

## Measuring Critical Thinking Skills in WCPSS: An Update with 2017-18 Data



Haigen Huang, Ph.D.  
Data, Research, and Accountability Department  
September 2018



## Introduction

In a global economy, stakeholders need to keep themselves well-informed in terms of how their local schools perform when compared with schools across the country and around the world. In doing so, they will be able to consider how well their schools are doing in a larger context and identify strengths as well as areas to target for improvement. Although countries organize education in different ways, since 2000 the Organization for Economic Co-operation and Development (OECD) has provided a tool—the Program for International Student Assessment (PISA)—to compare 15-year-old students’ performance in science, mathematics, and reading every three years. In 2015, more than a half-million students from 72 countries participated in PISA, including the United States (OECD, 2016a). Since spring 2014, a small number of WCPSS students have participated annually in a school-based version of PISA.

In addition to national and international comparisons across science, mathematics, and reading, understanding how well WCPSS students are prepared in skills such as problem-solving, scientific reasoning, and critical thinking is essential. Standardized assessments typically given in North Carolina (such as End-of-Grade and End-of-Course exams) do not measure these types of skills. WCPSS has recently implemented high school level assessments, including College and Work Readiness Assessment (CWRA+), designed to measure the critical thinking skills students need to be ready for college, career, and citizenship, which are at the heart of our school district’s Vision 2020.

CWRA+, developed by the Council for Aid to Education (CAE), measures students’ skills in problem-solving, scientific reasoning, and critical thinking through performance tasks and

items that require scientific and quantitative reasoning, critical reading and evaluation, and critique of an argument. WCPSS high schools participate in the CWRA+ every other year with half testing in the even-numbered years, and the other half in odd-numbered years.

This report answers two questions: How do WCPSS high schools do compared with the U.S. national and international averages? Also, how well are WCPSS students prepared for problem-solving, scientific reasoning, and critical thinking? In answering these questions, the first part of this report focuses on PISA and the second on CWRA+.

## What is PISA and what does it measure?

PISA is a computer-based assessment of science, mathematics, and reading. PISA measures how well 15-year-old students around the world apply what they learned to unfamiliar settings under the rationale that “modern economies reward individuals not for what they know, but for what they can do with what they know” (OECD, 2016b, p.3). Since 2000, OECD has published PISA international and national reports every three years. The latest OECD results were published in 2016 based on assessments completed in 2015.<sup>1</sup> Samples of 15-year-olds from WCPSS participated in a school-based version of PISA from 2017 through 2018. Five different schools participated each year (see Table 1).

## How well did WCPSS do on PISA?

**Overall, WCPSS students out-performed both the U.S. national and international averages in each core subject across the two years except in 2017 reading and science.** For example, compared with the 2015 U.S. averages, WCPSS 2018 PISA performance was higher by 32 points in

<sup>1</sup> PISA results are usually published one year after the assessments are completed because it takes a year for OECD to analyze and develop the reports.



mathematics, by 7 points in reading, and by 8 points in science. Compared with the 2015 international averages, WCPSS schools in 2018 performed better by 12 points in mathematics, 11 points in reading, and 11 points in science (Figure 1).

### What is CWRA+ and what does it measure?

According to the CAE, CWRA+ is an assessment of how well students are prepared to think critically and how capable they are in innovative ideas and problem solving when encountering complicated situations (CAE, 2016). Each student participating in CWRA+ is expected to complete two components in the assessment—a performance task and a selected-response question section (CAE, 2015). A typical performance task gives a scenario and provides related documents such as regulations, policies, and data reports. Students are expected to complete the task presented in the scenario by making use of the related documents. Selected-response items cover *Scientific and Quantitative Reasoning*, *Critical Reading and Evaluation*, and *Argument Critique* (CAE, 2015). A sample assessment can be found on the CAE website.<sup>2</sup> CAE also creates a composite score combining both the performance task score and selected-response score for each student.

### How well did WCPSS students do on CWRA+?

At the district level, 1,570 high school juniors participated in the assessment in spring 2018. **Overall, 51% of the students performed at a proficient level or above** (Figure 2). Figure 3 provides the percentage of scores that fell in each performance level.

WCPSS juniors' overall performance<sup>3</sup> in CWRA+ (composite score) was lower than the

averages of freshmen and seniors in the national CWRA+ sample. But there was a disparity between the performance task and selected-response items. In the selected-response section, WCPSS juniors' performance was near the midpoint between the national averages of freshmen and seniors; in the performance task, the WCPSS juniors' scores were lower than the freshman national average (Figure 4).

Because of the descriptive nature of the CWRA+ data, the reason WCPSS students performed lower in the performance task than the national average remains unknown. Discussions regarding this question among parents, teachers, and administrators could help identify helpful practices.

This report aims to open discussions on how teaching can best develop students' critical thinking and problem-solving skills. As WCPSS schools are committed to the Strategic Plan—Vision 2020, promotion of critical thinking and problem-solving skills will continue.

### References

- CAE. (2015). CWRA+ high school sample assessment. Retrieved from <http://cae.org/education-professionals/k12-faculty-or-administrator/cwra-sample-instrument/>
- CAE. (2016). CWRA+ Student Guide. Retrieved from <http://cae.org/students/high-school-student/what-is-cwra/>
- Organization for Economic Co-operation and Development. (2016a). *PISA 2015 results: Excellence and equity in education*. Paris, France: OECD Publishing.
- Organization for Economic Co-operation and Development. (2016b). *PISA 2015: Results in focus*. Paris, France: OECD Publishing.

<sup>2</sup> CAE. (2015). CWRA+ high school sample assessment. <http://cae.org/education-professionals/k12-faculty-or-administrator/cwra-sample-instrument/>

<sup>3</sup> The WCPSS students who participated in CWRA+ were juniors.



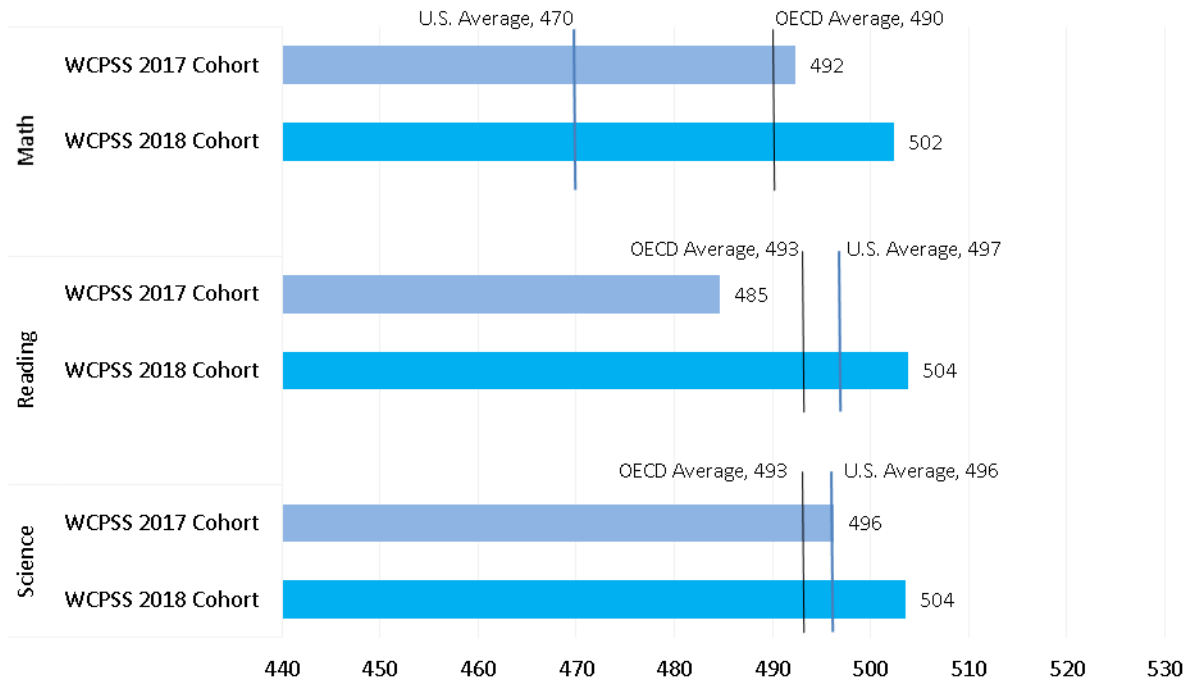
**Table 1**  
***WCPSS Students' PISA Average Scale Scores by School***

School Name	Year Tested	Number of Students Tested	Reading	Math	Science
Apex Friendship HS	2016	73	528	534	533
Apex HS	2015	54	539	538	539
	2017	72	505	521	529
Athens Drive HS	2016	66	515	502	504
Broughton HS	2015	67	500	498	513
Cary HS	2016	73	502	499	516
East Wake HS	2018	71	410	397	417
Enloe HS	2014	57	532	534	538
Fuquay-Varina HS	2017	73	476	491	481
Green Hope HS	2014	56	541	548	553
	2018	71	566	572	553
Heritage HS	2014	51	487	471	492
	2018	83	484	497	494
Holly Springs HS	2014	41	530	512	526
Knightdale HS	2015	55	446	440	451
Leesville Rd HS	2018	64	537	541	530
Middle Creek HS	2015	37	550	513	542
	2018	73	528	511	527
Panther Creek HS	2014	72	508	511	526
Rolesville HS	2016	71	482	475	492
Sanderson HS	2017	71	504	515	526
Southeast Raleigh HS	2017	72	450	442	453
Wake Forest HS	2017	74	488	493	494
Wakefield HS	2015	76	517	504	515

Note: Data from 2014 to 2018 are displayed to show the change over time if a school participated more than once.



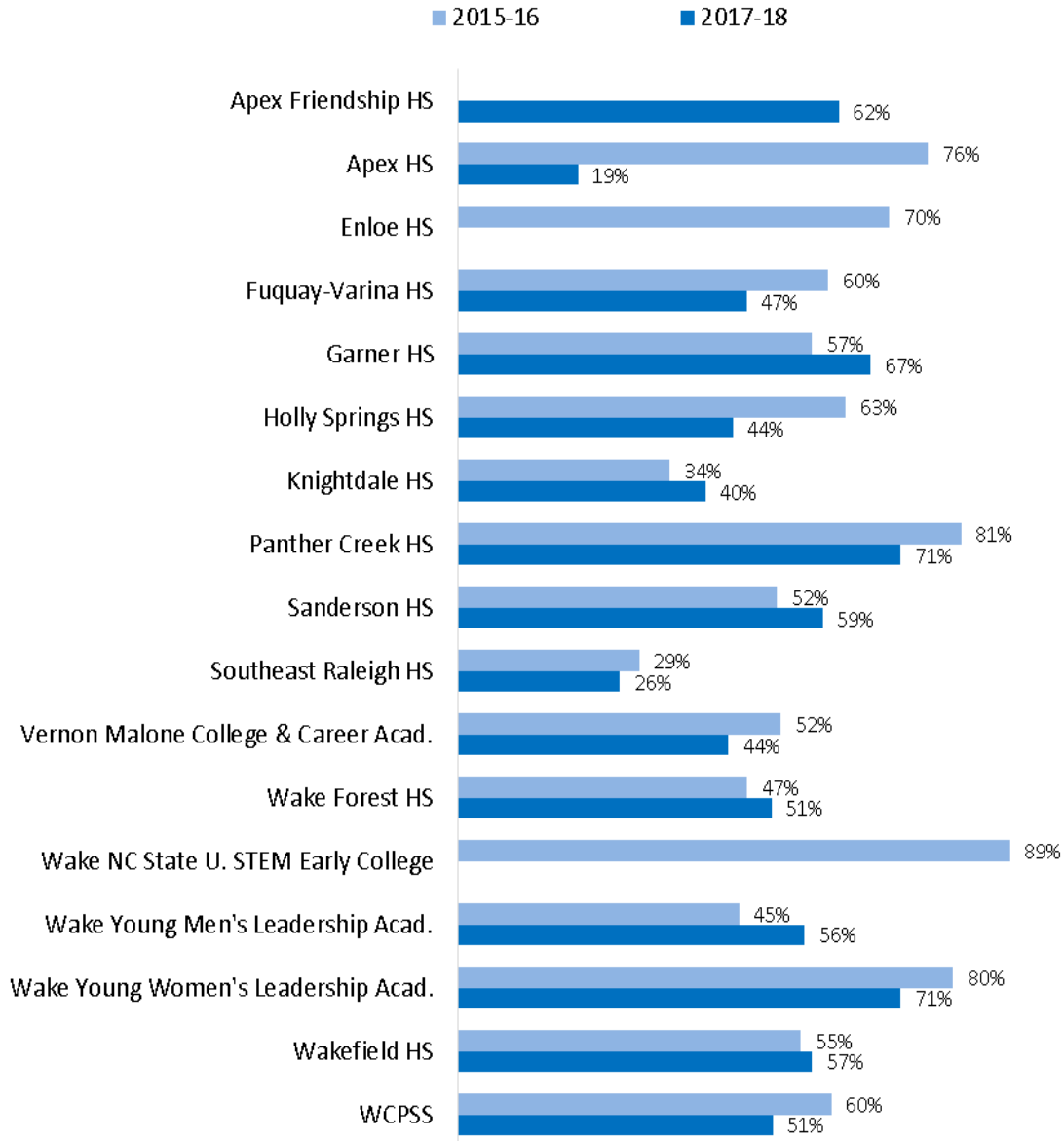
**Figure 1**  
*WCPSS Students' PISA Average Scale Scores in Comparison with the National and International/OECD Average*



- Note: 1. 2017 schools were Sanderson HS, Southeast Raleigh HS, Apex HS, Wake Forest HS, and Fuquay-Varina HS; 2018 schools were East Wake HS, Green Hope ES, Leesville Rd HS, Heritage HS, and Middle Creek HS.
2. The U.S. and international averages of PISA are announced once every three years; the most recent was from 2015; OECD has not published the PISA averages for 2018.



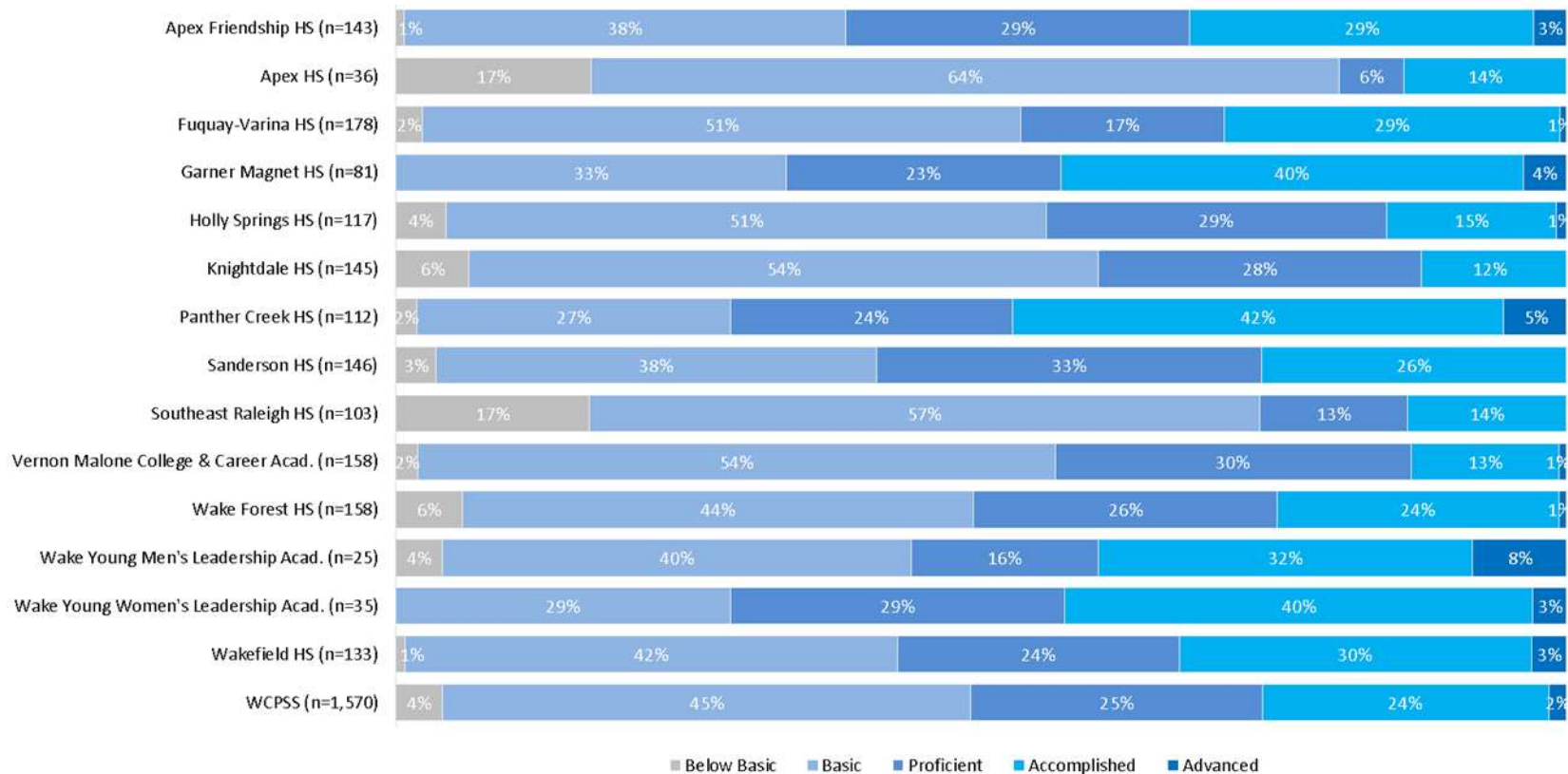
**Figure 2**  
*Percentage of Students Proficient or Above in CWRA+ Overall Score, Spring 2016 and 2018*



Note: "Proficient," "Accomplished," and "Advanced" are considered to be proficient or above. The 2015-16 data are included to show the change over time for schools that participated in both years.



**Figure 3**  
*WCPSS Student Performance in CWRA+ Overall by Proficiency Level, Spring 2018*



Note: "Proficient," "Accomplished," and "Advanced" are considered to be proficient or above. In spring 2018 1,891 WCPSS juniors participated in the CWRA+ assessments but only 1,570 had a valid composite score.



**Figure 4**  
*WCPSS Juniors' CWRA+ Assessment Performance Compared to the Averages of National Sample, Spring 2018*

