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Relations Among 2018-19 Kentucky Performance Rating for Educational Progress (K-PREP) and ACT Scores

Final Report

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Prepared under: Contract # PON2 540 1900004339

Authors: Justin Paulsen
Emily R. Dickinson
Arthur A. Thacker

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Introduction

The Kentucky Department of Education (KDE) has contracted with Human Resources Research Organization (HumRRO) to provide third party quality assurance and validity studies to assist KDE in meeting its statutory responsibilities under KRS 158.6453 and KRS 158.6455. Among the studies carried out on an annual basis, HumRRO independently conducts an analysis of the consistency of student results across multiple measures of student achievement administered under the state accountability system.

Two tests that are purported to measure the same or similar constructs are expected to be highly correlated. The pattern of student scores on one reading test, for example, would be expected to be similar to the pattern of student scores on another test that was also designed to measure reading. This is referred to as *convergent validity* evidence. Similarly, the pattern of student scores on a test designed to measure another construct (e.g., math) would not be expected to be as similar to the pattern of scores on the reading test. This is referred to as *discriminant validity* evidence. *Convergent* and *discriminant validity* evidence support the overall *validity that assessment scores represent the intended construct*, or that scores on the test reflect the content the test is intended to measure.

The purpose of this report is to contribute to the body of validity evidence for K-PREP. The other measures examined in this report are student scores from the ACT and student reported GPA. This report parallels previous analyses of the relations among KCCT and ACT (Dickinson & Thacker, 2009).

Following adoption of the Kentucky Core Academic Standards (KCAS) through Senate Bill 1 in 2009, Kentucky transitioned from the Kentucky Core Content Test (KCCT) to the K-PREP system for spring summative testing. K-PREP has been administered since 2012. From 2012 to 2017, K-PREP was a blend of norm-referenced and criterion-referenced tests, incorporating content from the Stanford Achievement Test (Stanford 10). Beginning in 2018, Stanford 10 was removed from the K-PREP assessments. In 2019, K-PREP at the high school level included summative tests in science (first operational year) and writing.

During the 2018-19 school year all Kentucky high school students took the ACT, as mandated by Senate Bill 1 in 2017. In addition, high school students were administered K-PREP assessments in science and on-demand writing (ODW) at grade 11. The statewide administration of ACT allows for analysis of the relations between multiple measures of student achievement at the high school level. No assessment other than K-PREP was administered statewide to students in grade 3-8.

K-PREP and ACT are designed to measure different sets of content standards. The K-PREP assessment targets outlined in the Kentucky Academic Standards (KAS) represents the knowledge and skills that students " should have the opportunity to learn before graduating from Kentucky high schools" (Kentucky Department of Education, 2020). ACT assessments target the ACT College and Career Readiness Standards®, described as the "essential skills and knowledge students need to become ready for college and career" (ACT, 2020).

Description of Data

Data for these analyses were provided by the Kentucky Department of Education (KDE). HumRRO received the dataset which included all Kentucky students with 2018-19 assessment data. Each student's data made up one row in the dataset. The dataset included each student's scale scores for every K-PREP test they attempted, as well as any additional standardized tests administered during the year. Eleventh grade students attempt the science and on-demand writing (ODW) assessment, in addition to the ACT. The dataset also included a variety of demographic variables including grade, gender, race, and free/reduced lunch program status. A separate dataset provided student's high school course grades as reported when students took the ACT. Grade point averages (GPAs) for each subject were computed from the students' self-reported scores for courses within that subject. The use of self-reported data undoubtedly involves some inaccuracies; however, Cassady found students' self-reported grades to be a reliable measure of actual grades (Cassady, 2001). These self-reported grades were measured categorically (F=0, D=1, C=2, B=3 and A=4); therefore, interpretations of overall GPA for each subject should be made cautiously. Students reporting having received an 'A' in each of their math courses, for example, would show an overall math GPA calculated to be 4.0; however, this 4.0 math grade point average is not a "perfect" score.

A series of data cleaning steps were taken to conduct the analyses that follow. Observations were removed that did not come from 11th grade students. Test scores that were 0 in the dataset when the student had not attempted the test were changed to N/A. Additionally, some ACT component scores were listed as "—" or blanks and were recoded to N/A.

The descriptive statistics in Table 1 come from the data after conducting the data cleaning steps. K-PREP science and ODW scale scores range from 100 to 300. The ACT component scores range from 1-36. The table includes a column for all students and one for complete cases. Because some students did not attempt all possible K-PREP tests or ACT components, some data were not included for subsequent analyses. Differences between complete cases and all cases were minimal across the tests. The table also compares K-PREP and ACT results across those who did and did not report their high school grades because of the large number of students who did not provide these data. Those who did report GPA showed meaningfully higher test scores across all tests than those who did not report GPA. This suggests the reported GPA results likely represent a disproportionate amount of higher achieving students. Reviewing reported GPAs from the 2008 HumRRO study of convergent validity also indicates that the GPAs reported below are much higher than in past years.

The standard deviation for K-PREP ODW is more than twice as large as the standard deviation for K-PREP science and the mean K-PREP ODW score is much farther from the range midpoint than the K-PREP science mean. These differences between the scales are likely a result of the scoring system for K-PREP ODW. While K-PREP ODW scale scores range from 100-300, there are only 17 possible scale score points within that range. Students received a rating between 0 and 4 for each of the two ODW prompts to create raw scores between 0 and 8. To account for different levels of difficulty between forms, there are two scale scores for each raw score between 1 and 8, resulting in 17 scale score points placed across the 100 to 300 interval. The most common raw score was 6 which resulted in a left-skewed distribution with far more student scores above 200 than below. Between the skewed distribution and the large gaps between score points, the standard deviation is much larger than the K-PREP science standard deviation.

Table 1. K-PREP, ACT, and GPA Descriptive Statistics among All Students and Complete Cases

		All Students	Complete Cases	Reported GPA Cases	No GPA Cases
K-PREP Science	Mean	202.08	202.35	203.73	199.09
	S. D.	14.03	13.85	13.72	14.10
	N	44,782	43,880	28,900	15,883
K-PREP ODW	Mean	238.12	238.69	243.02	229.16
	S. D.	37.39	37.08	35.56	18.96
	N	44,568	43,880	28,834	15,735
ACT Science	Mean	19.49	19.26	19.74	18.04
	S. D.	5.27	5.25	5.25	5.12
	N	45,224	43,880	29,315	15,910
ACT English	Mean	18.16	18.30	18.91	16.78
	S. D.	6.38	6.38	6.44	6.05
	N	45,243	43,880	29,323	15,921
ACT Reading	Mean	19.50	19.63	20.18	18.24
	S. D.	6.39	6.38	6.41	6.15
	N	45,232	43,880	29,319	15,914
ACT Math	Mean	18.51	18.61	19.00	17.62
	S. D.	4.63	4.66	4.77	4.27
	N	45,241	43,880	29,321	15,921
HS Science GPA	Mean			3.29	
	S. D.			0.79	
	N			28,642	
HS English GPA	Mean			3.18	
	S. D.			0.82	
	N			29,775	
HS Math GPA	Mean			3.09	
	S. D.			0.87	
	N			29,082	
HS Social Studies GPA	Mean			3.15	
	S. D.			0.83	
	N			28,389	

Results

Box Plot Illustrations of Relationships

Figures 1 and 2 illustrate the relationships between K-PREP science and ACT science and K-PREP ODW and ACT English, respectively. While the relationship between K-PREP and ACT science is clear, the decision to examine the relationship between K-PREP ODW and ACT English requires further justification. The K-PREP ODW assessment consists of two writing prompts that students respond to through essays. We found sufficient overlap between the scoring criteria for the K-PREP ODW and the ACT English blueprint that we deemed it appropriate to consider the two tests as assessments of similar content.

The box-and-whiskers plots represent the distribution of students on K-PREP scores for the different ACT ranges noted on the x-axis. The median is represented by the line in the middle of the box, with the 25th and 75th percentile marked by the bottom and top of the rectangle. The whiskers, or lines extending from the rectangle, represent the spread of the distribution of students. Below each box and whisker plot the number of students in the given ACT range is indicated. Each plot includes three dashed lines to separate the K-PREP test scores into four achievement levels: Novice (the bottom level), Apprentice (the second level), Proficient (the third level), and Distinguished (the fourth level).

Figure 1 illustrates a positive relationship between ACT science score and K-PREP science scale scores. The median K-PREP science scale score increases as the ACT science score range increases. This indicates that students who score higher on the ACT science test tend to generally score higher on the K-PREP science test.
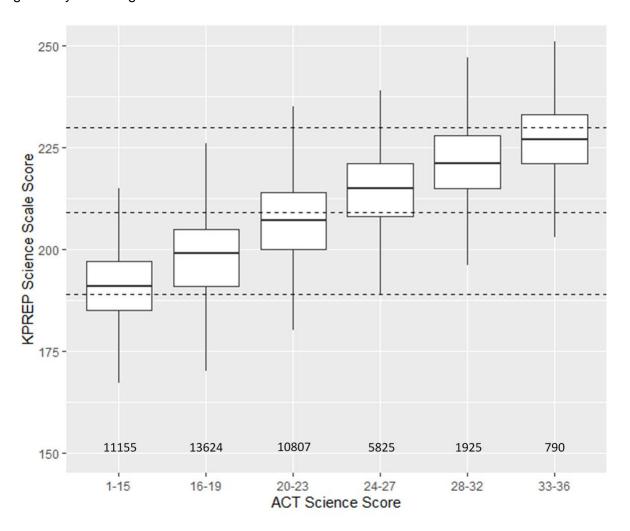

Figure 1. Relationship between K-PREP Science scale score and ACT Science score

Figure 2 illustrates a somewhat similar relationship between ACT English and K-PREP ODW tests. The median K-PREP ODW scores increase substantively between each of the first four ACT English score ranges. However, the median K-PREP ODW scores for the last three ACT English score ranges are essentially equal. As noted above, the K-PREP ODW scores are left-skewed and because there are a limited number of scale score points, the scale score with the largest number of examinees was the same in each range. While the mean for ODW score increases for each of these higher ranges, the median ends up being the same in each. Because the relationship is flat between K-PREP ODW and ACT English scores in these higher ranges, the correlation between the two assessment scores will be somewhat attenuated.
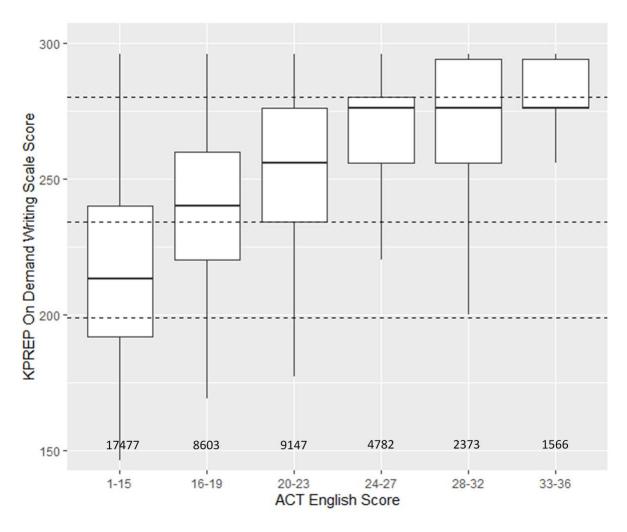

Figure 2. Relationship between K-PREP On-Demand Writing scale score and ACT English score

Figures 3 and 4 demonstrate a positive relationship between GPA and K-PREP test scores. The relationship between high school science GPA and K-PREP science test scores shows a more gradual increase in test scores between GPA categories. Figure 4 shows more grouping, where different high school English GPA categories show fairly similar medians and ranges of K-PREP ODW scores. These images also illustrate the skewed GPA distributions, as seen by both science and English GPA 4.0 categories having many more students than any other GPA category.
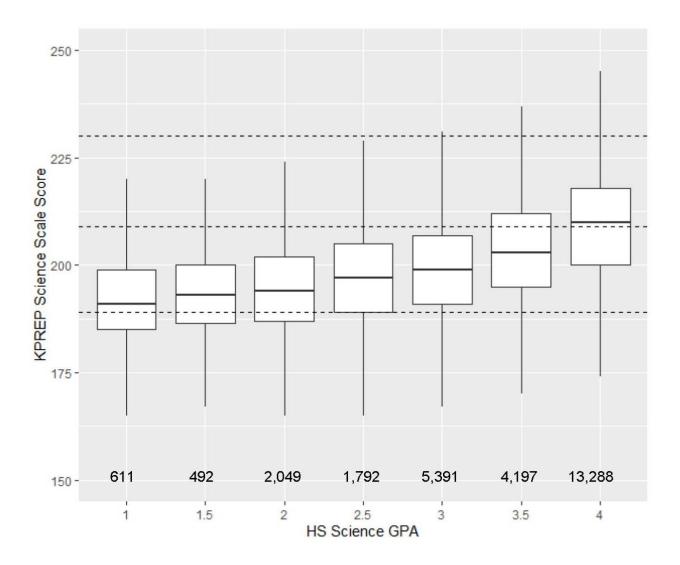

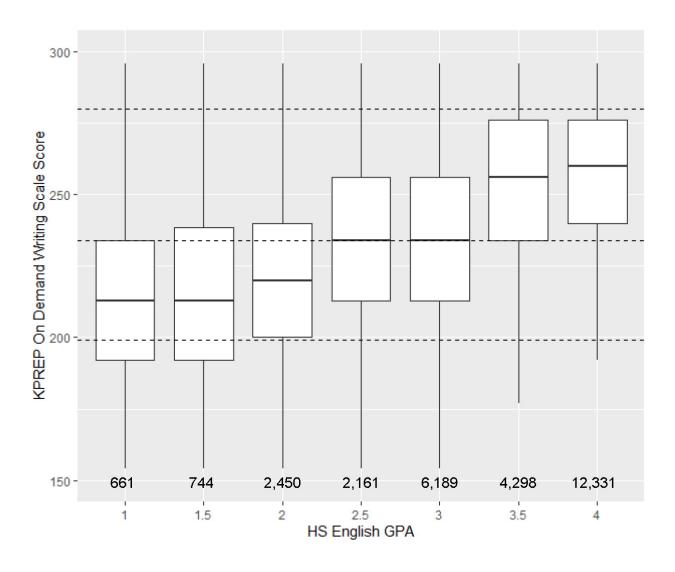***Figure 3. Relationship between K-PREP Science scale score and high school Science GPA***

Figure 4. Relationship between K-PREP On-Demand Writing scale score and high school English GPA

Correlations Among Measures

Table 2 presents correlations among the 11th grade K-PREP, ACT tests, and students' self-reported GPAs. The table differentiates between the correlations among the content areas within each of the different assessments from the correlations between the different kinds of assessments (Campbell & Fiske, 1959), thus allowing for the examination of the following relationships:

- The same content area within different achievement measures, or convergent validity coefficients. These correlations are in bold and are underlined.

- Different content areas within the same achievement measures. These correlations are in italics.

- Different content areas within different achievement measures. These correlations are in bold but not underlined.

The ACT reading and math tests and English and math GPAs are included to illustrate correlations among different content areas and across different achievement measures.

In correlation tables of this type, the expectation is for the highest correlations to be between different measures of the same content. Then, because of similarities in test-taking strategies or other method effects, the next highest correlations are typically between different content measured by the same assessment. Correlations between different content areas with different measures should be the lowest in the table.

Table 2. Correlations Among K-PREP, ACT, and Self-Reported GPA

Variable	1	2	3	4	5	6	7	8	9	10
K-PREP										
1. Science	*1.00*									
2. On-Demand Writing	*.60*	*1.00*								
ACT										
3. Science	**<u>.66</u>**	**.50**	*1.00*							
4. English	**.71**	**<u>.57</u>**	*.77*	*1.00*						
5. Reading	**.69**	**.51**	*.77*	*.81*	*1.00*					
6. Math	**.66**	**.47**	*.79*	*.77*	*.71*	*1.00*				
GPA										
7. Science	**<u>.41</u>**	**.39**	**<u>.42</u>**	**.46**	**.42**	**.41**	*1.00*			
8. English	**.45**	**<u>.45</u>**	**.47**	**<u>.53</u>**	**.48**	**.47**	*.70*	*1.00*		
9. Math	**.44**	**.39**	**.48**	**.49**	**<u>.43</u>**	**.51**	*.63*	*.68*	*1.00*	
10. Social Studies	**.46**	**.41**	**.48**	**.50**	**.46**	**<u>.48</u>**	*.68*	*.71*	*.69*	*1.00*

As Table 2 illustrates, the correlations between measures are all strongly positive, ranging from .47 to .71 between K-PREP and ACT, and between .39 and .53 for GPA and K-PREP or ACT. In a study of school-level assessment scores, Sicoly discussed the existence of a general cognitive factor that "cuts across content areas" (Sicoly, 2002). If such a "g-factor" exists, then it would be expected that students with high ability would score well on any test, regardless of the content. Correlations presented in Table 2 suggest that Kentucky students who exhibit high ability in one content area can be expected to perform well in other content areas.

Both K-PREP assessments diverged somewhat from the patterns expected in the correlation table. K-PREP science correlated most highly with ACT English (.71) rather than ACT science (.66) and correlated least with K-PREP ODW (0.60) rather than ACT reading (.69) or ACT math (.66). Similarly, among relationships with GPAs, K-PREP science correlated more highly with English and social studies (.45 and .46, respectively) than with science (.41). K-PREP ODW correlated most strongly with K-PREP science (.60) rather than ACT English (.57), but both of those correlations were higher than correlations with the other ACT test scores, as would be expected. Similarly, K-PREP ODW correlated more with English GPA (.45) than any of the GPAs from other, less related subject. The correlations with GPA results are likely attenuated because of the limited sample skewing toward higher GPAs.

Another way of considering K-PREP-ACT comparisons uses the percentile rankings ACT reports for each student. The percentile rankings allow students to quickly determine how well they've scored compared to the national population of ACT-taking students. Tables 3 and 4 contain ACT data percentiles and their associated scale scores for comparable content areas. The data were divided into deciles to make interpretation easier; however, ACT scores range from 1 to 36 and the number of students represented by each scale point varies substantially. Consequently, splitting the data into deciles resulted in uneven distributions. The percentage of students represented in each cell is provided in addition to target deciles. For instance, the percentile range from 90-99 could include ACT scores from 28-36, but a score of 28 might place students in the 91st percentile. In that case, the range of scores from 28-36 would actually be the top 9% of students despite our attempts to represent the top 10%.

Tables 3 and 4 can be analyzed by examining the mean K-PREP score for each ACT decile. For both K-PREP science and ODW, the mean score increases from every lower ACT score range to every higher ACT score range. Focusing on the means and using smaller ACT ranges, as compared to the medians in the box plot analyses above, shows a more consistent change pattern for the K-PREP ODW results.

Table 3. Proportion of Kentucky Students and Mean K-PREP Science Scores Within ACT Science Percentile Rankings

ACT Percentile Ranking	National Percentile	Actual ACT Score	Number of KY students	Mean K-PREP Science
90-99 (**10%**)	92-99 (**8%**)	29-36	2100 (**5%**)	223.15
80-89 (**10%**)	82-91 (**10%**)	25-28	3953 (**9%**)	217.50
70-79 (**10%**)	70-81 (**12%**)	23-24	5595 (**13%**)	211.16
60-69 (**10%**)	64-69 (**6%**)	22	3350 (**7%**)	207.48
50-59 (**10%**)	50-63 (**14%**)	20-21	4349 (**10%**)	204.65
40-49 (**10%**)	43-49 (**7%**)	19	4133 (**9%**)	201.88
30-39 (**10%**)	30-42 (**13%**)	17-18	6912 (**16%**)	197.86
20-29 (**10%**)	24-29 (**6%**)	16	2579 (**6%**)	194.77
10-19 (**10%**)	13-23 (**11%**)	14-15	5585 (**13%**)	192.61
0-9 (**10%**)	0-12 (**13%**)	1-13	5570 (**12%**)	189.16

Table 4. Proportion of Kentucky Students and Mean K-PREP On-Demand Writing Scores Within ACT English Percentile Rankings

ACT Percentile Ranking	National Percentile	Actual ACT Score	Number of KY students	Mean K-PREP ODW
90-99 (**10%**)	90-99 (**10%**)	30-36	2936 (**7%**)	274.27
80-89 (**10%**)	82-89 (**8%**)	26-29	2551 (**6%**)	267.25
70-79 (**10%**)	70-81 (**12%**)	23-25	4864 (**11%**)	260.29
60-69 (**10%**)	59-69 (**11%**)	21-22	4851 (**11%**)	254.02
50-59 (**10%**)	48-58 (**11%**)	19-20	4635 (**10%**)	247.91
40-49 (**10%**)	40-47 (**8%**)	17-18	4253 (**9%**)	240.36
30-39 (**10%**)	30-39 (**10%**)	15-16	5689 (**13%**)	232.35
20-29 (**10%**)	23-29 (**7%**)	14	3350 (**7%**)	226.11
10-19 (**10%**)	11-22 (**12%**)	11-13	6741 (**15%**)	213.07
0-9 (**10%**)	0-10 (**11%**)	1-10	5078 (**11%**)	199.96

Additionally, Table 3 and 4 allow for comparisons of the percentiles in the different ACT ranges among the national and Kentucky sample to see how comparable the distributions are. The tables indicate that the distribution of Kentucky ACT science and English scores is fairly similar to the national distribution. The Kentucky distributions have somewhat fewer students in the highest deciles and somewhat more in the middle and lower deciles.

Kentucky students are classified into one of four proficiency categories based on their K-PREP scores, and the proportion of students classified as Proficient and above contributes positively to school-level accountability scores. ACT published a set of College Readiness Benchmarks (ACT, 2013), which suggest that when a student has scored 18 or above on the ACT English test a student has approximately a 50% or better chance of earning a B or better, and approximately a 75% chance of earning a C or better, in a university English Composition course. Scoring a 23 or higher on the ACT science test indicates the same probabilities for earning a B or C or better in a university Biology course.

Table 5 presents cross tabulations of students' ACT scores, categorized above or below the relevant ACT benchmark score, with students' classifications above or below the Proficient cut score on K-PREP. Cross classification tables can be analyzed by examining the percent of students who would be classified in the same way by both tests (the top left and bottom right cells within a subject) to those that were differentially classified by the two tests (the bottom left and top right cells within a subject). Examining the science assessments finds that the ACT and K-PREP tests would classify about 80% of students in the same way (about 62% as below proficient and 19% proficient and above). About 20% of examinees would be differentially classified by ACT and K-PREP assessments, with slightly more (12%) being rated proficient or above by K-PREP but not by ACT. The English assessments would classify students at a slightly lower rate of agreement (about 72%) than the science assessments. The differential classifications among the assessments were relatively similar between cases where K-PREP ODW classified as proficient and above and ACT did not (about 15%), and vice versa (about 13%). Although the K-PREP proficiency levels were designed to equate to the Council for Postsecondary Education's benchmarks, which are related to but slightly different from the ACT benchmarks (Thacker, Dickinson, & Sinclair, 2013), some amount of differential classification is to be expected.

Table 5. Cross-Classification Rates Across K-PREP Proficiency and ACT Scores

	Science	Science
	K-PREP Below Proficient	K-PREP Proficient & Above
ACT Score < 23	27,185 (61.61%)	5,293 (11.99%)
ACT Score ≥ 23	3,328 (7.54%)	8,320 (18.86%)
	English/ODW	English/ODW
	K-PREP Below Proficient	K-PREP Proficient & Above
ACT Score < 18	15,403 (35.05%)	6,581 (14.97%)
ACT Score ≥ 18	5,591 (12.72%)	16,373 (37.26%)

Tables 6 and 7 provide scoring comparisons for K-PREP and ACT throughout the range of possible scores. We chose to base these tables on the ACT scale score because there are only 36 potential ACT scores, whereas K-PREP scores are on a larger, 200-point scale. The first column in these tables lists all potential ACT scores. The second column, Equated K-PREP Score, contains an equivalent score on K-PREP for each ACT scale score. This equivalent score was calculated using equipercentile equating estimated through the relative distributions of scores on both assessments. The Linking with Equivalent Groups or Single Group Design program (Brennan, 2004) was used to conduct the equipercentile equating. It is important to reiterate that the K-PREP assessment uses a 100-300 scale, and that the K-PREP ODW assessment includes only 17 score points. Differences in the number of scale score points can complicate the relationship between the linked scores (Pommerich, Hanson, Harris, & Sconing, 2000).

Because we have essentially the full population of students in Kentucky taking the ACT in our sample, we were also able to calculate a simple mean K-PREP score for students scoring at each scale score on ACT. The fourth column in the tables, Mean K-PREP Score, contains these mean scores and provides a check on the accuracy of the equated results. The sixth column contains the difference between the two. The third and fifth columns contain the performance category represented by either the equated K-PREP scores or the mean K-PREP scores, respectively. Each of the categories is color coded (N=Red, A=Yellow, P=Green, and D=Purple) to show clearly where the K-PREP categories fall on the ACT scale calculated using both linear equating and the mean student scores. As might be expected, the equating results are particularly strong in the middle of the distributions where the most students' scores fell and more disparate at the tails of the distributions where fewer students scored. The science distribution shows some disordering of mean K-PREP scores and achievement level categories for lower ACT scores, likely due to the extremely small sample sizes for these ACT scores.

Finally, Tables 6 and 7 contain gray horizontal shading line indicating the ACT College Readiness Benchmarks for science, when ACT = 23, and ACT = 18 for English. For both distributions, the College Readiness Benchmark aligns closely with where the equated scores begin the Proficient achievement level.

Table 6. ACT Science Scores, Equated ACT Science Scores and Corresponding Mean K-PREP Science Scores

ACT Score	Equated ACT Score	Category	Mean K-PREP Score	Category	Difference	Number of Students	S.D.	S.E.
1	103.76	N	191.00	A	-87.24	1	NA	0.86
2	112.29	N	189.00	N	-76.71	1	NA	0.86
3	120.81	N	NA	NA	NA	0	NA	0.86
4	129.34	N	196.50	A	-67.16	2	4.95	0.86
5	137.86	N	190.22	A	-52.36	9	5.78	1.43
6	146.39	N	189.68	N	-43.29	25	9.42	2.22
7	154.91	N	185.88	N	-30.96	72	7.80	0.40
8	163.44	N	188.03	N	-24.59	155	9.95	0.25
9	171.96	N	187.89	N	-15.92	346	9.23	0.22
10	176.76	N	187.58	N	-10.82	914	9.84	0.07
11	179.96	N	189.00	N	-9.04	1007	9.30	0.05
12	182.96	N	189.72	N	-6.76	1350	9.25	0.05
13	184.96	N	190.14	A	-5.17	1688	9.46	0.04
14	188.22	N	192.07	A	-3.85	3124	9.86	0.08
15	191.03	A	193.30	A	-2.27	2461	9.93	0.09
16	193.41	A	194.77	A	-1.36	2579	10.30	0.10
17	196.57	A	197.05	A	-0.49	4187	10.14	0.10
18	199.73	A	199.10	A	0.62	2725	10.19	0.07
19	202.35	A	201.87	A	0.48	4133	10.26	0.05
20	205.08	A	203.60	A	1.48	2146	10.75	0.07
21	207.09	A	205.67	A	1.42	2203	10.00	0.06
22	209.70	A	207.48	A	2.22	3350	10.43	0.08
23	212.83	P	210.01	P	2.82	3108	10.27	0.13
24	216.23	P	212.60	P	3.63	2487	9.91	0.12
25	218.93	P	213.85	P	5.09	1130	10.40	0.14
26	221.23	P	216.29	P	4.94	1515	10.25	0.09
27	223.15	P	218.44	P	4.71	693	9.82	0.16
28	224.85	P	219.73	P	5.12	615	10.63	0.17
29	225.99	P	220.32	P	5.67	122	11.24	0.16
30	227.07	P	220.02	P	7.05	456	9.70	0.18
31	228.66	P	221.50	P	7.16	358	11.18	0.20
32	230.46	P	222.62	P	7.84	374	9.73	0.17
33	232.74	D	224.71	P	8.03	311	10.50	0.24
34	235.41	D	225.98	P	9.44	205	10.32	0.29
35	243.85	D	227.99	P	15.85	167	10.40	0.24
36	252.28	D	229.48	P	22.81	107	10.05	0.53

Table 7. ACT English Scores, Equated ACT English Scores and Corresponding Mean K-PREP On-Demand Writing Scores

ACT Score	Equated ACT Score	Category	Mean K-PREP Score	Category	Difference	Number of Students	S.D.	S.E.
1	102.61	N	NA	NA	NA	0	NA	0.01
2	108.83	N	169.00	N	-60.17	1	NA	0.01
3	115.05	N	NA	NA	NA	0	NA	0.01
4	121.26	N	186.50	N	-65.24	4	11.45	0.01
5	127.48	N	168.80	N	-41.32	5	41.50	0.01
6	133.70	N	191.35	N	-57.65	37	36.46	0.02
7	139.92	N	190.93	N	-51.01	118	27.73	0.04
8	146.14	N	193.21	N	-47.08	542	31.32	0.16
9	168.63	N	197.46	N	-28.83	875	30.63	0.04
10	176.96	N	202.95	A	-25.99	2496	32.05	0.03
11	192.35	N	209.51	A	-17.16	2998	31.45	0.04
12	200.69	A	214.81	A	-14.12	2204	32.42	0.04
13	212.94	A	217.52	A	-4.58	1539	30.91	0.03
14	219.46	A	226.11	A	-6.65	3350	31.68	0.03
15	233.42	A	231.16	A	2.26	3308	30.60	0.02
16	234.12	A	234.01	A	0.11	2381	31.18	0.02
17	234.74	A	239.10	P	-4.35	2126	30.54	0.02
18	240.30	P	241.62	P	-1.32	2127	30.85	0.04
19	255.58	P	245.31	P	10.27	1969	29.89	0.02
20	256.07	P	249.83	P	6.23	2666	29.47	0.02
21	256.67	P	251.66	P	5.01	2637	30.69	0.02
22	260.52	P	256.83	P	3.69	2214	28.62	0.04
23	275.69	P	257.39	P	18.29	1630	29.11	0.02
24	276.09	P	260.44	P	15.65	1948	27.99	0.02
25	276.47	P	263.72	P	12.75	1286	27.32	0.01
26	279.21	P	265.62	P	13.59	558	25.51	0.05
27	280.08	P	266.82	P	13.26	990	26.37	0.05
28	293.21	D	268.71	P	24.50	541	27.25	0.02
29	293.51	D	268.45	P	25.06	462	26.10	0.02
30	293.75	D	270.73	P	23.02	690	28.41	0.02
31	293.94	D	266.83	P	27.12	115	29.02	0.02
32	294.12	D	273.14	P	20.98	565	22.68	0.02
33	294.32	D	275.24	P	19.08	285	22.74	0.01
34	294.52	D	275.08	P	19.44	474	22.10	0.01
35	295.37	D	277.05	P	18.31	570	22.91	0.05
36	296.12	D	281.43	D	14.69	237	18.57	0.02

Summary and Conclusion

The purpose of this report is to explore whether K-PREP scores appropriately related to other measure of educational achievements, the ACT assessment and students' self-reported grades. Results contribute to the body of validity evidence for K-PREP. Specifically, evidence of construct validity supports the assertion that students' K-PREP scores provide meaningful information about their performance in the tested content areas. Meaningful information about student academic performance is essential for robust school accountability systems.

Overall, the results indicate strong, positive relations between K-PREP and ACT test scores. Correlations between K-PREP and ACT are strong, but not so strong as to indicate that the two tests are interchangeable. The box plots and percentile analyses both demonstrate a positive association between the K-PREP and ACT tests, although the box plot relationship was somewhat attenuated in the case of the K-PREP ODW scores related to the left-skewed distribution of relatively few possible score points.

Correlations between K-PREP and students' self-reported grades are not as strong but are moderate and positive, indicating that students with higher course grades can be expected to score better on K-PREP. This supports the use of K-PREP as an indicator of student achievement in the tested subject areas. The magnitude of correlations between K-PREP and students' self-reported grades are likely impacted by missing GPA data, which led to a restriction in the range of reported GPAs. Grades also reflect aspects of educational achievement not captured by standardized test scores, such as class participation.

Additionally, mapping K-PREP and ACT scale scores to proficiency cut scores and benchmarks, respectively, showed a high degree of concordance. In examining the cross-classification between K-PREP proficiency achievement and ACT benchmark scores, the two tests jointly classified as proficient or above 80% of examinees in science and 72% in ODW/English. Similarly, the equipercentile linking analyses suggested the two tests would find fairly similar cut scores in the distributions between "not proficient" and "proficient and above."

Both K-PREP assessments diverged somewhat from the patterns expected in the correlation table. These associations suggest that students who do well on the K-PREP tests are likely to do well on other tests and in different content areas. The evidence does not strongly support the idea that the K-PREP science assessment taps into unique content compared to the ACT science test. However, the strong correlation between K-PREP science and ACT English and reading is reasonable given Kentucky's emphasis of integrating literacy across all content areas and the high reading requirements on K-PREP science.

The largely uniform correlations among the ACT tests indicate that the different content tests are subject to a strong influence because of the similar method of testing. The low correlations between K-PREP ODW and other tests are not surprising given its unique design and potential attenuation due to the reduced scale for ODW.

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