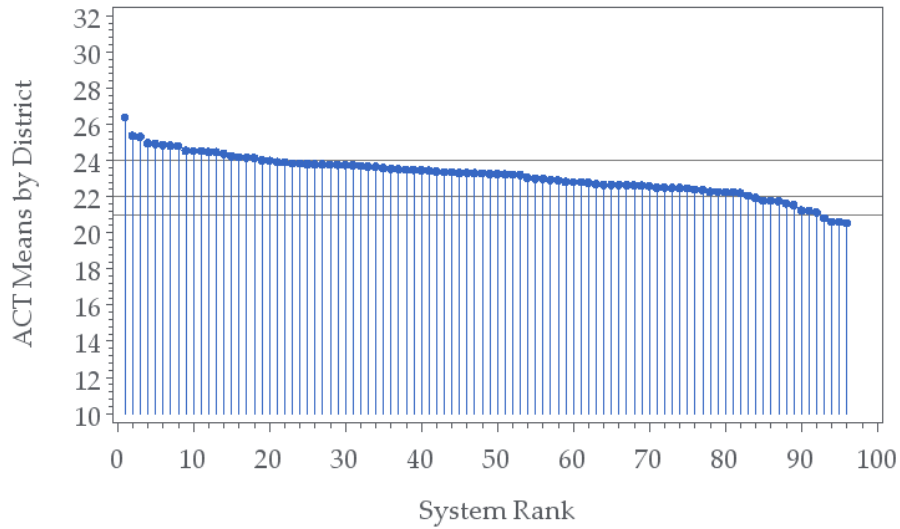
Average ACT Scores in 2008 by District for the Highest Achieving Sixth Graders in Math and Science

These two charts represent the average 2008 ACT scores by district of students who profiled in the top state quartile based on their sixth grade TCAP scores in math and science, respectively. The horizontal lines on each graph represent the key cutoff scores described on page 4.

Math Highest Quartile



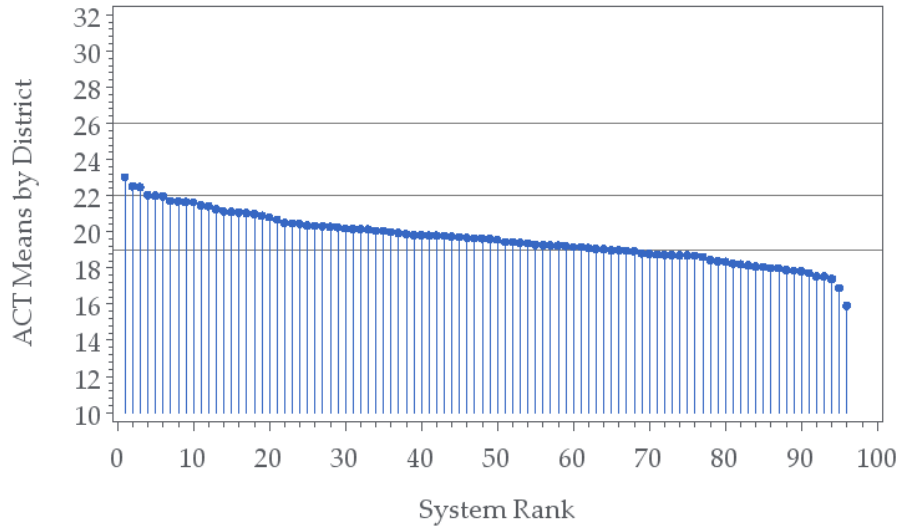
Science Highest Quartile



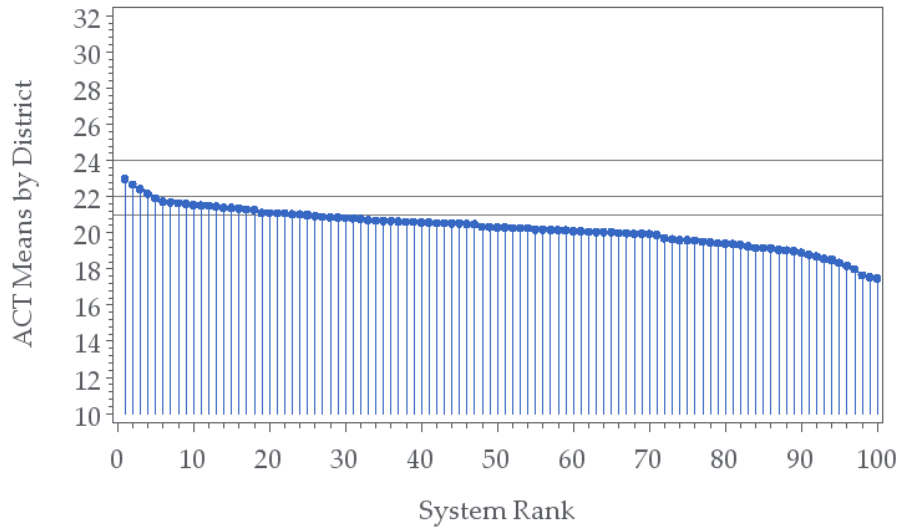
Average ACT Scores in 2008 by District for the Second-Highest Achieving Sixth Graders in Math and Science

These two charts represent the average 2008 ACT scores by district of students who profiled in the second-highest state quartile based on their sixth grade TCAP scores in math and science, respectively. The horizontal lines on each graph represent the key cutoff scores described on page 4.

Math Second-Highest Quartile



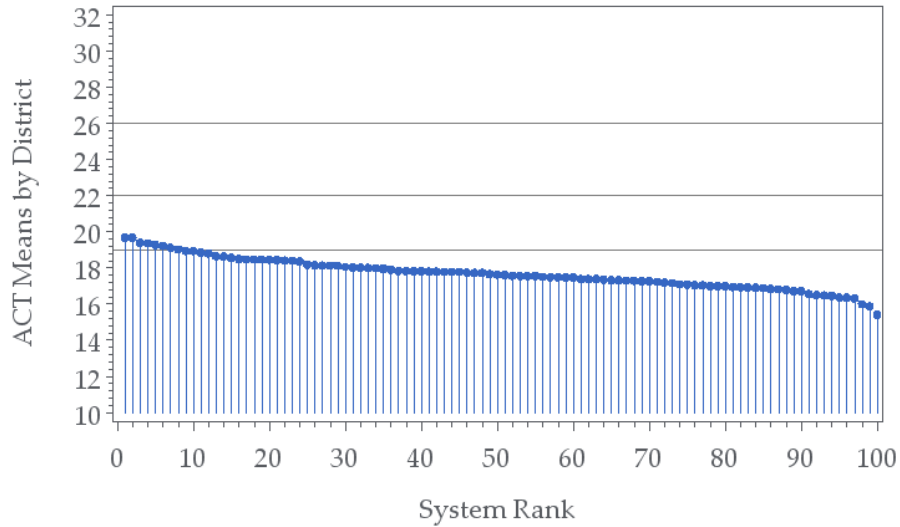
Science Second-Highest Quartile



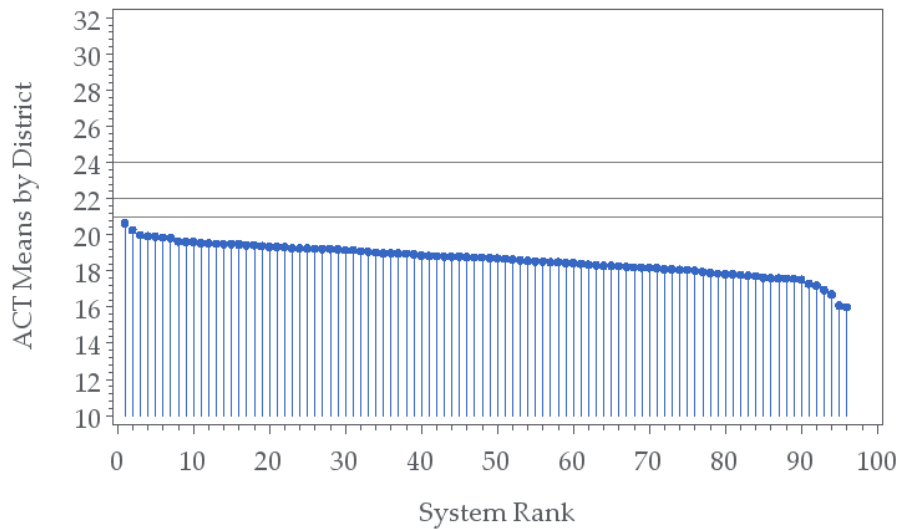
Average ACT Scores in 2008 by District for the Third-Highest Achieving Sixth Graders in Math and Science

These two charts represent the average 2008 ACT scores by district of students who profiled in the third-highest state quartile based on their sixth grade TCAP scores in math and science, respectively. The horizontal lines on each graph represent the key cutoff scores described on page 4.

Math Third-Highest Quartile



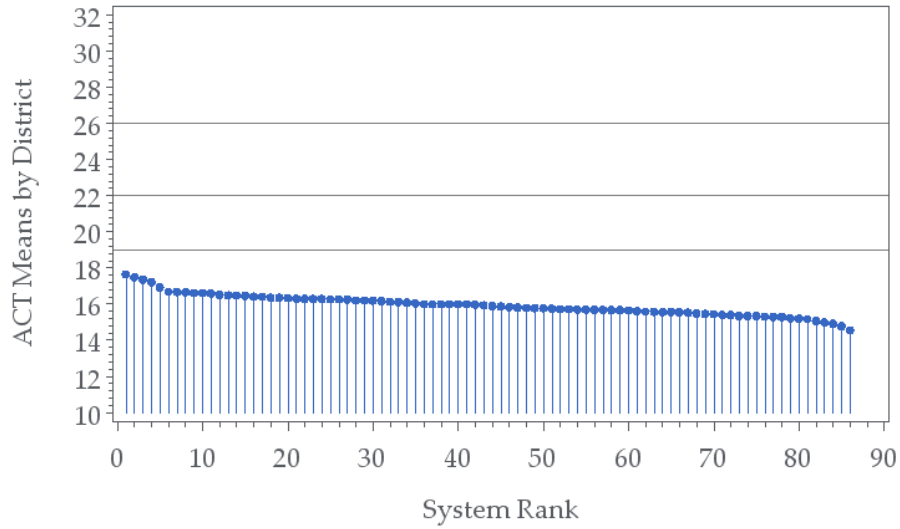
Science Third-Highest Quartile



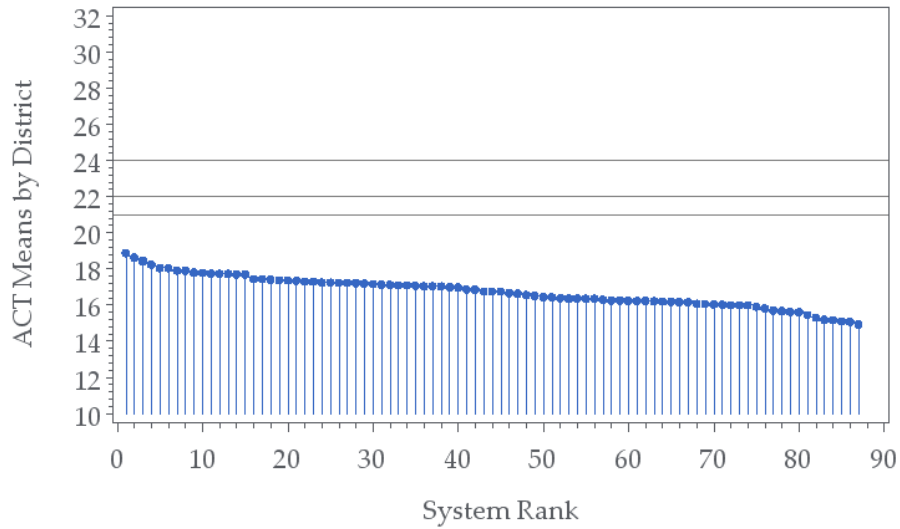
Average ACT Scores in 2008 by District for the Lowest Achieving Sixth Graders in Math and Science

These two charts represent the average 2008 ACT scores by district of students who profiled in the lowest state quartile based on their sixth grade TCAP scores in math and science, respectively. The horizontal lines on each graph represent the key cutoff scores described on page 4.

Math Lowest Quartile



Science Lowest Quartile



Recommendations

The Academic Preparedness Report of future and past ACT performance provides critical information on Tennessee's students. The variability of ACT scores among school districts, particularly in the top quartiles of sixth graders, is an indicator that children of similar early achievement may have fewer college options due to their district enrollment. Appropriate academic progress each year for students at all achievement levels is a worthy goal for districts that wish to increase their students' college opportunities.

The TVAAS website provides valuable diagnostic information for this purpose. Student projections for the ACT are available as early as fourth grade for Tennessee students and are refreshed each year, taking into account a student's newest test scores.

More specifically, the TVAAS restricted website has system, school and student level reporting for various tests, subjects, grades and student performance levels. This information can be very helpful in formulating strategies to improve effectiveness in districts. Potential strategies for this goal include:

1. Improving college readiness of students based on students' projected achievement levels to various college benchmarks to assess the necessary growth for preparedness.
2. Leveraging highly effective teaching, such as assigning students to teachers who have demonstrated teaching effectiveness for their previous achievement level.
3. Empowering highly effective teaching, such as pairing first-time teachers with a mentoring teacher who has demonstrated teaching effectiveness.
4. Anticipating staffing needs based on students' projected achievement levels, such as hiring additional Algebra I teachers for middle schools if more students are projected to be proficient in eighth grade.
5. Identifying district strengths and opportunities for improvement, such as identifying what accelerates the progress of more students towards proficiency without suppressing the growth of early high-achieving students.
6. Improving educational opportunities for all students by ensuring students at varying levels of previous achievement are making appropriate academic growth each year.
7. Identifying greatest areas of need for resource allocation, such as identifying and formulating academic plans for students projected to be at-risk for graduation.

Formulating and implementing these strategies could be enhanced by the following reports available through the TVAAS website:

Strategy	Potential Support for Strategy
1, 2, 4, 7	TVAAS custom student reports of individual student projections
3, 4, 5	TVAAS feeder pattern reports
1, 2, 4, 6, 7	TVAAS individual student projections
2, 3, 6	TVAAS school diagnostic report
5, 7	TVAAS school performance diagnostic report
2, 3, 7	TVAAS school value-added summary
5, 6, 7	TVAAS system diagnostic report and summary report
5, 7	TVAAS system performance diagnostic report and summary report
5, 6, 7	TVAAS system progress reports
2, 3, 5, 7	TVAAS system value-added summary

Tennessee administrators have another information resource available to them. Although not discussed in this summary, TVAAS teacher reporting provides additional insight into educational effectiveness. Appropriate use of teacher results could leverage teaching effectiveness for more students.

TDOE offers several options for training in TVAAS as well as the Tennessee Teacher Effect. Such training is available free of charge to educators and administrators across the state and can be customized to meet the specific needs of certain groups of educators. Administrators can request TVAAS/Teacher Effect training for their system or school by completing an Assessment Literacy Request Form at www.state.tn.us/education/assessment/literacy.shtml.

Additionally, TDOE has partnered with the Tennessee Education Association (TEA) in order to provide even more opportunities for TVAAS training to Tennessee educators. As an additional resource to educators in your district, TEA offers an introductory workshop on TVAAS to provide educators with the basic knowledge and understanding of TVAAS. The session includes an introduction on how to utilize the TVAAS restricted Web site and is appropriate for teacher of grades 3- 12. Information can be found at www.teateachers.org.

Although Tennessee was the first state in the country to demonstrate the importance of effective teaching for students, those early research findings have been replicated by many.⁷ The challenge that policy makers face is twofold:

- Ensuring a more equitable distribution of Tennessee’s teaching talent⁸
- Improving the preparation of beginning teachers

⁷ See for example: Sanders, William L. and June C. Rivers. “Cumulative and Residual Effects of Teachers on Future Student Academic Achievement,” Research Progress Report by the University of Tennessee Value-Added Research and Assessment Center, November 1996.

⁸ See for example: Tennessee Department of Education. “Tennessee’s Most Effective Teachers: Are they assigned to the schools that need them most?” Research Brief March 2007.

This challenge, and the others cited in this summary, can be addressed through the resources described in this section. These resources, available at the district, school, teacher and student level, can aid educators with the preparation of their students for college and beyond.



References

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