



cwra+

National Results, 2016 -17

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INTRODUCTION

The College and Work Readiness Assessment (CWRA) was launched in 2006 as a high school version of the Collegiate Learning Assessment (CLA), a major initiative of CAE (the Council for Aid to Education). Since then, the CLA and CWRA have offered institutions a valuable measure of their contributions—or value added—to students' attainment of higher-order skills. The assessment requires students to analyze, evaluate, and synthesize information as they demonstrate their ability to think critically and solve problems. To date, hundreds of institutions and hundreds of thousands of students have participated in these testing programs.

In 2013, CAE introduced CWRA+, an enhanced version of the assessment that includes new subscores, criterion-referenced mastery levels, and reliable information about performance at the student and institutional levels.

Advancing beyond a growth-centered model, CWRA+ is designed to measure critical thinking and written communication—key higher-order skills that are valued by both secondary and higher educational institutions, as well as by employers. CWRA+ provides students with reliable evidence that they have these skills and to what degree they possess them.

METHODOLOGY

THE INSTRUMENT

CWRA+ includes two major components: the Performance Task (PT) and the Selected-Response Question (SRQ) section.

The **Performance Task** presents students with a real-world scenario that requires a purposeful written response. Students are asked to address an issue, propose a solution to a problem, or recommend a course of action to resolve a conflict. Students are instructed to support their responses by using information provided in the CWRA+ Document Library. This repository contains a variety of reference materials, such as technical reports, data tables, newspaper articles, office memoranda, and emails. A full PT includes four to nine documents in its Document Library. Students have 60 minutes to complete this constructed-response task.

Student responses to the PT are scored in three skill areas: Analysis and Problem Solving, Writing Effectiveness, and Writing Mechanics. Students

Higher-order skills are a necessity for navigating and excelling in today's complex, new Knowledge Economy. Employers overwhelmingly report valuing employees who exhibit strong critical-thinking and written-communication skills (Hart Research Associates, 2013). Correspondingly, students who excel in the areas measured by CWRA+ have been shown to experience greater success in their careers (Arum & Roksa, 2014).

CWRA+ enables schools to identify areas of strength and weakness so they can improve their teaching and learning processes and ultimately graduate students who are prepared to succeed in the collegiate arena and in the workplace. Concurrently, CWRA+ provides graduating students with the tools to stand out in a competitive college application market by highlighting key skills for academic and professional success.

This report summarizes the performance of the **105** secondary institutions and **11,922** students who participated in the 2016-2017 academic year of the CWRA+.

receive subscores based on the CWRA+ rubric, which range from 1 to 6, for each skill category based on key characteristics of their written responses. These characteristics are described in detail within the PT rubric, which is available on CAE's website at www.cae.org/cwraptrubric. PT subscores are then summed to yield raw total PT scores, which are then scaled and equated so that all scores are comparable regardless of which PT was administered. This process, which is accomplished via a linear transformation, puts the PT scores on a scale with an approximate mean of 1000 and standard deviation of 200.

In the second section of the examination, students are asked to answer 25 **Selected-Response Questions**. Like the PT, the 25 SRQs require students to draw information from provided materials. Students have 30 minutes to complete this section of the assessment. Each of three question sets represents a skill area: Scientific and Quantitative

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Reasoning (10 questions), Critical Reading and Evaluation (10 questions), and Critique an Argument (five questions).

The SRQ section is scored based on the number of correct responses that a student provides. Each set of questions is scored separately and then equated via a linear transformation. This process puts the three SRQ subscores on approximately the same scale as each other and as SRQs given previously, and results in an approximate score range of 200 to

800 for each section, with approximate mean and standard deviation of 500 and 100, respectively. A total SRQ score is created by taking a weighted average of the equated SRQ subscores, with weights corresponding to the number of questions in the subset.

In addition to receiving scores for each of the two sections of the assessment, students receive total scores, which are simply the average of the PT and SRQ scores.

Table 1A. CWRA+ Student Sample Characteristics, by Sector

SCHOOL CHARACTERISTIC	NATION		CWRA+	
	PUBLIC	PRIVATE	PUBLIC	PRIVATE
ALL STUDENTS	93% (100%)	7% (100%)	38% (100%)	62% (100%)
RACE/ ETHNICITY				
American Indian / Alaska Native / Indigenous	1% (1%)	0% (0%)	1% (3%)	1% (1%)
Asian (including Indian subcontinent and Philippines)	5% (5%)	<1% (6%)	4% (11%)	9% (14%)
Native Hawaiian or other Pacific Islander	0% (0%)	<1% (1%)	<1% (1%)	<1% (<1%)
African American / Black (including African and Caribbean), non-Hispanic	15% (16%)	1% (9%)	5% (13%)	4% (7%)
Hispanic or Latino	21% (23%)	1% (10%)	7% (20%)	4% (6%)
White (including Middle Eastern), non-Hispanic	49% (53%)	5% (71%)	16% (44%)	41% (66%)
Other / Decline to State	2% (2%)	<1% (3%)	3% (8%)	4% (5%)

Note: Percentages outside of parentheses correspond to national or CWRA+ totals. Percentages in parentheses correspond to national or CWRA+ totals within the public or private sector. For example, 16% of all CWRA+ students covered by this report are White and attend public school, but 44% of all public school students covered by this report are White.

Sources: The Elementary/Secondary Information System (ELSi), an NCES application that provides data from the Common Core of Data (CCD) and Private School Survey (PSS). Data in this table only include schools serving at least grades 9-12. Accessed June 14, 2016.

INSTITUTIONAL AND STUDENT SAMPLE

Participating schools are individually responsible for student sampling and recruitment. Guidance is available from CAE on strategies for achieving a representative sample. It is recommended that schools test at least 100 students, or 25% to 50% of the population size, for each class level tested. Smaller high schools typically use a census sampling approach.

Student-level demographic data suggest that schools are fairly successful at recruiting

representative samples. CWRA+ students are representative of their peers nationally in terms of race/ethnicity (see Table 1A).

At the institutional level, the sample of participating institutions is more heavily represented by private schools (70%) than is the nation as a whole (24%). The high schools comprising the CWRA+ sample are, however, fairly representative of institutions within sectors. The exception is CWRA+ schools are larger, on average, than high schools nationally.

Table 1B. CWRA+ Institutional Sample Characteristics, by Sector

SCHOOL CHARACTERISTIC		NATION		CWRA+	
		PUBLIC	PRIVATE	PUBLIC	PRIVATE
ALL INSTITUTIONS		76% (100%)	24% (100%)	30% (100%)	70% (100%)
CHARTER		6% (8%)	--	9% (29%)	--
MAGNET		2% (3%)	--	1% (3%)	--
TITLE I ELIGIBLE		38% (51%)	--	13% (47%)	--
RELIGIOUS AFFILIATION	Non-Sectarian	--	7% (27%)	--	45% (64%)
	Catholic	--	3% (14%)	--	7% (10%)
	Other	--	14% (59%)	--	18% (26%)
SCHOOL TYPE	Regular	56% (74%)	19% (79%)	26% (87%)	63% (90%)
	Career/Technical/Vocational	3% (4%)	0% (0%)	0% (0%)	0% (0%)
	Montessori	--	0% (1%)	--	2% (3%)
	Special Education	4% (5%)	2% (10%)	0% (0%)	1% (1%)
	Special Program Emphasis	--	1% (3%)	--	2% (3%)
	Alternative/Other	13% (18%)	2% (7%)	4% (13%)	2% (3%)
MEDIAN ENROLLMENT (GRADES 9-12)		222	42	577.5	281
MEAN PUPIL-TO-TEACHER RATIO		15:1	10:1	18:1	8:1
MEAN PERCENTAGE NON-WHITE STUDENTS		43%	29%	46%	36%

Note: Percentages outside of parentheses correspond to national or CWRA+ totals. Percentages in parentheses correspond to national or CWRA+ totals within the public or private sector. For example, 9% of all institutions covered by this report are charter schools, but 29% of all public schools covered by this report are charter schools.

Sources: The Elementary/Secondary Information System (ELSi), an NCES application that provides data from the Common Core of Data (CCD) and Private School Survey (PSS). Data in this table only include schools serving at least grades 9-12. Because all schools did not report on every measure in the table, the averages and percentages may be based on slightly different denominators. Accessed June 14, 2016.

MASTERY LEVELS

CWRA+ Mastery Levels contextualize CWRA+ scores in relation to the qualities exhibited by examinees. There are five mastery levels: Below Basic, Basic, Proficient, Accomplished, and Advanced. The full standard-setting report can be found at http://cae.org/images/uploads/pdf/cwra_ss.pdf.

Each mastery level corresponds to specific evidence of critical-thinking and written-communication skills. While the profiles of all five mastery levels can be found in Appendix B, the two most prominent mastery level profiles from the 2016-17 testing administration are highlighted here.

Students scoring at the Proficient Mastery Level have shown that they are able to extract the major

Students scoring at the Basic Mastery Level provide evidence of a discernable and relevant attempt to analyze the details of the PT and demonstrate that they are able to communicate in a manner that is understandable to the reader. Students with Basic Mastery also show some judgment about the quality of evidence provided in the Document Library.

In addition, students scoring at the Basic Mastery Level know the difference between correlation and causality, and they can read and interpret a bar graph—but not necessarily a scatterplot or regression analysis. Tables may also be out of reach for Basic Mastery Level students.

relevant pieces of evidence provided in the Document Library and develop a cohesive argument

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and analysis of the PT. Proficient Mastery Level students are able to distinguish the quality of evidence in these documents and express the appropriate level of conviction in their conclusion given the provided evidence. Additionally, Proficient Mastery Level students are able to suggest additional research or consider counterarguments.

Students at this level can correctly identify logical fallacies, accurately interpret quantitative evidence, and distinguish the validity of evidence and its purpose. Likewise, they have the ability to determine the truth and validity of an argument. Students at this level also recognize when a graph or table is applicable to an argument.

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SUBSCORES

Student responses to the [Performance Task](#) are scored in three skill areas: Analysis and Problem Solving, Writing Effectiveness, and Writing Mechanics. These subscores are assigned values ranging from 1 to 6, with those values determined according to specific response characteristics outlined in the CWRA+ Performance Task Rubric (see Appendix C).

EFFECT SIZES

To estimate growth in critical-thinking and written-communication skills across high school, CAE calculates [effect sizes](#) for participating schools. Effect sizes characterize the amount of growth in CWRA+ scores that is evident across classes. This is done by relating the performance of the freshman

STATISTICAL METHODOLOGY

Most of the results reported here are comparisons of different groups of institutions on mean freshman and senior CWRA+ test results and effect sizes. To determine which comparisons are statistically significant, independent-samples *t*-tests (yielding a *t*-statistic and *p*-value) are used to compare two groups and one-way analyses of variance (ANOVAs; yielding an *F*-statistic and *p*-value) are used to compare three or more groups. As a general rule, *p*-

Subscores for the [Selected-Response Question](#) section represent three additional skill areas: Scientific and Quantitative Reasoning (10 questions), Critical Reading and Evaluation (10 questions), and Critique an Argument (5 questions). Because some question sets may be more difficult than others, the subscores for each category are adjusted to account for these differences and reported on a common scale. Score values range from approximately 200 to 800 for each SRQ section.

class to that of the sophomore, junior, and senior classes. Effect sizes are calculated by subtracting the mean scores of the freshmen from the mean scores of the seniors, and dividing the result by the standard deviation of the freshmen scores. Effect sizes are reported in standard deviation units.

values less than .05 ($p < .05$, $p < .01$, or $p < .001$) are considered statistically significant and indicative of substantively meaningful findings. Any *p*-values greater than .05 indicate that any observed differences between groups are not great enough to indicate substantively meaningful differences (i.e., the results could have been obtained simply by chance).

2016-17 CWRA+ RESULTS

INSTITUTION-LEVEL CWRA+ SCORES

The institutional mean freshman CWRA+ score for public schools was 923, indicating Basic Mastery of the skills measured by CWRA+. The institutional mean senior CWRA+ score for public schools was 982, indicating Proficient Mastery of the skills measured by CWRA+.

Private institutions had higher mean scores. The institutional mean freshman CWRA+ score for private schools was 1053, indicating Proficient Mastery of the skills measured by CWRA+. The institutional mean senior CWRA+ score for private schools was 1129, indicating Accomplished Mastery of the skills measured by CWRA+.

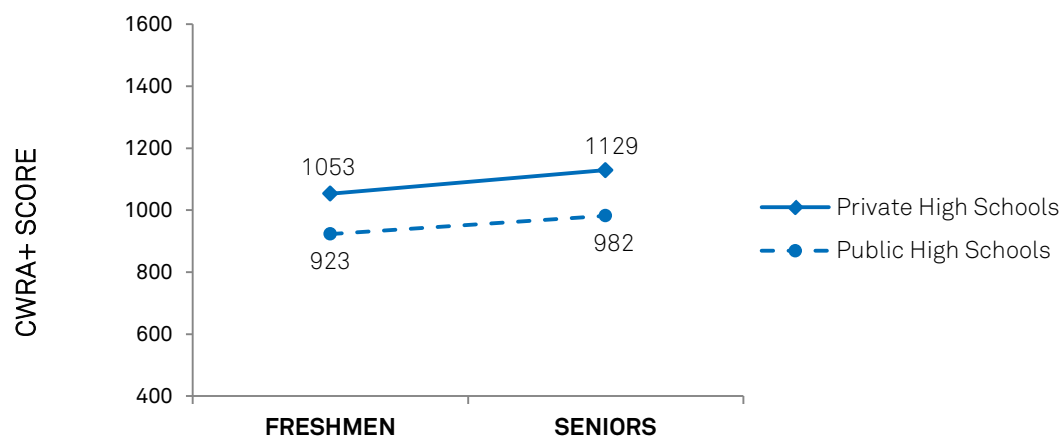


FIGURE 1. Change in Average Institutional CWRA+ Score, by Sector

There were only very minor differences due to geographic region, either for freshmen at public schools [$F(3,26) = 2.06, p = .13$], for seniors at public schools [$F(3,17) = 0.79, p = .52$], for freshmen at private schools [$F(3,64) = 0.35, p = .79$], or for seniors at private schools [$F(3,37) = 0.25, p = .86$]. These results indicate that any differences seen on

average between different regions within any of the four previously mentioned groups (class crossed with sector) are too small to indicate that differences are truly present in the population. Table 2 summarizes differences in average institutional score by each of the previously discussed institutional characteristics.

TABLE 2. Average Senior CWRA+ Performance by Sector and School Characteristic, 2016-17

INSTITUTIONAL CHARACTERISTIC	PUBLIC HIGH SCHOOLS			PRIVATE HIGH SCHOOLS		
	N	Mean Score	SD	N	Mean Score	SD
All Institutions	21	982	116	41	1129	86
Region						
Northeast	1	--	--	9	1141	106
Midwest	7	987	121	3	1146	16
South	6	934	113	16	1115	75
West	7	998	119	13	1135	97

Note: Because data are not available for all institutions, the sample sizes for a given institutional characteristic may not sum to the same N as the overall number of CWRA+ institutions.

STUDENT-LEVEL CWRA+ SCORES

There was more substantial variation in scores due to student-level factors than due to institution-level factors (see Table 3).

On average, females scored significantly higher than males, both among freshmen [$F(2,7368) = 31.128, p < .001, \eta^2 = .01$] and seniors [$F(2, 3838) = 36.04, p < .001, \eta^2 = .02$]. However, effect sizes indicate that these differences were not practically meaningful.

Primary language made a small difference in scores among freshmen [$t(7369) = 9.81, p < .001, \text{Cohen's } d = .33$], and a medium difference among seniors [$t(3839) = 11.23, p < .001, \text{Cohen's } d = .50$]. Both freshmen and seniors scored higher if they spoke English as a first language. These differences were

most notable among public school freshmen and private school seniors.

CWRA+ results also show performance differences across racial and ethnic groups as well, among both freshmen [$F(7,7363) = 123.09, p < .001, \eta^2 = .10$] and among seniors [$F(7,3833) = 55.54, p < .001, \eta^2 = .09$]. Among freshmen, the major differences in performance were that Asian students scored highest, followed by White students, and that African American and Hispanic students almost always scored on average lower than other races or ethnicities. There was a similar pattern among seniors, except that White students outperformed Asian students as well. These differences were substantially smaller among private school students

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than among public school students, for freshmen and seniors alike.

Parental education levels were similarly associated with CWRA+ performance among both freshmen [$F(4,7061) = 318.59, p < .001, \eta^2 = .15$] and seniors [$F(4,3784) = 173.03, p < .001, \eta^2 = .15$]. Both students whose parents had obtained less than a high school

diploma and those whose parents had graduated from high school were outperformed by peers whose parents had reached higher levels of education. After high school, each additional level of parent education was associated with an increase in CWRA+ score. This trend held for both freshmen and seniors.

TABLE 3. Senior CWRA+ Performance by Sector and Demographic Characteristic, 2016-17

DEMOGRAPHIC CHARACTERISTIC	PUBLIC HIGH SCHOOLS			PRIVATE HIGH SCHOOLS		
	N	Mean Score	SD	N	Mean Score	SD
All Seniors	1295	1032	181	2546	1140	162
Transfer Status						
Transfer Student	76	1048	156	232	1079	175
Non-Transfer Student	1219	1031	183	2314	1146	160
Gender						
Male	644	1027	186	1137	1107	170
Female	618	1035	177	1368	1168	150
Decline to State	33	1059	185	41	1144	173
Primary Language						
English	1038	1039	182	2206	1154	157
Other	257	1003	174	340	1051	168
Race/Ethnicity						
American Indian / Alaska Native / Indigenous	10	879	165	11	1159	123
Asian (including Indian Subcontinent and Philippines)	236	1113	153	382	1101	175
Native Hawaiian or other Pacific Islander	5	1008	251	16	1033	189
African-American / Black (including African and Caribbean), non-Hispanic	194	952	171	142	1064	174
Hispanic or Latino	230	927	147	169	1118	152
White (Including Middle Eastern), non-Hispanic	526	1078	179	1686	1161	153
Other	40	980	125	67	1087	185
Decline to State	54	1036	187	73	1143	178
Parent Education						
Less Than High School	88	902	131	26	1017	125
High School	219	940	152	111	1045	165
Some College	265	980	154	196	1086	162
Bachelor's Degree	307	1058	173	773	1123	155
Graduate or Post-Graduate Degree	383	1137	167	1421	1169	158

Note: Table includes students with missing information on other demographic characteristics.

MASTERY LEVELS

More than 500 (40%) of the exiting public high school students tested during the 2016-2017 academic year were non-proficient in CWRA+ skills—scoring at or below the Basic Mastery Level. Another 21% scored at the Proficient Mastery Level, with 39% of public school seniors exhibiting Accomplished Mastery or Advanced Mastery of critical-thinking and written-communication skills, as measured by CWRA+.

Exiting public school seniors scored on average 1032, corresponding to a Proficient Mastery Level.

Across private school seniors testing in 2016-17, over 2,000 (84%) were at least Proficient in CWRA+ skills—scoring either at or above the Proficient Mastery Level. A total of only 15% scored at the Basic Mastery Level, while <1% of seniors scored at the Below Basic Mastery Level. Another 51% scored at the Accomplished Mastery Level and the final 13% scored at the Advanced Mastery Level.

Exiting private school seniors scored an average of 1140, corresponding to an Accomplished Mastery Level.

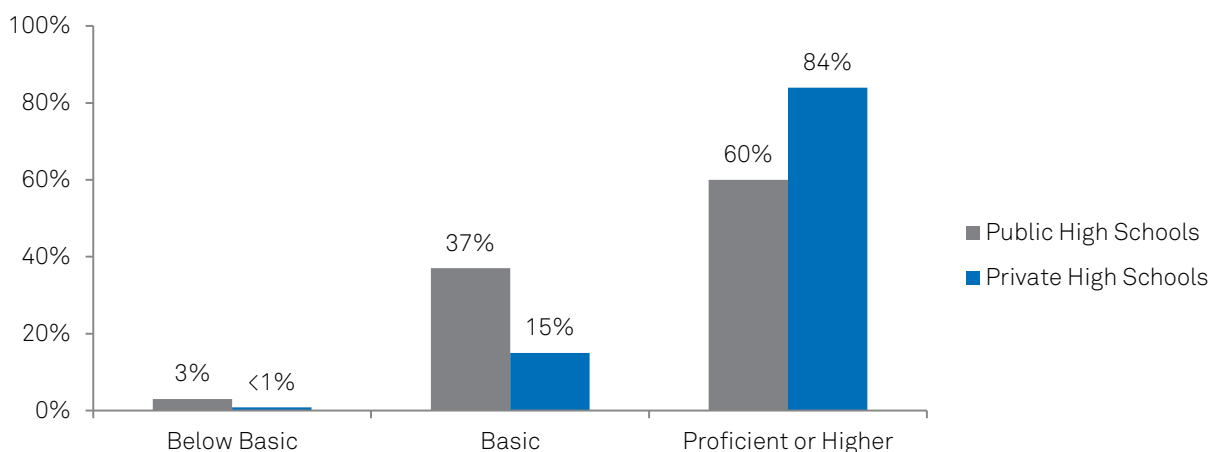


FIGURE 2. Distribution of Seniors' CWRA+ Mastery Levels, by Sector

SUBSCORES

The average PT subscores for freshmen at public schools were 2.9 for Analysis and Problem Solving (APS), 2.9 for Writing Effectiveness (WE), and 3.3 for Writing Mechanics (WM). These scores improved to senior averages of 3.3, 3.3, and 3.7 for APS, WE, and WM, respectively. Among private schools, the average PT subscores for freshmen were 3.4, 3.5, and 3.8 for APS, WE, and WM, respectively. These scores improved to senior averages of 3.8, 3.9, and 4.2 for APS, WE, and WM, respectively.

The average SRQ subscores for freshmen at public schools were 461 for Scientific and Quantitative Reasoning (SQR), 485 for Critical Reading (CRE), and 466 for Critique an Argument (CA). These scores improved to senior averages of 481, 529, and 497 for SQR, CRE, and CA, respectively. Among private schools, the average SRQ subscores for freshmen were 515, 543, and 515 for SQR, CRE, and CA, respectively. These scores improved to senior

averages of 532, 588, and 543 for SQR, CRE, and CA, respectively.

EFFECT SIZES

Effect sizes characterize the amount of growth in CWRA+ scores that is evident across classes, in standard deviation units (see Figure 4). The effect size for the average CWRA+ institution in 2016-17 was 0.61, which represents nearly two-thirds of standard deviations of improvement from freshman to senior year. Taking into account school sector, the average effect size for public schools was 0.44, while the average for private schools was 0.70. By this estimate, private schools demonstrated about 1.5 times the growth from freshman to senior year as did public schools, relative to their own freshman classes.

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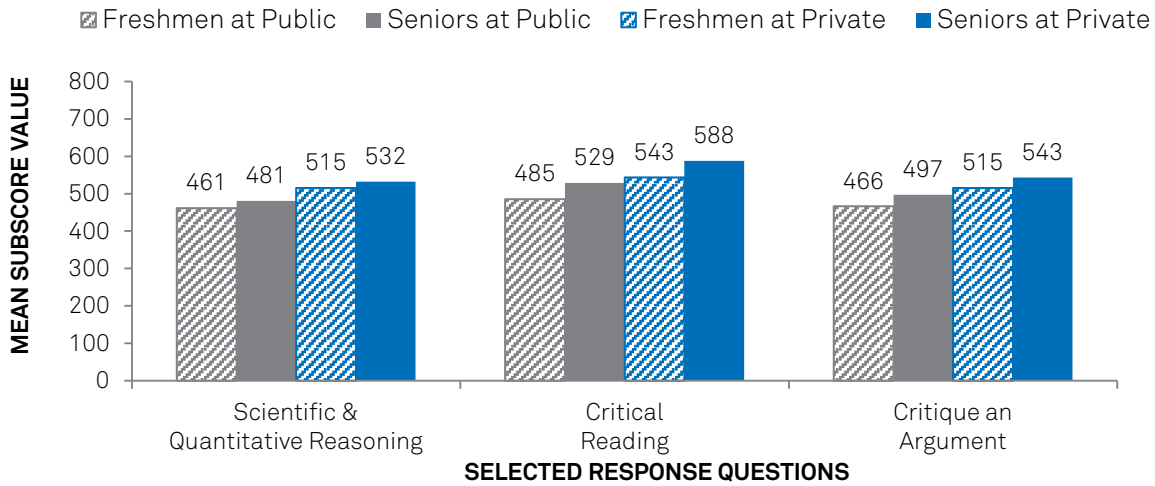
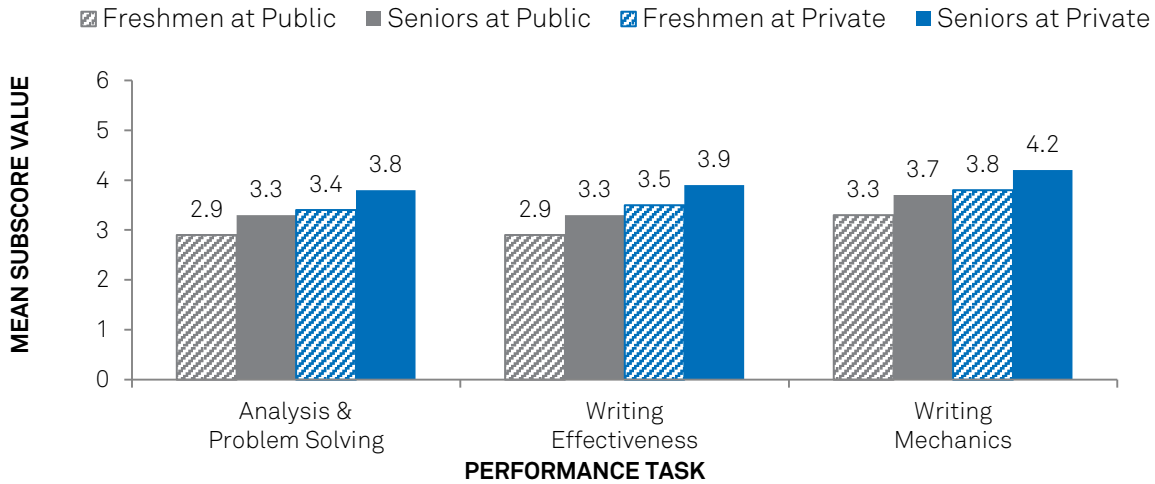


FIGURE 3. Average CWRA+ Subscores, by Class and Sector

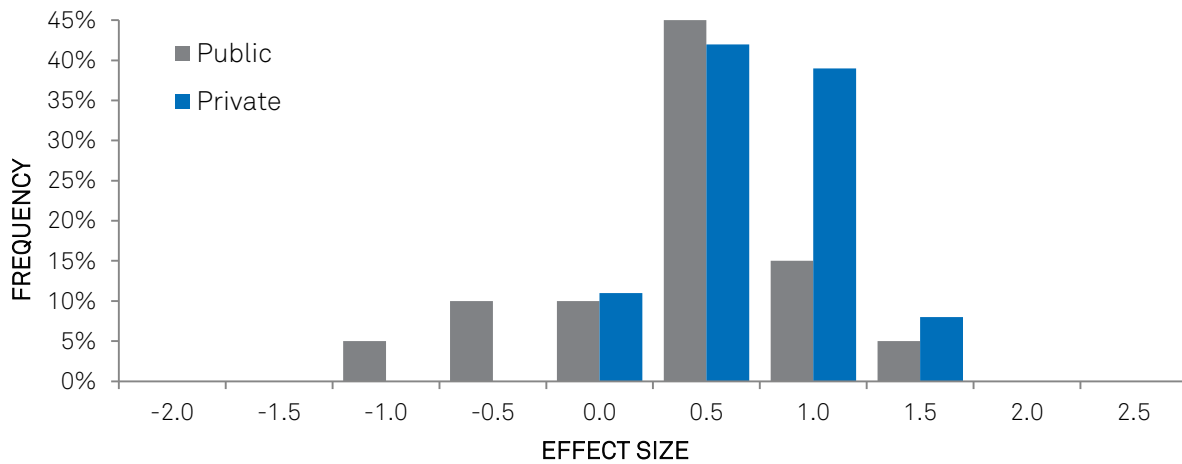


FIGURE 4. Distribution of Institutional Effect Sizes, by Sector

Note. Plot includes only schools with at least 10 freshmen and 10 seniors.

CONCLUSION

The comparison among private and public institutions of secondary education shows that the current sector demographics of CWRA+ institutions are not representative of the national sector demographics. While public schools make up 76% of the nation's institutions of secondary education, 30% of the current CWRA+ institution sector demographic is made up of public schools. Where the national percentage of private schools falls near 24%, the current CWRA+ institution sector demographic consists of 70% private schools. Charter schools and magnet schools are also more prevalent in the CWRA+ public institutional sample compared to the national public institutional sample. Non-sectarian private schools are twice as prevalent in the CWRA+ private institutional sample as they are in the national private institutional sample, and regardless of sector, CWRA+ institutions have much higher median enrollment numbers than the national norms.

However, while the results of this summary report may not necessarily be indicative of what CWRA+ results may look like across the entire nation, as the institution population grows, keeping track of and publishing the results only lends to paint a clearer picture of where secondary institutions lie within the United States in terms of students' critical-thinking abilities.

Within the current CWRA+ sample there are clear and distinct differences both across all institutions and within sectors. Also, within each sector, when broken down into different groups, there are comparisons that can be made which also lend insights into where there are areas of weakness and strength in terms of critical-thinking ability. By using our calculated estimate of growth, we also see that a majority of institutions across all sectors have demonstrated growth in this area over time and that some groups have shown more or less growth than others.

Although there is a large overall difference between the distribution of mastery levels between public and private institutions, both sectors show growth between freshman and senior years with respect to this outcome. And although private schools in the CWRA+ institutional sample performed better than public schools, seniors on average scored higher than freshmen in both sectors. Clearly, both sectors experience growth between freshman and senior years, and various measures included in this report serve to highlight the ways that public and private institutions differ from each other as well as the similarities that they share.

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Hart Research Associates. (2013). It takes more than a major: employer priorities for college learning and student success. Liberal Education, 99.

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U.S. Department of Education National Center for Education Statistics "Private School Universe Survey (PSS)" 2011-12.

APPENDIX A: LIST OF PARTICIPATING INSTITUTIONS, 2016-17

The schools listed below in alphabetical order constitute the sample of institutions testing CWRA+ students that have agreed to be listed. To view a list of currently participating schools, please visit <http://www.cae.org/images/uploads/pdf/cwraschoollist.pdf>.

CWRA+ Schools

Alexander Dawson School	Forsyth Country Day School, High School
All Saints Academy	Fountain Valley School of Colorado
American Canyon High School	Gilmour Academy
Anson New Technology High School	Greensboro Day School
Applied Technology Center	Heathwood Hall Episcopal School
Archmere Academy	Hebron Academy
Areté Preparatory Academy	Holy Family Academy
Arkadelphia High School	IDEAS Academy
Asheville School	Illinois Mathematics and Science Academy
Barrie School, High School	Kimball Union Academy
Battle Mountain High School	Lakeland High School Leading EDGE
Beacon Academy	Logan View High School
Belleville New Tech	Los Angeles School of Global Studies
Blue Ridge School	Marist School
Blue Ridge Virtual Governor's School	Mary Institute Country Day School
Bosque School	Maryknoll School
Brimmer and May School, High School	McKinley Academy
Brooks School	Menlo School
Catalina Foothills High School	Metairie Park Country Day School
Charles R. Drew Charter School	Moorestown Friends School
Christchurch School	Mount Vernon Presbyterian School
Collegiate School	New Technology High School
Colorado Academy, High School	Norfolk Collegiate School
Compass Academy	North Shore Country Day School
Cougar New Tech	Pacific Buddhist Academy
Cross County High School	Parish Episcopal School
Crystal Springs Uplands School	Pomfret School
Culver Academies	Principia Upper School
Currey Ingram Academy	Rising Tide Charter Public School
Da Vinci Charter Academy	Riverdale Country School
Design Tech High School	Robinson School, High School
Dwight-Englewood School	Roland Park Country School
Eagle Rock School & Professional Development Center	Sacramento New Technology High School
Eagle Valley High School	Sage Hill School
Emma Willard School	Saint Mary's School
Étude High School	Salem Academy
Farmington High School	Sanford School

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Seacrest Country Day School, High School
Severn School
Sioux Falls New Technology High School
Sonoma Academy
South Bronx Community Charter School
St. Andrew's School
St. Anne's-Belfield School
St. Christopher's School
St. George's Independent School
St. Mark's School
Stuart Country Day School
Tabor Academy
Tech Valley High School
The Chapin School
The Colorado Springs School
The Gregory School
The Hill School

The Lovett School
The Salisbury School
The Taft School
The Webb School
Tilton School
Tower Hill School
Trinity School of Durham and Chapel Hill
Ursuline Academy of Dallas
Viking New Tech
Virginia Episcopal School
Warrior Tech Academy
Westtown School
Wildwood School
William Smith High School
Worcester Academy, High School
York School

APPENDIX B: CWRA+ MASTERY LEVELS

SETTING STANDARDS FOR CWRA+

Following the creation of CWRA+, a standard-setting study was conducted to establish fair and defensible levels of mastery for the new and improved assessment. This formal study was held at CAE headquarters in New York City on December 13, 2013. A two-step, follow-up study was conducted in November 2014 to establish the cut score for the Accomplished student, an additional level of mastery for the CWRA+. Fifteen distinguished panelists, representing a variety of K-12 and higher education sectors, were invited to participate. The table below lists each panelist.

During the initial standard-setting study, panelists defined descriptions of four mastery levels: Below Basic, Basic, Proficient, and Advanced. Panelists returned in November 2014 to define a fifth level of mastery—Accomplished—using the same methods.

Their discussions were based on the CWRA+ scoring rubric as well as the knowledge, skills, and abilities required to perform well on CWRA+. The purpose of this activity was to develop consensus among the judges regarding each mastery level and to create a narrative profile of the knowledge, skills, and abilities necessary for CWRA+ students.

During subsequent rating activities, panelists relied on these consensus profiles to make item performance estimates. Judges broke into three groups of four, and each group evaluated characteristics related to one mastery level. The groups then reconvened and reported their findings to the group at large so they could form final consensus on student performance at each of the mastery levels.

CWRA+ Standard-Setting Study Participant List and Institutional Affiliation

PARTICIPANT	INSTITUTION
Mark Battersby	Capilano University (Canada)
Ray Bryant	Warwick Valley School District
Paul Carney	Minnesota State Technical and Community College
Peter Gow	Beaver Country Day School
John Gulla	E.E. Ford Foundation
Bonnie Hain	Baltimore County School District
Jonathan Martin	Independent Consultant
Syna Morgan	Douglas County School District
Andrew Niblock	Greenwich Country Day School
Dominic Randolph	Riverdale Country School
Drew Schrader	New Tech Network
Tyler Thigpen	Mount Vernon Presbyterian School
Amada Torres	National Association of Independent Schools
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CWRA+ MASTERY LEVELS

CAE uses outcomes from the 2013 and 2014 standard-setting studies to distinguish between CWRA+ students with varying knowledge, skills, and abilities as measured by the assessment. On

individual reports, mastery levels are determined by students' Total CWRA+ scores. On institutional reports, they are determined by each class level's mean Total CWRA+ score.

Institutions should not use mastery levels for purposes other than the interpretation of test results. If an institution wishes to use the attainment of CWRA+ Mastery Levels as part of a graduation

requirement or the basis for college entrance decisions, the institution should conduct a separate standard-setting study with this specific purpose in mind.

The following table summarizes each level of mastery and provides a description of students below the Basic level of mastery.

Student Levels of Mastery Profiles

LEVEL OF MASTERY	PROFILE
BELOW BASIC	Students who are below basic make severe errors that are frequent and often interfere with meaning. Students write simple sentences and some non-sentences.
BASIC	<p>Students at the basic level create responses that state or imply a decision, conclusion, or position and provide some analysis that may be minimal, inaccurate, or irrelevant. A basic student would provide an argument with some supporting information from sources and an attempt to cohesively organize that argument. Yet, the elaboration is limited and the organization lacks sufficient cohesion and clarity. For the basic student, severe errors are infrequent, but there are minor errors that sometimes interfere with meaning. The basic student also writes sentences that are similar in structure and length, with an overreliance on sentences with simple structure. The basic student draws obvious inferences from sources, rarely recognizes relevant information, and takes all information at face value.</p> <p>Analysis and Problem Solving and Writing Effectiveness are more important than Writing Mechanics in making the cut score decision.</p>
PROFICIENT	<p>Students at the proficient level have the ability to make inferences from the document and provide some support for their position but may omit some evidence. They address most elements of the task although sometimes tangentially. Students make a few accurate claims about the quality of evidence while citing the evidence provided in the documents. However, their responses may have a few misinterpretations of the information and evidence provided in the documents.</p> <p>The students at this level are writing generally understandable sentences with minor errors and use the conventions of standard written English. The student responses are communicated in a way that is readily comprehensible.</p> <p>There is an evaluation of the relative value of common logical strategies (e.g., bad cause and effect). They extract meaningful information and recognize utility from basic graphs and are able to draw conclusions from them. There is an understanding of correlation versus causality as well as a basic understanding of the design of the experiment. Proficient students will know what makes a credible scientific claim and provide an appropriate critical evaluation of sources.</p>
ACCOMPLISHED	Students at the accomplished level of mastery have the ability to make inferences from the document and provide sufficient evidence (based on multiple sources) to support their claim. This would include generating accurate interpretations of the document library, developing coherent arguments using much of the information provided in the documents, and potentially identifying, but not fully developing, potential future steps and the need for additional research. They are also able to identify and address bias when making inferences or drawing conclusions, assess the relevancy of the qualitative and quantitative data (e.g., read and understand a graph and identify limitations and shortcomings; demonstrate an understanding

that correlation does not necessarily imply causality), distinguish credible versus non-credible sources of information, and generate counter-claims. Accomplished students state a decision/recommendation/position and develop their argument based upon the identified information; however, they fall short of using evidence to fully support and leverage their argument. They have the ability to identify and extend the impact of the supporting versus counter-evidence and their broader implications.

Accomplished students write responses that are cohesive, organized, and elaborated effectively. The student recognizes the correct audience and writes in a way that demonstrates understanding of the intended audience. The sources (documents) of evidence in support of students' claims can be identified. The student's intent is clear, and the organization or the argument and understanding it represents is accurate and logical. There may be some minor spelling and syntax errors, but the sentences are generally well constructed, with varying and sometimes advanced vocabulary and structure, communicating a level of sophistication in the response.

ADVANCED

Students at the advanced level discern the merit of information and evaluate the strength of arguments, including identifying bias. They demonstrate a thorough evaluation of the evidence by making connections between the information found in the documents, potentially identifying patterns, and if applicable, refuting false or weak claims, which ultimately informs one's response. They clarify potential further steps, either a next step moving forward or additional research that is needed or would be helpful. In order to strengthen their own arguments, students at the advanced level also address counter-arguments and demonstrate the weaknesses of the counter-arguments and/or the ways in which they are less compelling.

Advanced students provide a decision/recommendation with thorough support of the argument articulated in an effective way. The evidence is thoroughly examined, including addressing and navigating contradictory responses, and the interpretation of the documents is comprehensive. They fully respond to the prompt.

Student writing is precise, purposeful, uses a varied vocabulary, sentence structure and length, and is free—or almost entirely free—from mechanical error. Their responses are organized in a fluid, coherent, and engaging way. It is easy to follow the student's argument, which also has the correct audience in mind and appropriately addresses them. They use the correct genre to deliver the response, whether it is a blog response, report, memo, speech, etc.

Students should be able to consistently reason analytically and solve problems and be able to understand the nuances when integrating information across multiple sources.

APPENDIX C: CWRA+ PERFORMANCE TASK RUBRIC

SCALE	DESCRIPTION	1	2
ANALYSIS AND PROBLEM SOLVING	Making a logical decision or conclusion (or taking a position) and supporting it by utilizing appropriate information (facts, ideas, computed values, or salient features) from the Document Library	<ul style="list-style-type: none"> ▪ May state or imply a decision/conclusion/position ▪ Provides minimal analysis as support (e.g., briefly addresses only one idea from one document) or analysis is entirely inaccurate, illogical, unreliable, or unconnected to the decision/conclusion/position 	<ul style="list-style-type: none"> ▪ States or implies a decision/conclusion/position ▪ Provides analysis that addresses a few ideas as support, some of which are inaccurate, illogical, unreliable, or unconnected to the decision/conclusion/position
WRITING EFFECTIVENESS	Constructing organized and logically cohesive arguments. Strengthening the writer's position by providing elaboration on facts or ideas (e.g., explaining how evidence bears on the problem, providing examples, and emphasizing especially convincing evidence)	<ul style="list-style-type: none"> ▪ Does not develop convincing arguments; writing may be disorganized and confusing ▪ Does not provide elaboration on facts or ideas 	<ul style="list-style-type: none"> ▪ Provides limited, invalid, over-stated, or very unclear arguments; may present information in a disorganized fashion or undermine own points ▪ Any elaboration on facts or ideas tends to be vague, irrelevant, inaccurate, or unreliable (e.g., based entirely on writer's opinion); sources of information are often unclear
WRITING MECHANICS	Demonstrating facility with the conventions of standard written English (agreement, tense, capitalization, punctuation, and spelling) and control of the English language, including syntax (sentence structure) and diction (word choice and usage)	<ul style="list-style-type: none"> ▪ Demonstrates minimal control of grammatical conventions with many errors that make the response difficult to read or provides insufficient evidence to judge ▪ Writes sentences that are repetitive or incomplete, and some are difficult to understand ▪ Uses simple vocabulary, and some vocabulary is used inaccurately or in a way that makes meaning unclear 	<ul style="list-style-type: none"> ▪ Demonstrates poor control of grammatical conventions with frequent minor errors and some severe errors ▪ Consistently writes sentences with similar structure and length, and some may be difficult to understand ▪ Uses simple vocabulary, and some vocabulary may be used inaccurately or in a way that makes meaning unclear

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<ul style="list-style-type: none"> ▪ States or implies a decision/conclusion/position ▪ Provides some valid support, but omits or misrepresents critical information, suggesting only superficial analysis and partial comprehension of the documents ▪ May not account for contradictory information (if applicable) 	<ul style="list-style-type: none"> ▪ States an explicit decision/conclusion/position ▪ Provides valid support that addresses multiple pieces of relevant and credible information in a manner that demonstrates adequate analysis and comprehension of the documents; some information is omitted ▪ May attempt to address contradictory information or alternative decisions/conclusions/positions (if applicable) 	<ul style="list-style-type: none"> ▪ States an explicit decision/conclusion/position ▪ Provides strong support that addresses much of the relevant and credible information, in a manner that demonstrates very good analysis and comprehension of the documents ▪ Refutes contradictory information or alternative decisions/conclusions/positions (if applicable) 	<ul style="list-style-type: none"> ▪ States an explicit decision/conclusion/position ▪ Provides comprehensive support, including nearly all the relevant and credible information, in a manner that demonstrates outstanding analysis and comprehension of the documents ▪ Thoroughly refutes contradictory evidence or alternative decisions/conclusions/positions (if applicable)
<ul style="list-style-type: none"> ▪ Provides limited or somewhat unclear arguments. Presents relevant information in each response, but that information is not woven into arguments ▪ Provides elaboration on facts or ideas a few times, some of which is valid; sources of information are sometimes unclear 	<ul style="list-style-type: none"> ▪ Organizes response in a way that makes the writer's arguments and logic of those arguments apparent but not obvious ▪ Provides valid elaboration on facts or ideas several times and cites sources of information 	<ul style="list-style-type: none"> ▪ Organizes response in a logically cohesive way that makes it fairly easy to follow the writer's arguments ▪ Provides valid elaboration on facts or ideas related to each argument and cites sources of information 	<ul style="list-style-type: none"> ▪ Organizes response in a logically cohesive way that makes it very easy to follow the writer's arguments ▪ Provides valid and comprehensive elaboration on facts or ideas related to each argument and clearly cites sources of information
<ul style="list-style-type: none"> ▪ Demonstrates fair control of grammatical conventions with frequent minor errors ▪ Writes sentences that read naturally but tend to have similar structure and length ▪ Uses vocabulary that communicates ideas adequately but lacks variety 	<ul style="list-style-type: none"> ▪ Demonstrates good control of grammatical conventions with few errors ▪ Writes well-constructed sentences with some varied structure and length ▪ Uses vocabulary that clearly communicates ideas but lacks variety 	<ul style="list-style-type: none"> ▪ Demonstrates very good control of grammatical conventions ▪ Consistently writes well-constructed sentences with varied structure and length ▪ Uses varied and sometimes advanced vocabulary that effectively communicates ideas 	<ul style="list-style-type: none"> ▪ Demonstrates outstanding control of grammatical conventions ▪ Consistently writes well-constructed complex sentences with varied structure and length ▪ Displays adept use of vocabulary that is precise, advanced, and varied