

**Results of Spring 2007 TAKS Grade 7-10 Online Comparability Study Analyses**

## Summary

The Texas Assessment of Knowledge and Skills (TAKS) has been offered online (in addition to paper) for certain grades and subjects since 2005. The joint *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 1999, Standard 4.10) and the *Guidelines for Computer-Based Tests and Interpretations* (APA, 1986) both speak to the need for the evaluation of the score equivalence across computer-based and paper-based tests.

Texas uses a “matched samples comparability analyses” (MSCA, Way, Davis, & Fitzpatrick, 2006) design to study equivalence of the resulting raw score to scale score conversions between online and paper testing modes. In this design, a bootstrap sampling approach is used to selected online and paper samples where each selected online student is matched to a paper student with the same gender, ethnicity, and level of proficiency on the subject matter. Once both the paper sample and online sample are selected, raw score to scale score conversions are calculated applying the Rasch measurement model. This sampling is repeated many times. Conversion tables for each replication are retained and aggregated to obtain the final conversion and standard error of linking. The equivalency between online and paper scale scores is then evaluated. A separate conversion table is recommended if the two sets of scores are considered not comparable. Between-mode item level analyses and subgroup analyses for ethnic and gender groups are also performed.

Using this methodology, the comparability analyses were carried out for the 2007 TAKS administrations in the following grades/subject areas:

- grade 7 reading and math;
- grade 8 reading, math, science and social studies;
- grade 9 reading and math; and
- grade 10 ELA, math, science and social studies.

With the criteria used to evaluate the equivalence (raw score differences that matter, scale score differences compared to the standard error of linking, and raw score cuts at various performance levels), the comparability between online and paper administration was assessed. It was found that mode effects existed between online and paper for all but the grade 10 science test. When the mode effect was found, in general the mode effect was that the online test was generally 1-2 points more difficult than the paper test.

The subgroup analysis results showed the same pattern as the overall test results. The online version of the test appeared more difficult for most subgroups for most tests. The item analysis results indicated that for most items where there was a mode effect, students tested in paper scored higher. The prevalence of the online mode effect was apparent in all analyses.

The following table is a summary of the evaluation results applying the criteria for each grade/subject area tested.

Grade	Subject	Scale score conversions differ by more than two standard errors of linking throughout most of the raw score range	Raw scores differences greater than or equal to half of a raw score point throughout most of the raw score range	Cut Score Difference	
				Met the Standard	Commended
7	Reading	X	X	X	
	Math	X	X	X	
8	Reading	X	X	X	
	Math	X	X		X
	Science	X	X	X	
	Social Studies	X	X	X	
9	Reading	X	X	X	X
	Math	X	X	X	X
10	ELA	X	X	X	X
	Math	X	X	X	
	Science			X	
	Social Studies	X	X	X	

Based on the results, we recommended using paper conversion tables for all grade/subject areas but the grade 10 science in the Spring 2007 online administrations, and using a separate conversion table for the grade 10 science online.

## Introduction

Online comparability studies were first implemented in Texas in 2005 covering the Texas Assessment of Knowledge and Skills (TAKS) in grade 8 reading, mathematics and social studies as well as exit level (Grade 11) retests of TAKS in English language arts (ELA), mathematics, social studies, and science. The 2006 comparability studies included TAKS grade 8 reading, mathematics, science, and social studies, grade 9 reading and mathematics, and all Exit Level July and October retests. Further expansion for online testing in 2007 added TAKS grade 7 reading and mathematics and grade 10 ELA, mathematics, science, and social studies. This report describes the results of the comparability studies for the spring 2007 TAKS online administrations in grades 7-10.

The online versions of the TAKS tests were administered between April 9 and April 13, except grade 10 ELA and grade 9 Reading tests, which were administered on February 20. This allowed sufficient time for the hand-scoring of open-ended and essay items prior to the comparability analyses.

## Methodology

In 2005, TEA and PEM devised a matched samples comparability analysis plan using a bootstrap approach in which students in the online group would be matched to students from the paper group on their previous TAKS test scores. Based on recommendations from the Texas Technical Advisory Committee (TTAC), additional demographic variables were considered as matching variables beginning in 2006. The decision was made to include previous TAKS scores, ethnicity, and gender as matching variables in the matched comparability analyses. For the grade 7-10 2007 comparability studies, a composite of the previous scores in ELA/reading, mathematics, science, social studies and writing was created. This composite was then used in the matching of samples. A description of this process is included below.

- 1) Using the students who tested in paper, we regressed their spring 2007 raw score on their spring 2006 ELA, mathematics, science, social studies and writing scale scores.

For grade 7:

$$\hat{Y}_{predicted\_rawscore} = \beta_0 + \beta_1 X_{1(Prev\_Reading)} + \beta_2 X_{2(prev\_Math)}.$$

For grade 8:

$$\hat{Y}_{predicted\_rawscore} = \beta_0 + \beta_1 X_{1(prev\_Reading)} + \beta_2 X_{2(prev\_Math)} + \beta_3 X_{3(prev\_Writing)}.$$

For grade 9:

$$\hat{Y}_{predicted\_rawscore} = \beta_0 + \beta_1 X_{1(prev\_Reading)} + \beta_2 X_{2(prev\_Math)} + \beta_3 X_{3(prev\_SocialStudies)} + \beta_4 X_{4(prev\_Science)}.$$

For grade 10:

$$\hat{Y}_{predicted\_rawscore} = \beta_0 + \beta_1 X_{1(Prev\_Reading)} + \beta_2 X_{2(prev\_Math)}.$$

- 2) The resulting regression weights were applied to all students (paper and online) to obtain an estimated raw score ( $\hat{y}$ ) for each of the students.
- 3) Students were then broken into 20 groups based on the estimated raw score.
- 4) This resulted in a 20 (previous score groups) by 4 (ethnicity groups) by 2 (gender groups) grid that was used in the matched sampling.
- 5) To improve optimal matching, students with missing values on any of the matching variables were dropped from the study.

Table 1 displays the demographic information for the online and paper samples for each grade level tested. The online and paper samples tended to differ in terms of ethnicity proportions. For example, according to table 1, there appears to be more minority students than White students in the paper samples. It can also be seen that for all grades, online students generally scored lower than the paper students. The only exception was for grade 10 ELA, where the online students scored higher than the paper students on average. Studies from previous comparability analyses on ELA (on the retest population) have

consistently indicated that there exists an item type by mode interaction, namely students tested online have a higher essay score, whereas students tested in paper have a higher scores on multiple-choice items. Table 2 provides the student performance for grade 10 ELA students, by testing mode. Students tested online performed better on the essay than students tested in paper. However, for the multiple-choice items the performance levels appear to be about the same. Students tested in paper did however scorer higher on the open-ended items, as Table 2 shows.

The matched samples comparability analysis method is described in the steps below.

1. All students eligible for matching were placed into 20 groups based on the regression of 2007 raw score on the 2006 scale scores as described earlier. Each student testing online with complete data was matched to a student from the available 2007 paper TAKS data with an identical profile on the matching variables.
2. Online versus paper comparability analyses were performed using matched groups of students. The following steps were repeated 100 times (500 for grade 9 reading and grade 10 ELA):
  - a. A bootstrap sample of students was drawn from the online participants.
  - b. A matched sample was drawn at random from the available 2007 paper TAKS data.
  - c. A raw score-to-raw score equating was carried out with the bootstrap samples.
  - d. The raw score equivalents were transformed to scale scores using the operational 2007 score conversion tables and linear interpolation.
3. Online scale score conversions for each raw score were based on the average of the conversions calculated over each of the 100 replications (500 for grade 9 reading and grade 10 ELA). These average scale score values comprised the alternate online conversion table.
4. The standard deviation of online scale score conversions at each raw score represented the conditional bootstrap standard errors of the linking.
5. To evaluate comparability, raw score points for which the difference between the online and paper scale score conversions exceeded two standard errors of the linking were noted. Also, the differences between the paper-raw-score equivalent and the corresponding paper raw score were calculated, and differences greater than 0.5 were noted.

To verify the results, two PEM psychometricians programmed independent versions of the analysis. The online results based on these two analyses were compared to the paper results. The recommendations regarding the use of a separate online score conversion table were made based on a set of rules that PEM adopted in 2006. PEM recommended the consideration of three pieces of information: the standard error of the linking, the magnitude of the raw score differences, and the rounding differences for cut scores.

- The standard error of the linking criterion was suggested by Dorans and Lawrence (1990): “To assess equivalence, it is convenient to compute the difference between the equating function and the identity transformation, and to divide this difference by the standard error of equating. If the resultant ratio falls within a bandwidth of plus or minus two, then the equating function is deemed to be within sampling error of the identity function” (p. 247). In using this procedure, we paid special attention to differences in the range of scale scores around the “Met the Standard” and “Commended” score levels. Differences at the extremes of the scale are less important, given the purpose and primary uses of the TAKS tests. This standard error procedure is sensitive to sample size such that the standard errors will be greater when the sample sizes are smaller. Therefore, we also considered additional criteria.
- The magnitude of the raw score differences was evaluated using the criterion of differences that matter (DTM; Dorans & Feigenbaum, 1994). This was originally developed in the context of the SAT where scaled scores are reported in 10-point units. For a given raw score, if the resulting scales scores from the linking differed by fewer than 5 points, then the scale scores would ideally be rounded to the same value and would be considered equivalent. This process was adapted to other tests and the DTM was considered to be a half of a score unit for unrounded scores (Dorans, Holland, Thayer, & Tateneni, 2003). For the TAKS, the DTM was considered to be half of a raw score point. For a given proficiency level, if the corresponding raw scores from the linking differed by less than half of a raw score point, then the two could be considered equivalent.
- The third piece of information we considered is the rounding differences for the cut scores. The raw score to scale score conversions for the paper and online tests were compared to see if they result in different raw score cut points

across the two modes of test administration. Cuts were evaluated for both the “Met the Standard” and the “Commended Performance” levels PEM recommended that this information be used in conjunction with the magnitude of the raw score differences, and the statistical significance of the differences (based on the Dorans and Lawrence [1990] two standard errors of the linking).

In addition to those three pieces of information, subgroup analyses were conducted, as well as the impact of using the alternate score table, and results were used to inform decision-making in borderline cases. Using these pieces of information, overall psychometric judgment determined the recommendation for use of an alternate score table for the online TAKS administration.

## Results

Tables 3 and 4 provide an overview of the comparisons between online and paper scores. As indicated in the tables, there seem to be mode effect for the majority of the tests. In fact, the only test where no mode effect was found was grade 10 science.

Tables 5 to 16 detail the comparisons between online and paper for each test. The columns of the tables are as follows:

RS – Paper test raw score

CBT\_RS – Equivalent raw scores on the online test based on the comparability linking. Note that a higher equivalent raw score indicates that the online version of the test was more difficult.

RS\_SD – Standard deviation of the equivalent raw scores over the 100/500 replications.

PAP\_SS – Paper test scale score conversions, based on the 2007 TAKS post-equated scales

CBT\_SS – Equivalent scale scores on the online test based on the comparability linking. Again, higher equivalent scale scores indicate that the online version of the test was more difficult.

SS\_SD – Standard deviation of the equivalent scale scores over the 100/500 replications.

RS\_DIF – Difference between online raw score equivalent and paper raw score.

SS\_DIF – Difference between online scale score equivalent and paper scale score.

SIG – Raw score points where scale score differences exceed two standard errors of the linking and where the difference in raw scores is greater than half a point are noted by “\*”.

FINAL– Final recommended online scale score conversion.

\* Note that the \* in the SIG column indicates both statistical and practical significance, based on the recommendations from the TTAC.

The general trend of the comparability results was that the online version appeared to be a little more difficult than the paper version. In addition, cut score differences were observed for most of the tests. At the lowest and highest scaled score points, the large differences occur because WINSTEPS (the IRT calibration software used in the study) does not estimate abilities for zero and perfect scores and the comparability WINSTEPS runs were centered differently than the paper runs. These differences are not meaningful. Therefore, for each test the conversion table (if recommended) will have the scale score at the extreme ends set to the paper, as was consistently done in the past.

### Grade 7

The results for reading, shown in Table 5, indicate that the online version was more difficult than the paper version. The differences in the raw score conversions were more than half of one raw score point throughout most of the scale. In terms of scale score conversions, the differences were between 25 and 30 points over most of the scale. Across the entire raw score range, the scale score differences exceeded two standard errors of the linking. The raw score cut associated with the Met the Standard performance level was 32 for the paper version and 30 for the online version. The raw score cut associated with the Commended performance level was 44 for both paper and online.

For mathematics, Table 6 shows that the online version was more difficult than paper, with the raw score differences exceeding 2 raw score points in certain range of the scale. The raw score cut associated with the Met the Standard

performance level was 28 for the paper version and 25 for the online version. The raw score cut associated with the Commended performance level was 44 for paper and 43 for online.

### **Grade 8**

For grade 8, the online version was more difficult across all subject areas: reading, mathematics, science and social studies. For all four subject areas the “Met the Standard” cut score was one point lower for the online version. The “Commended” performance level corresponded to different raw scores between the online and paper versions for reading and mathematics. The raw score cut at the “Commended” level was one point lower for the online group. The scale score differences exceeded 20 points across the entire scale for most subject areas.

### **Grade 9**

For grade 9, the online version was again more difficult for both reading and mathematics. The “Met the Standard” cut score was 1 point lower for online reading, and 2 points lower for online mathematics. The “Commended” performance level corresponds to lower raw scores between the online and paper versions for reading and mathematics, where the raw score cut at the “Commended” level was one point lower for the online group.

It should be mentioned that, as consistent with the previous policy enacted for Grade 9 reading in 2006, PEM recommended that the online scale scores corresponding to raw scores of 40 and 41 be constrained to the same values as those for the paper test (in addition to constraining the lowest and highest possible raw scores, 0 and 42). No students in the online condition earned a score point of ‘3’ on any of the open-ended items. This is due to the small sample size of students in the online condition and the relative difficulty of earning this score point. Since no students in the online sample attained a 3 on any of the open ended items, none attained a raw score of 40, 41, or 42 on the overall test. Thus the online scale scores computed by the comparability method at these raw score points are less stable. This results in the appearance of larger scale score differences between paper and online at these raw score points. Providing the same scale scores at the three top raw score points for the online and paper tests avoids reporting large differences in scale scores between the two modes in an area of the scale in which no student data was present in the online condition. Note that for the spring 2007 administration, no students actually received these scores as no online testers in grade 9 reading earned a raw score above 39.

### **Grade 10**

For grade 10, the online version of the test was more difficult for mathematics and social studies. The “Met the Standard” cut score was 1 point lower for both tests, and the scale score differences reach statistical significance across most of the scale range. For science, the differences of raw scores were less than half of a raw score point in the entire scale, and the scale score differences were not statistically significant. The “Met the Standard” performance level however did correspond to a lower raw score for the online version compared to the paper version for science.

For ELA, an observation that has consistently been seen in the past ELA studies was again noted: the raw score cut for the “Met the Standard” level was lower for the online students, but for the “Commended” level was higher for the online students. This suggests that the multiple-choice items were easier in paper but the essay item was easier online.

Similar to grade 9 reading, PEM recommended that the online scale scores corresponding to raw scores of 71 and 72 also be constrained to the same values as those for the paper test. The reasoning for this is the same as the reasoning applied to the online grade 9 reading test in both 2006 and 2007. Only one student in the online condition earned a score point of ‘3’ on any of the open-ended items. And that student might not have been included in the many of the bootstrap samples.

### **Impact Data Analyses**

The pass-rate-comparison table (Table 17) indicates that for most subject areas, using the online score table does make a difference in pass-rates, especially at the ‘Met the Standard’ level, such that the online passing rates are more similar to the

paper passing rates. In general, applying the paper conversion tables to the online students results in a lower percentage of students achieving the 'Met the Standard' level.

### Additional Analysis

As consistent with previous online comparability studies, two sets of additional analyses were conducted: namely the item-level analysis and the subgroup analysis. The item-level analysis compares mean differences of each item between the two testing modes across replications, whereas the subgroup analysis compares mean differences of the total raw scores between the two testing modes across replications for White, Hispanic and African American student groups separately.

#### Subgroup Analysis

The mean raw score differences (and the mean effect size, see Cohan [1992]) between the online and paper testing modes for each subgroup for each subject area are listed in table 18. A significance test was performed for each 'matched' subgroup using the following equation:

$$Z_{dif} = \frac{\bar{D}_{Diff}}{\sqrt{SE_{Diff}^2}}$$

where  $\bar{D}_{Diff}$  is the grand mean of the differences between mean online and mean paper essay scores over the replications for each subgroup; and  $SE_{diff}$  and is the bootstrap standard error of the mean differences over the replications, also for each subgroup.

The effect size between two group means at each replication was calculated by the following equation:

$$EffectSize = \frac{\bar{X}_{Group1} - \bar{X}_{Group2}}{\sqrt{\frac{(SD_{Group1}^2 + SD_{Group2}^2)}{2}}}$$

The effect sizes for the raw scores (and individual item scores) were based on the averages of the effect sizes over the replications.

As can be seen in table 18, there is a consistent mode effect across most subject areas, with the exception being Grade 10 ELA and science. It should be noted that for grade 10 ELA, the subgroup analyses might not reveal mode differences at the raw score level because there is an interaction effect of item type (essay versus non-essay) and mode at the item level.

Because the negative values in the table denote that online students scored lower, students tested on paper appear to have higher raw scores than their counterpart tested online. This is consistent with the decision to use alternate score table for most of the subject areas.

#### Item-Level Analysis

Tables 19 to 30 display the results of item-level comparison across replications for each subject area tested. The columns of the tables are as follows:

CBT\_PVAL: Mean item score for the online students across 100/500 replications.

PAP\_PVAL: Mean item score for the paper students across 100/500 replications.

DIF\_PVAL: Mean item score differences between online and paper students across 100/500 replications

DIF\_STD: Standard deviation of the mean differences across 100/500 replications

Z\_DIF: Z statistic for the mean item score differences

SIG: Items where mean item score differences exceed two standard errors of the linking are noted by “\*”.

EFFECT\_SIZE: Mean effect size over 100/500 replications.

As can be seen from the tables, when there was a significant between-mode mean difference, the paper group almost always scored higher. The exception was grade 10 ELA, where the online students scored lower on the multiple choice items but scored higher on the essay item.

It should also be noted that for most of the differences, the standard errors were relatively small—which might have contributed to the large number of items showing statistically significant difference between the testing modes. To help determine the ‘practical’ significance of the differences, the average effect size for each difference was calculated and listed on the last column of these tables. It can be seen that the magnitude of the effect sizes ranged between 0 and 0.2.

### **Summary and Recommendation**

Based on the comparisons, PEM recommended the use of a separate online conversion table for ALL but grade 10 science. For grade 10 science, although the “Met the Standard” performance level did correspond to different cut scores between online and paper versions of the test, this is only one of the three criteria. Evaluation using the other two criteria indicated that there was no practically or statistically significant difference between the online and paper results. Therefore PEM recommended the use of the paper April 2007 scale score conversion table for students taking grade 10 science test online.



## References

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**Table 1. Student Demographic Information for April 2007 Comparability Analyses\***

Grade	Subject	Number of Campuses		Number of Students		Mean Raw Score		Estimated Raw Score, or y-hat		Demographic Information**											
		CBT	PAP	CBT	PAP	CBT	PAP	CBT	PAP	Male		White		Hispanic		African American		Other Ethnicity		Special Education***	
										CBT	PAP	CBT	PAP	CBT	PAP	CBT	PAP	CBT	PAP	CBT	PAP
7	Reading	30	809	1086	108875	37.48	39.30	38.75	39.30	49	50	52	41	38	40	7	15	2	5	3	2
	Mathematics	25	821	746	111880	31.25	35.12	32.90	35.12	50	50	47	40	40	40	12	15	2	5	3	2
8	Reading	47	813	2176	108306	40.88	41.37	41.53	41.37	51	49	58	41	34	39	7	16	2	5	2	2
	Mathematics	37	814	1368	107706	34.59	35.92	35.81	35.92	51	49	62	41	30	39	6	16	2	5	2	2
	Science	90	814	7571	108514	33.79	34.19	34.28	34.19	49	49	52	40	37	40	9	16	2	5	2	2
	Social Studies	80	808	6742	105307	36.48	37.03	37.27	37.03	49	49	53	40	35	39	10	16	2	5	2	2
9	Reading	53	1586	2312	252291	32.69	32.76	33.25	32.76	47	49	58	40	30	42	9	14	2	4	1	2
	Mathematics	51	649	3820	101304	34.16	35.02	35.20	35.02	48	49	54	40	24	40	19	16	3	4	2	2
10	ELA	47	1564	1313	220046	56.09	55.44	55.95	55.44	50	49	62	43	27	40	9	13	2	3	3	3
	Mathematics	35	660	1193	96210	36.72	37.05	37.63	37.05	50	48	54	43	29	37	15	15	2	5	2	3
	Science	37	656	1438	95415	37.23	37.63	37.33	37.63	50	48	53	49	33	37	13	16	2	5	2	2
	Social Studies	44	659	2176	94511	39.68	39.82	40.13	39.82	50	48	50	43	34	40	12	15	4	5	2	3

\* CBT-Online administration; PAP-Paper administration.

\*\* Cell entries represent percentages rounded to the nearest integer. Due to rounding, the percentages may not add up to 100%.

\*\*\* Special education status is included in the demographics table, but was not used as a matching variable.

**Table 2: Student Performance on Grade 10 ELA Multiple Choice, Open-Ended Items, and Essay by Test Mode**

	<b>ONLINE</b>					<b>PAPER</b>				
Multiple Choice	41.96					41.92				
	0	1	2	3		0	1	2	3	
OE 1	6.63%	54.53%	38.84%	0.00%		5.69%	52.77%	41.14%	0.39%	
OE 2	9.52%	48.51%	41.89%	0.08%		10.58%	40.07%	49.12%	0.23%	
OE 3	7.77%	77.53%	14.70%	0.00%		6.91%	74.82%	18.17%	0.10%	
	0	1	2	3	4	0	1	2	3	4
Essay	1.22%	8.76%	35.72%	37.09%	17.21%	2.09%	43.51%	48.18%	6.01%	0.21%

**Table 3. Summary of the April 2007 Online TAKS Comparability Analyses**

Grade/Language /Subject	Sample Size		Raw Score Cuts*		Pass Rates (%) Comparison**			Number of Raw Score Points with Meaningful Difference***	Decision (Conclusion)
	Online	Paper	Online	Paper	Paper w/Paper	Online w/Online	Online w/Paper		
Grade 7 English Reading	1086	108875	<b>30</b>	32	59.6	64.7	58.7	41 (48)	Alternate Conversion Table (Mode Effect)
			<b>44</b>	44	26.5	20.3	20.3		
Grade 7 English Math	746	111880	<b>25</b>	28	58.5	64.6	57.7	42 (48)	Alternate Conversion Table (Mode Effect)
			<b>43</b>	44	18.0	11.0	7.6		
Grade 8 English Reading	2176	108306	<b>32</b>	33	46.1	49.1	47.4	40 (48)	Alternate Conversion Table (Mode Effect)
			<b>44</b>	44	43.7	42.6	42.6		
Grade 8 English Math	1368	107706	<b>29</b>	30	54.8	55.2	54.7	44 (50)	Alternate Conversion Table (Mode Effect)
			<b>44</b>	45	18.3	18.2	15.6		
Grade 8 English Science	7571	108514	<b>31</b>	32	42.9	49.9	46.5	39 (50)	Alternate Conversion Table (Mode Effect)
			<b>43</b>	43	18.4	16.4	16.4		
Grade 8 English Social Studies	6742	105307	<b>24</b>	25	51.1	55.7	53.9	40 (48)	Alternate Conversion Table (Mode Effect)
			<b>42</b>	42	36.6	34.9	34.9		
Grade 9 English Reading	2312	252291	<b>27</b>	28	62.3	56.7	70.0	34 (42)	Alternate Conversion Table (Mode Effect)
			<b>35</b>	36	23.6	36.9	21.4		
Grade 9 English Math	3820	101304	<b>29</b>	31	43.7	53.1	46.8	44 (52)	Alternate Conversion Table (Mode Effect)
			<b>44</b>	45	17.2	18.3	15.3		
Grade 10 ELA	1313	220046	<b>43</b>	44	73.5	73.4	67.7	32 (73)	Alternate Conversion Table (Mode Effect)
			<b>65</b>	64	11.3	14.3	18.7		
Grade 10 English Math	1193	96210	<b>31</b>	32	49.9	55.2	52.5	44 (56)	Alternate Conversion Table (Mode Effect)
			<b>50</b>	50	14.3	14.1	14.1		
Grade 10 English Science	1438	95415	34	<b>35</b>	47.6	54.9	51.0	0 (55)	Paper Conversion Table (No Mode Effect)
			50	<b>50</b>	11.8	11.0	11.0		
Grade 10 English Social Studies	2176	94511	<b>28</b>	29	53.6	56.9	55.1	28 (50)	Alternate Conversion Table (Mode Effect)
			<b>45</b>	45	33.4	34.5	34.5		

\*: Raw score points corresponding to 'Met Standards' (top) and 'Commended' (bottom) levels. Final RS cuts in bold.

\*\* : Pass rates based on different conversion tables.

\*\*\*: Meaningful differences require both scale score statistical significance and raw score practical significance. Total maximum RS points shown in parentheses.

**Table 4. Summary of Item-Level Analyses and the Subgroup Analyses**

Grade/Language/Subject	Number of Items with Significant Mode Differences****	Mean RS Difference (Effect Size) between Online and Paper over Replications*****	Subgroup Analysis--Mean RS Difference (Effect Size) between Online and Paper over Replications*****				
			Gender		Ethnicity		
			Male	Female	African American	Hispanic	White
Grade 7 English Reading	19 (48)	<b>-1.26</b> (-0.19)	<b>-1.22</b> (-0.17)	<b>-1.30</b> (-0.20)	-0.72 (-0.10)	<b>-1.40</b> (-0.20)	<b>-1.25</b> (-0.21)
Grade 7 English Math	21 (48)	<b>-1.64</b> (-0.19)	<b>-1.93</b> (-0.22)	<b>-1.36</b> (-0.16)	<b>-1.86</b> (-0.22)	<b>-1.53</b> (-0.18)	<b>-1.70</b> (-0.21)
Grade 8 English Reading	18 (48)	<b>-0.74</b> (-0.12)	<b>-0.79</b> (-0.13)	<b>-0.68</b> (-0.12)	-0.67 (-0.10)	<b>-0.88</b> (-0.13)	<b>-0.70</b> (-0.14)
Grade 8 English Math	17 (50)	<b>-1.32</b> (-0.15)	<b>-1.37</b> (-0.15)	<b>-1.26</b> (-0.15)	-1.24 (-0.13)	<b>-1.17</b> (-0.13)	<b>-1.37</b> (-0.17)
Grade 8 English Science	25 (50)	<b>-0.78</b> (-0.09)	<b>-0.63</b> (-0.08)	<b>-0.91</b> (-0.11)	-0.50 (-0.06)	<b>-0.71</b> (-0.08)	<b>-0.89</b> (-0.12)
Grade 8 English Social Studies	31 (48)	<b>-0.92</b> (-0.11)	<b>-0.63</b> (-0.08)	<b>-1.21</b> (-0.15)	<b>-1.09</b> (-0.13)	<b>-1.26</b> (-0.14)	<b>-0.69</b> (-0.10)
Grade 9 English Reading	14 (36)	<b>-0.70</b> (-0.18)	<b>-0.70</b> (-0.17)	<b>-0.70</b> (-0.20)	<b>-0.59</b> (-0.15)	<b>-0.64</b> (-0.14)	<b>-0.74</b> (-0.23)
Grade 9 English Math	27 (52)	<b>-1.24</b> (-0.13)	<b>-1.22</b> (-0.13)	<b>-1.25</b> (-0.13)	<b>-1.26</b> (-0.14)	<b>-0.97</b> (-0.11)	<b>-1.31</b> (-0.15)
Grade 10 ELA	11 (52)	0.09 (0.01)	-0.10 (-0.01)	0.27 (0.04)	-0.44 (-0.06)	-0.08 (-0.01)	0.22 (0.03)
Grade 10 English Math	17 (56)	<b>-1.05</b> (-0.09)	<b>-0.93</b> (-0.08)	<b>-1.16</b> (-0.11)	-1.15 (-0.11)	<b>-1.07</b> (-0.09)	<b>-1.06</b> (-0.10)
Grade 10 English Science	8 (55)	<b>-0.44</b> (-0.05)	-0.56 (-0.06)	-0.32 (-0.03)	-0.63 (-0.07)	0.14 (0.01)	<b>-0.73</b> (-0.08)
Grade 10 English Social Studies	13 (50)	<b>-0.59</b> (-0.08)	<b>-0.68</b> (-0.09)	<b>-0.50</b> (-0.07)	-0.71 (-0.09)	-0.44 (-0.05)	<b>-0.69</b> (-0.10)

\*\*\*\*: Items with significant mean differences ( $p < .05$ ) over replications. Total number of items in parentheses.

\*\*\*\*\*: RS Significant Differences ( $p < .05$ ) are in bold-face. Negative values indicate a lower mean RS for the online group.

Table 5: Summary of Comparability Analysis – April Grade 7 Reading

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.35	0.022	1232.53	1281.94	3.142	0.35	49.41		1233
1	1.17	0.066	1373.98	1391.01	6.762	0.17	17.02		1391
2	2.33	0.114	1476.47	1497.33	7.118	0.33	20.85		1497
3	3.50	0.150	1538.98	1561.95	6.942	0.50	22.97		1562
4	4.66	0.179	1585.13	1609.50	6.653	0.66	24.37	*	1610
5	5.80	0.203	1622.34	1647.67	6.280	0.80	25.32	*	1648
6	6.94	0.223	1653.93	1679.93	5.938	0.94	26.00	*	1680
7	8.07	0.241	1681.65	1708.20	5.675	1.07	26.55	*	1708
8	9.19	0.256	1706.65	1733.45	5.489	1.19	26.81	*	1733
9	10.30	0.269	1729.41	1756.52	5.367	1.30	27.12	*	1757
10	11.40	0.280	1750.53	1777.90	5.268	1.40	27.37	*	1778
11	12.49	0.290	1770.34	1797.92	5.186	1.49	27.58	*	1798
12	13.58	0.298	1789.09	1816.85	5.110	1.58	27.75	*	1817
13	14.65	0.306	1806.98	1834.86	5.042	1.65	27.89	*	1835
14	15.71	0.312	1824.14	1852.13	4.981	1.71	27.99	*	1852
15	16.77	0.317	1840.71	1868.77	4.927	1.77	28.07	*	1869
16	17.82	0.321	1856.78	1884.90	4.879	1.82	28.12	*	1885
17	18.86	0.324	1872.43	1900.58	4.837	1.86	28.15	*	1901
18	19.89	0.326	1887.74	1915.91	4.798	1.89	28.17	*	1916
19	20.91	0.327	1902.77	1930.94	4.763	1.91	28.17	*	1931
20	21.93	0.327	1917.58	1945.73	4.731	1.93	28.15	*	1946
21	22.94	0.327	1932.21	1960.33	4.703	1.94	28.12	*	1960
22	23.95	0.325	1946.71	1974.80	4.677	1.95	28.09	*	1975
23	24.95	0.323	1961.13	1989.17	4.652	1.95	28.04	*	1989
24	25.94	0.320	1975.51	2003.49	4.628	1.94	27.98	*	<u>2009</u>
25	26.93	0.316	1989.89	2017.80	4.607	1.93	27.91	*	2018
26	27.91	0.312	2004.31	2032.15	4.586	1.91	27.84	*	2032
27	28.89	0.307	2018.81	2046.57	4.563	1.89	27.76	*	<u>2053</u>
28	29.86	0.301	2033.43	2061.10	4.542	1.86	27.66	*	2061
29	30.82	0.294	2048.23	2075.82	4.532	1.82	27.59	*	2076
30	31.78	0.286	2063.23	<b>2090.77</b>	4.510	1.78	27.53	*	<b>2100</b>
31	32.73	0.278	2078.56	2105.99	4.490	1.73	27.43	*	2106
32	33.68	0.269	<b>2094.22</b>	2121.54	4.471	1.68	27.32	*	2122
33	34.62	0.258	2110.29	2137.54	4.466	1.62	27.25	*	2138
34	35.56	0.248	2126.85	2154.06	4.449	1.56	27.21	*	2154
35	36.49	0.236	2144.06	2171.18	4.443	1.49	27.12	*	2171
36	37.41	0.224	2161.98	2189.04	4.446	1.41	27.06	*	2189
37	38.33	0.210	2180.79	2207.80	4.457	1.33	27.01	*	2208
38	39.25	0.196	2200.69	2227.66	4.467	1.25	26.97	*	2228
39	40.16	0.181	2221.92	2248.86	4.474	1.16	26.94	*	2249
40	41.06	0.165	2244.84	2271.77	4.456	1.06	26.93	*	2272
41	41.96	0.149	2269.91	2296.89	4.381	0.96	26.98	*	2297
42	42.85	0.131	2297.84	2325.00	4.259	0.85	27.16	*	2325
43	43.74	0.112	2329.69	2357.33	4.217	0.74	27.64	*	2357
44	44.61	0.092	<b>2367.23</b>	<b>2395.77</b>	4.305	0.61	28.54	*	<b>2400</b>
45	45.48	0.072	2413.79	2444.09	4.516	0.48	30.29		2444
46	46.34	0.050	2476.81	2511.58	5.120	0.34	34.77		2512
47	47.18	0.026	2579.93	2604.89	3.630	0.18	24.97		2605
48	47.76	0.008	2719.55	2685.51	1.133	-0.24	-34.03		2720

Table 6: Summary of Comparability Analysis – April Grade 7 Mathematics

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.38	0.017	1369.15	1420.43	2.249	0.38	51.28		1369
1	1.25	0.053	1504.74	1529.16	5.124	0.25	24.43		1529
2	2.48	0.099	1601.92	1629.99	5.809	0.48	28.07		1630
3	3.68	0.140	1660.58	1689.97	6.011	0.68	29.38	*	1690
4	4.87	0.177	1703.51	1733.31	5.860	0.87	29.80	*	1733
5	6.04	0.210	1737.82	1767.57	5.609	1.04	29.75	*	1768
6	7.20	0.239	1766.72	1796.31	5.505	1.20	29.59	*	1796
7	8.34	0.266	1791.89	1821.33	5.490	1.34	29.44	*	1821
8	9.47	0.290	1814.37	1843.71	5.500	1.47	29.34	*	1844
9	10.59	0.312	1834.79	1864.03	5.453	1.59	29.24	*	1864
10	11.70	0.331	1853.70	1882.71	5.425	1.70	29.01	*	1883
11	12.79	0.349	1871.23	1900.13	5.401	1.79	28.90	*	1900
12	13.88	0.364	1887.74	1916.54	5.378	1.88	28.80	*	1917
13	14.96	0.378	1903.42	1932.11	5.356	1.96	28.69	*	1932
14	16.02	0.389	1918.40	1946.99	5.340	2.02	28.59	*	1947
15	17.08	0.400	1932.81	1961.30	5.325	2.08	28.49	*	1961
16	18.13	0.408	1946.74	1975.12	5.312	2.13	28.39	*	1975
17	19.17	0.415	1960.26	1988.55	5.300	2.17	28.29	*	1989
18	20.21	0.420	1973.46	2001.65	5.288	2.21	28.19	*	2002
19	21.23	0.424	1986.38	2014.46	5.273	2.23	28.08	*	<u>2023</u>
20	22.25	0.427	1999.09	2027.06	5.268	2.25	27.97	*	2027
21	23.26	0.428	2011.62	2039.50	5.262	2.26	27.88	*	2039
22	24.26	0.428	2024.00	2051.81	5.257	2.26	27.81	*	<u>2061</u>
23	25.26	0.427	2036.33	2064.05	5.252	2.26	27.72	*	2064
24	26.25	0.424	2048.60	2076.24	5.248	2.25	27.64	*	2076
25	27.23	0.420	2060.88	<b>2088.43</b>	5.244	2.23	27.55	*	<b>2100</b>
26	28.20	0.415	2073.19	2100.67	5.242	2.20	27.47	*	2101
27	29.17	0.409	2085.58	2112.98	5.242	2.17	27.40	*	2113
28	30.13	0.401	<b>2098.09</b>	2125.41	5.241	2.13	27.32	*	2125
29	31.09	0.393	2110.77	2138.02	5.242	2.09	27.25	*	2138
30	32.04	0.383	2123.65	2150.83	5.241	2.04	27.18	*	2151
31	32.98	0.372	2136.80	2163.92	5.244	1.98	27.12	*	2164
32	33.91	0.359	2150.28	2177.34	5.245	1.91	27.06	*	2177
33	34.84	0.346	2164.16	2191.17	5.248	1.84	27.01	*	2191
34	35.77	0.332	2178.51	2205.48	5.250	1.77	26.97	*	2205
35	36.69	0.316	2193.43	2220.36	5.250	1.69	26.93	*	2220
36	37.60	0.299	2209.05	2235.95	5.252	1.60	26.90	*	2236
37	38.50	0.281	2225.50	2252.38	5.265	1.50	26.89	*	2252
38	39.40	0.262	2242.97	2269.85	5.297	1.40	26.89	*	2270
39	40.29	0.242	2261.70	2288.58	5.345	1.29	26.89	*	2289
40	41.18	0.221	2282.01	2308.89	5.400	1.18	26.88	*	2309
41	42.06	0.198	2304.35	2331.23	5.412	1.06	26.88	*	2331
42	42.93	0.174	2329.39	2356.33	5.331	0.93	26.94	*	2356
43	43.79	0.149	2358.14	<b>2385.32</b>	5.168	0.79	27.18	*	<b>2400</b>
44	44.65	0.122	<b>2392.29</b>	2420.17	5.208	0.65	27.88	*	2420
45	45.50	0.094	2435.03	2464.39	5.481	0.50	29.36		2464
46	46.34	0.064	2493.50	2526.82	6.218	0.34	33.33		2527
47	47.18	0.033	2590.45	2614.13	4.412	0.18	23.67		2614
48	47.75	0.010	2724.53	2691.55	1.349	-0.25	-32.98		2725

Table 7: Summary of Comparability Analysis – April Grade 8 Reading

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.35	0.010	1162.51	1216.93	1.601	0.35	54.42		1163
1	1.16	0.032	1318.06	1336.06	3.622	0.16	18.00		1336
2	2.31	0.060	1430.13	1450.93	4.059	0.31	20.79		1451
3	3.44	0.084	1497.97	1519.84	4.165	0.44	21.87		1520
4	4.56	0.105	1547.72	1570.09	4.176	0.56	22.37	*	1570
5	5.67	0.124	1587.57	1610.18	4.150	0.67	22.61	*	1610
6	6.77	0.140	1621.18	1643.88	4.076	0.77	22.69	*	1644
7	7.87	0.155	1650.50	1673.19	3.971	0.87	22.68	*	1673
8	8.95	0.169	1676.71	1699.33	3.880	0.95	22.62	*	1699
9	10.03	0.181	1700.55	1723.09	3.821	1.03	22.54	*	1723
10	11.10	0.192	1722.55	1745.05	3.761	1.10	22.50	*	1745
11	12.16	0.202	1743.16	1765.45	3.728	1.16	22.29	*	1765
12	13.22	0.210	1762.47	1784.67	3.706	1.22	22.20	*	1785
13	14.27	0.218	1780.83	1802.94	3.687	1.27	22.11	*	1803
14	15.31	0.224	1798.38	1820.41	3.669	1.31	22.03	*	1820
15	16.35	0.230	1815.28	1837.22	3.652	1.35	21.94	*	1837
16	17.39	0.234	1831.62	1853.47	3.634	1.39	21.85	*	1853
17	18.41	0.238	1847.50	1869.27	3.616	1.41	21.77	*	1869
18	19.43	0.241	1863.00	1884.67	3.590	1.43	21.67	*	1885
19	20.45	0.243	1878.19	1899.75	3.576	1.45	21.56	*	1900
20	21.46	0.244	1893.09	1914.59	3.559	1.46	21.50	*	1915
21	22.47	0.244	1907.82	1929.24	3.543	1.47	21.42	*	1929
22	23.47	0.244	1922.41	1943.76	3.525	1.47	21.34	*	1944
23	24.47	0.243	1936.91	1958.18	3.510	1.47	21.27	*	1958
24	25.47	0.241	1951.36	1972.56	3.493	1.47	21.19	*	1973
25	26.45	0.238	1965.82	1986.94	3.477	1.45	21.12	*	1987
26	27.44	0.235	1980.31	2001.36	3.462	1.44	21.05	*	<u>2006</u>
27	28.42	0.231	1994.90	2015.88	3.448	1.42	20.98	*	<u>2016</u>
28	29.39	0.227	2009.63	2030.55	3.435	1.39	20.92	*	2031
29	30.37	0.221	2024.56	2045.41	3.422	1.37	20.85	*	<u>2051</u>
30	31.33	0.215	2039.73	2060.52	3.411	1.33	20.79	*	2061
31	32.30	0.209	2055.21	2075.94	3.402	1.30	20.73	*	2076
32	33.26	0.202	2071.08	<b>2091.74</b>	3.393	1.26	20.67	*	<b>2100</b>
33	34.21	0.194	<b>2087.40</b>	2108.00	3.385	1.21	20.60	*	2108
34	35.16	0.186	2104.27	2124.81	3.378	1.16	20.54	*	2125
35	36.11	0.177	2121.81	2142.29	3.369	1.11	20.48	*	2142
36	37.05	0.167	2140.15	2160.57	3.352	1.05	20.42	*	2161
37	37.99	0.157	2159.45	2179.81	3.327	0.99	20.36	*	2180
38	38.92	0.146	2179.92	2200.24	3.290	0.92	20.32	*	2200
39	39.85	0.135	2201.85	2222.15	3.247	0.85	20.29	*	2222
40	40.78	0.123	2225.60	2245.91	3.216	0.78	20.31	*	2246
41	41.70	0.110	2251.69	2272.07	3.206	0.70	20.38	*	2272
42	42.61	0.097	2280.87	2301.39	3.227	0.61	20.53	*	2301
43	43.52	0.082	2314.30	2335.10	3.269	0.52	20.79	*	2335
44	44.43	0.068	<b>2353.95</b>	<b>2375.24</b>	3.350	0.43	21.29		<b>2400</b>
45	45.33	0.052	2403.45	2425.77	3.518	0.33	22.33		2426
46	46.23	0.036	2470.99	2496.26	3.992	0.23	25.27		2496
47	47.12	0.018	2582.89	2600.96	2.866	0.12	18.07		2601
48	47.74	0.006	2739.12	2697.76	0.877	-0.26	-41.36		2739



Table 8: Summary of Comparability Analysis – April Grade 8 Mathematics

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.36	0.011	1229.77	1284.52	1.691	0.36	54.75		1230
1	1.19	0.035	1382.31	1403.63	3.918	0.19	21.32		1404
2	2.37	0.066	1493.64	1518.45	4.432	0.37	24.81		1518
3	3.53	0.093	1560.82	1587.05	4.584	0.53	26.24	*	1587
4	4.69	0.118	1609.96	1636.92	4.623	0.69	26.96	*	1637
5	5.83	0.140	1649.25	1676.55	4.540	0.83	27.30	*	1677
6	6.96	0.159	1682.34	1709.75	4.384	0.96	27.41	*	1710
7	8.07	0.177	1711.17	1738.55	4.269	1.07	27.38	*	1739
8	9.18	0.193	1736.91	1764.21	4.217	1.18	27.30	*	1764
9	10.28	0.208	1760.30	1787.48	4.175	1.28	27.18	*	1787
10	11.37	0.221	1781.87	1808.87	4.181	1.37	27.00	*	1809
11	12.45	0.232	1801.86	1828.86	4.168	1.45	27.00	*	1829
12	13.53	0.243	1820.75	1847.66	4.150	1.53	26.91	*	1848
13	14.59	0.252	1838.66	1865.49	4.129	1.59	26.83	*	1865
14	15.65	0.260	1855.77	1882.51	4.108	1.65	26.74	*	1883
15	16.70	0.267	1872.20	1898.85	4.085	1.70	26.65	*	1899
16	17.75	0.272	1888.06	1914.63	4.065	1.75	26.56	*	1915
17	18.78	0.277	1903.45	1929.93	4.042	1.78	26.48	*	1930
18	19.82	0.281	1918.44	1944.84	4.022	1.82	26.40	*	1945
19	20.84	0.284	1933.10	1959.42	4.002	1.84	26.32	*	1959
20	21.86	0.286	1947.49	1973.74	3.984	1.86	26.25	*	1974
21	22.88	0.287	1961.66	1987.84	3.966	1.88	26.18	*	1988
22	23.89	0.287	1975.65	2001.77	3.948	1.89	26.12	*	2015
23	24.89	0.286	1989.53	2015.59	3.931	1.89	26.06	*	2016
24	25.89	0.284	2003.32	2029.33	3.914	1.89	26.01	*	2029
25	26.89	0.282	2017.07	2043.03	3.897	1.89	25.96	*	2043
26	27.88	0.279	2030.81	2056.74	3.881	1.88	25.92	*	2057
27	28.86	0.275	2044.60	2070.49	3.865	1.86	25.89	*	2070
28	29.84	0.271	2058.46	2084.32	3.849	1.84	25.86	*	2084
29	30.81	0.266	2072.44	<b>2098.28</b>	3.833	1.81	25.84	*	<b>2100</b>
30	31.78	0.260	<b>2086.59</b>	2112.41	3.818	1.78	25.83	*	2112
31	32.75	0.253	2100.95	2126.77	3.802	1.75	25.82	*	2127
32	33.71	0.246	2115.57	2141.39	3.788	1.71	25.82	*	2141
33	34.66	0.238	2130.52	2156.35	3.774	1.66	25.83	*	2156
34	35.61	0.229	2145.86	2171.70	3.760	1.61	25.84	*	2172
35	36.56	0.220	2161.67	2187.53	3.750	1.56	25.87	*	2188
36	37.50	0.210	2178.03	2203.93	3.747	1.50	25.90	*	2204
37	38.43	0.200	2195.06	2221.00	3.750	1.43	25.94	*	2221
38	39.36	0.188	2212.89	2238.87	3.759	1.36	25.99	*	2239
39	40.28	0.177	2231.68	2257.71	3.772	1.28	26.03	*	2258
40	41.20	0.164	2251.64	2277.72	3.785	1.20	26.08	*	2278
41	42.11	0.151	2273.05	2299.16	3.788	1.11	26.12	*	2299
42	43.02	0.137	2296.27	2322.43	3.752	1.02	26.16	*	2322
43	43.91	0.123	2321.82	2348.08	3.659	0.91	26.27	*	2348
44	44.81	0.107	2350.44	<b>2376.96</b>	3.557	0.81	26.52	*	<b>2400</b>
45	45.69	0.091	<b>2383.31</b>	2410.30	3.573	0.69	26.99	*	2410
46	46.57	0.075	2422.37	2450.27	3.671	0.57	27.90	*	2450
47	47.44	0.057	2471.46	2500.80	3.839	0.44	29.34		2501
48	48.30	0.039	2538.43	2571.79	4.342	0.30	33.36		2572
49	49.15	0.020	2649.54	2673.58	3.111	0.15	24.04		2674
50	49.75	0.006	2805.32	2765.94	0.948	-0.25	-39.38		2805

Table 9: Summary of Comparability Analysis – April Grade 8 Science

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.34	0.005	863.38	936.33	0.994	0.34	72.95		863
1	1.13	0.015	1077.22	1097.58	2.275	0.13	20.36		1098
2	2.25	0.028	1230.92	1254.36	2.585	0.25	23.44		1254
3	3.36	0.039	1323.81	1348.36	2.675	0.36	24.55		1348
4	4.46	0.050	1391.84	1416.84	2.697	0.46	25.00		1417
5	5.55	0.059	1446.26	1471.42	2.689	0.55	25.15	*	1471
6	6.63	0.067	1492.11	1517.27	2.670	0.63	25.15	*	1517
7	7.70	0.074	1532.07	1557.13	2.647	0.70	25.07	*	1557
8	8.77	0.081	1567.73	1592.66	2.617	0.77	24.93	*	1593
9	9.83	0.087	1600.13	1624.90	2.586	0.83	24.77	*	1625
10	10.88	0.092	1629.99	1654.67	2.555	0.88	24.67	*	1655
11	11.93	0.097	1657.91	1682.26	2.502	0.93	24.35	*	1682
12	12.98	0.101	1684.03	1708.20	2.461	0.98	24.16	*	1708
13	14.02	0.105	1708.81	1732.79	2.430	1.02	23.98	*	1733
14	15.05	0.108	1732.46	1756.25	2.406	1.05	23.80	*	1756
15	16.08	0.112	1755.16	1778.79	2.387	1.08	23.63	*	1779
16	17.11	0.114	1777.07	1800.53	2.371	1.11	23.46	*	1801
17	18.13	0.116	1798.30	1821.61	2.358	1.13	23.30	*	1822
18	19.15	0.118	1818.97	1842.13	2.348	1.15	23.15	*	1842
19	20.16	0.120	1839.17	1862.17	2.332	1.16	23.00	*	1862
20	21.18	0.121	1858.97	1881.79	2.328	1.18	22.82	*	1882
21	22.19	0.122	1878.39	1901.12	2.322	1.19	22.73	*	1901
22	23.19	0.122	1897.60	1920.22	2.315	1.19	22.62	*	1920
23	24.19	0.123	1916.62	1939.13	2.310	1.19	22.50	*	1939
24	25.19	0.123	1935.51	1957.91	2.306	1.19	22.39	*	1958
25	26.19	0.122	1954.33	1976.62	2.301	1.19	22.29	*	<u>1984</u>
26	27.18	0.122	1973.12	1995.32	2.299	1.18	22.19	*	1995
27	28.17	0.120	1991.96	2014.05	2.295	1.17	22.10	*	2014
28	29.15	0.119	2010.88	2032.89	2.296	1.15	22.01	*	<u>2041</u>
29	30.13	0.117	2029.96	2051.88	2.292	1.13	21.92	*	2052
30	31.11	0.115	2049.25	2071.09	2.291	1.11	21.83	*	2071
31	32.09	0.113	2068.83	<b>2090.57</b>	2.289	1.09	21.75	*	<b>2100</b>
32	33.06	0.110	<b>2088.76</b>	2110.42	2.286	1.06	21.66	*	2110
33	34.03	0.107	2109.13	2130.71	2.281	1.03	21.58	*	2131
34	35.00	0.104	2130.02	2151.52	2.276	1.00	21.50	*	2152
35	35.96	0.100	2151.56	2172.98	2.264	0.96	21.42	*	2173
36	36.92	0.096	2173.86	2195.21	2.253	0.92	21.34	*	2195
37	37.88	0.092	2197.08	2218.36	2.243	0.88	21.28	*	2218
38	38.83	0.087	2221.39	2242.62	2.240	0.83	21.23	*	2243
39	39.78	0.082	2247.03	2268.22	2.242	0.78	21.19	*	2268
40	40.72	0.077	2274.29	2295.46	2.248	0.72	21.16	*	2295
41	41.67	0.071	2303.55	2324.71	2.256	0.67	21.16	*	2325
42	42.61	0.065	2335.30	2356.49	2.269	0.61	21.19	*	2356
43	43.54	0.058	<b>2370.28</b>	<b>2391.53</b>	2.287	0.54	21.25	*	<b>2400</b>
44	44.47	0.051	2409.51	2430.90	2.317	0.47	21.39		2431
45	45.40	0.044	2454.59	2476.24	2.359	0.40	21.65		2476
46	46.33	0.036	2508.21	2530.37	2.431	0.33	22.16		2530
47	47.25	0.028	2575.39	2598.62	2.568	0.25	23.23		2599
48	48.17	0.019	2667.40	2693.63	2.926	0.17	26.23		2694
49	49.09	0.010	2820.17	2838.63	2.079	0.09	18.46		2839
50	49.73	0.003	3031.02	2973.38	0.637	-0.27	-57.64		3031

Table 10: Summary of Comparability Analysis – April Grade 8 Social Studies

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.34	0.006	1337.19	1388.07	0.943	0.34	50.88		1337
1	1.14	0.020	1485.23	1500.39	2.080	0.14	15.15		1500
2	2.28	0.035	1591.73	1609.52	2.280	0.28	17.79		1610
3	3.40	0.049	1656.28	1675.24	2.313	0.40	18.97		1675
4	4.52	0.061	1703.60	1723.22	2.308	0.52	19.62	*	1723
5	5.63	0.072	1741.45	1761.48	2.296	0.63	20.03	*	1761
6	6.73	0.082	1773.32	1793.61	2.285	0.73	20.28	*	1794
7	7.83	0.092	1801.06	1821.51	2.273	0.83	20.45	*	1822
8	8.92	0.101	1825.78	1846.31	2.232	0.92	20.53	*	1846
9	10.00	0.109	1848.21	1868.76	2.185	1.00	20.55	*	1869
10	11.07	0.117	1868.85	1889.37	2.154	1.07	20.52	*	1889
11	12.14	0.124	1888.06	1908.54	2.141	1.14	20.48	*	1909
12	13.21	0.131	1906.10	1926.54	2.141	1.21	20.44	*	1927
13	14.26	0.137	1923.18	1943.58	2.143	1.26	20.40	*	1944
14	15.31	0.142	1939.47	1959.83	2.145	1.31	20.35	*	1960
15	16.36	0.147	1955.10	1975.41	2.147	1.36	20.31	*	1975
16	17.40	0.151	1970.17	1990.44	2.148	1.40	20.26	*	1990
17	18.43	0.155	1984.78	2005.00	2.150	1.43	20.22	*	<u>2016</u>
18	19.46	0.157	1999.01	2019.18	2.150	1.46	20.17	*	2019
19	20.48	0.160	2012.92	2033.04	2.150	1.48	20.12	*	2033
20	21.50	0.162	2026.57	2046.64	2.149	1.50	20.08	*	<u>2058</u>
21	22.51	0.163	2040.02	2060.05	2.150	1.51	20.03	*	2060
22	23.52	0.164	2053.32	2073.30	2.149	1.52	19.99	*	2073
23	24.52	0.164	2066.51	2086.46	2.147	1.52	19.94	*	2086
24	25.52	0.163	2079.65	<b>2099.55</b>	2.147	1.52	19.90	*	<b>2100</b>
25	26.51	0.162	<b>2092.77</b>	2112.64	2.145	1.51	19.86	*	2113
26	27.49	0.161	2105.93	2125.76	2.146	1.49	19.83	*	2126
27	28.48	0.159	2119.16	2138.95	2.146	1.48	19.79	*	2139
28	29.45	0.156	2132.50	2152.27	2.146	1.45	19.76	*	2152
29	30.43	0.153	2146.02	2165.76	2.147	1.43	19.74	*	2166
30	31.40	0.150	2159.76	2179.48	2.149	1.40	19.71	*	2179
31	32.36	0.146	2173.79	2193.48	2.153	1.36	19.69	*	2193
32	33.32	0.141	2188.16	2207.84	2.155	1.32	19.68	*	2208
33	34.27	0.136	2202.96	2222.62	2.158	1.27	19.66	*	2223
34	35.22	0.130	2218.26	2237.91	2.163	1.22	19.65	*	2238
35	36.17	0.124	2234.18	2253.83	2.168	1.17	19.64	*	2254
36	37.11	0.118	2250.85	2270.48	2.169	1.11	19.64	*	2270
37	38.05	0.111	2268.41	2288.04	2.160	1.05	19.63	*	2288
38	38.98	0.103	2287.08	2306.72	2.133	0.98	19.64	*	2307
39	39.90	0.095	2307.10	2326.79	2.094	0.90	19.68	*	2327
40	40.83	0.087	2328.84	2348.63	2.077	0.83	19.79	*	2349
41	41.74	0.078	2352.77	2372.85	2.098	0.74	20.08	*	2373
42	42.66	0.068	<b>2379.77</b>	<b>2400.03</b>	2.107	0.66	20.26	*	<b>2400</b>
43	43.56	0.058	2410.68	2431.33	2.140	0.56	20.65	*	2431
44	44.46	0.048	2447.45	2468.75	2.196	0.46	21.30		2469
45	45.36	0.037	2493.54	2516.07	2.312	0.36	22.53		2516
46	46.24	0.025	2556.70	2582.39	2.623	0.24	25.69		2582
47	47.13	0.013	2661.64	2680.20	1.884	0.13	18.56		2680
48	47.74	0.004	2808.84	2770.37	0.575	-0.26	-38.47		2809

Table 11: Summary of Comparability Analysis – February Grade 9 Reading

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.34	0.027	1285.16	1327.37	3.310	0.34	42.22		1285
1	1.12	0.081	1410.00	1421.19	7.588	0.12	11.19		1421
2	2.23	0.145	1501.90	1514.96	8.381	0.23	13.06		1515
3	3.33	0.193	1558.52	1572.48	8.261	0.33	13.96		1572
4	4.42	0.231	1600.78	1615.27	7.998	0.42	14.49		1615
5	5.50	0.258	1635.27	1650.13	7.667	0.50	14.86		1650
6	6.58	0.278	1664.90	1680.05	7.311	0.58	15.15	*	1680
7	7.64	0.292	1691.25	1706.66	6.965	0.64	15.41	*	1707
8	8.70	0.301	1715.25	1730.90	6.632	0.70	15.65	*	1731
9	9.76	0.305	1737.50	1753.41	6.325	0.76	15.91	*	1753
10	10.81	0.306	1758.46	1774.61	6.030	0.81	16.14	*	1775
11	11.86	0.304	1778.39	1794.79	5.762	0.86	16.40	*	1795
12	12.90	0.300	1797.52	1814.20	5.515	0.90	16.67	*	1814
13	13.94	0.295	1816.06	1833.01	5.289	0.94	16.96	*	1833
14	14.98	0.289	1834.12	1851.39	5.083	0.98	17.27	*	1851
15	16.01	0.281	1851.85	1869.41	4.894	1.01	17.56	*	1869
16	17.03	0.273	1869.32	1887.22	4.727	1.03	17.89	*	1887
17	18.06	0.265	1886.65	1904.88	4.577	1.06	18.24	*	1905
18	19.07	0.256	1903.91	1922.50	4.444	1.07	18.59	*	1922
19	20.09	0.247	1921.19	1940.14	4.322	1.09	18.95	*	1940
20	21.10	0.238	1938.57	1957.87	4.218	1.10	19.30	*	1958
21	22.10	0.228	1956.11	1975.79	4.124	1.10	19.69	*	1976
22	23.10	0.219	1973.92	1993.98	4.040	1.10	20.05	*	1994
23	24.09	0.209	1992.09	2012.52	3.965	1.09	20.43	*	<u>2021</u>
24	25.08	0.198	2010.70	2031.52	3.896	1.08	20.81	*	2032
25	26.06	0.188	2029.89	2051.09	3.835	1.06	21.20	*	<u>2059</u>
26	27.04	0.176	2049.78	2071.40	3.773	1.04	21.63	*	2071
27	28.01	0.165	2070.55	<b>2092.60</b>	3.710	1.01	22.05	*	<b>2100</b>
28	28.97	0.153	<b>2092.37</b>	2114.91	3.643	0.97	22.54	*	2115
29	29.93	0.140	2115.53	2138.64	3.566	0.93	23.11	*	2139
30	30.88	0.127	2140.33	2164.14	3.475	0.88	23.81	*	2164
31	31.84	0.114	2167.20	2191.97	3.385	0.84	24.76	*	2192
32	32.79	0.100	2196.78	2222.87	3.307	0.79	26.09	*	2223
33	33.74	0.086	2229.91	2257.93	3.249	0.74	28.02	*	2258
34	34.69	0.072	2267.90	2298.84	3.226	0.69	30.94	*	2299
35	35.64	0.060	2312.81	<b>2348.36</b>	3.300	0.64	35.55	*	<b>2400</b>
36	36.59	0.050	<b>2368.20</b>	2411.33	3.655	0.59	43.13	*	2411
37	37.52	0.042	2441.11	2498.24	4.692	0.52	57.14	*	2498
38	38.36	0.029	2551.83	2664.31	9.244	0.36	112.48		2664
39	39.33	0.185	2866.33	2977.44	62.410	0.33	111.11		2977
40	41.11	0.449	3204.32	3391.31	79.244	1.11	186.99	*	3204
41	41.65	0.270	3377.81	3479.91	43.162	0.65	102.10	*	3378
42	41.90	0.100	3534.46	3519.36	15.619	-0.10	-15.10		3534

Table 12: Summary of Comparability Analysis – April Grade 9 Mathematics

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.35	0.007	1041.96	1108.94	1.280	0.35	66.97		1042
1	1.16	0.021	1232.98	1254.71	2.827	0.16	21.74		1255
2	2.30	0.039	1367.52	1392.37	3.166	0.30	24.85		1392
3	3.43	0.054	1449.02	1474.90	3.243	0.43	25.88		1475
4	4.55	0.068	1508.76	1535.02	3.249	0.55	26.26	*	1535
5	5.65	0.080	1556.57	1582.94	3.228	0.65	26.37	*	1583
6	6.75	0.091	1596.84	1623.20	3.196	0.75	26.36	*	1623
7	7.84	0.101	1631.92	1658.19	3.143	0.84	26.27	*	1658
8	8.92	0.110	1663.21	1689.36	3.063	0.92	26.14	*	1689
9	10.00	0.119	1691.63	1717.62	2.989	1.00	25.99	*	1718
10	11.07	0.126	1717.78	1743.61	2.937	1.07	25.83	*	1744
11	12.13	0.134	1742.13	1767.82	2.909	1.13	25.69	*	1768
12	13.19	0.140	1765.00	1790.56	2.895	1.19	25.56	*	1791
13	14.24	0.146	1786.65	1812.10	2.886	1.24	25.45	*	1812
14	15.29	0.151	1807.28	1832.65	2.879	1.29	25.37	*	1833
15	16.34	0.156	1827.05	1852.34	2.874	1.34	25.30	*	1852
16	17.38	0.160	1846.09	1871.32	2.868	1.38	25.24	*	1871
17	18.42	0.164	1864.51	1889.70	2.863	1.42	25.19	*	1890
18	19.45	0.167	1882.41	1907.56	2.856	1.45	25.16	*	1908
19	20.48	0.170	1899.86	1924.98	2.852	1.48	25.13	*	1925
20	21.51	0.172	1916.94	1942.04	2.846	1.51	25.11	*	1942
21	22.53	0.174	1933.70	1958.80	2.841	1.53	25.10	*	1959
22	23.54	0.176	1950.22	1975.30	2.837	1.54	25.09	*	1975
23	24.56	0.176	1966.53	1991.61	2.831	1.56	25.09	*	<u>2000</u>
24	25.57	0.177	1982.68	2007.77	2.827	1.57	25.09	*	2008
25	26.57	0.177	1998.73	2023.83	2.823	1.57	25.10	*	2024
26	27.57	0.176	2014.71	2039.83	2.820	1.57	25.12	*	<u>2050</u>
27	28.57	0.175	2030.67	2055.81	2.816	1.57	25.14	*	<u>2056</u>
28	29.56	0.174	2046.66	2071.82	2.814	1.56	25.16	*	2072
29	30.55	0.172	2062.71	<b>2087.90</b>	2.813	1.55	25.19	*	<b>2100</b>
30	31.54	0.170	2078.87	2104.09	2.812	1.54	25.22	*	2104
31	32.52	0.167	<b>2095.19</b>	2120.45	2.812	1.52	25.26	*	2120
32	33.50	0.164	2111.73	2137.03	2.812	1.50	25.30	*	2137
33	34.47	0.161	2128.53	2153.87	2.815	1.47	25.35	*	2154
34	35.44	0.157	2145.65	2171.05	2.818	1.44	25.40	*	2171
35	36.40	0.152	2163.18	2188.63	2.824	1.40	25.45	*	2189
36	37.36	0.147	2181.18	2206.68	2.830	1.36	25.51	*	2207
37	38.32	0.142	2199.74	2225.31	2.841	1.32	25.57	*	2225
38	39.27	0.136	2218.98	2244.61	2.852	1.27	25.63	*	2245
39	40.21	0.130	2239.02	2264.71	2.866	1.21	25.69	*	2265
40	41.15	0.123	2260.02	2285.77	2.876	1.15	25.75	*	2286
41	42.09	0.115	2282.17	2307.99	2.892	1.09	25.82	*	2308
42	43.02	0.108	2305.73	2331.74	2.870	1.02	26.01	*	2332
43	43.94	0.099	2331.17	2357.18	2.817	0.94	26.01	*	2357
44	44.86	0.090	2358.69	<b>2384.87</b>	2.765	0.86	26.18	*	<b>2400</b>
45	45.78	0.081	<b>2389.01</b>	2415.45	2.763	0.78	26.44	*	2415
46	46.69	0.071	2423.04	2449.86	2.791	0.69	26.82	*	2450
47	47.59	0.061	2462.18	2489.54	2.838	0.59	27.36	*	2490
48	48.48	0.050	2508.77	2537.00	2.919	0.48	28.23		2537
49	49.37	0.038	2567.18	2597.03	3.074	0.37	29.85		2597
50	50.26	0.026	2647.25	2681.27	3.493	0.26	34.02		2681
51	51.13	0.013	2780.36	2804.87	2.509	0.13	24.51		2805
52	51.74	0.004	2966.93	2918.46	0.766	-0.26	-48.47		2967

Table 13: Summary of Comparability Analysis – February Grade 10 ELA

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.33	0.041	1458.81	1490.66	3.941	0.33	31.85		1459
1	1.09	0.125	1556.07	1562.26	9.309	0.09	6.18		1562
2	2.19	0.225	1626.64	1634.01	10.506	0.19	7.36		1634
3	3.28	0.310	1669.24	1677.61	10.020	0.28	8.37		1678
4	4.37	0.382	1700.41	1709.33	9.620	0.37	8.92		1709
5	5.45	0.443	1725.28	1734.57	9.268	0.45	9.29		1735
6	6.53	0.496	1746.20	1755.73	8.937	0.53	9.53		1756
7	7.61	0.541	1764.38	1774.08	8.630	0.61	9.70		1774
8	8.68	0.579	1780.56	1790.38	8.341	0.68	9.82		1790
9	9.75	0.611	1795.21	1805.13	8.073	0.75	9.92		1805
10	10.81	0.638	1808.69	1818.67	7.815	0.81	9.98		1819
11	11.87	0.659	1821.20	1831.22	7.571	0.87	10.02		1831
12	12.92	0.677	1832.92	1842.98	7.340	0.92	10.05		1843
13	13.97	0.690	1844.00	1854.07	7.115	0.97	10.07		1854
14	15.01	0.700	1854.53	1864.59	6.897	1.01	10.06		1865
15	16.05	0.706	1864.59	1874.65	6.690	1.05	10.06		1875
16	17.09	0.710	1874.25	1884.29	6.492	1.09	10.05		1884
17	18.12	0.711	1883.56	1893.59	6.304	1.12	10.03		1894
18	19.15	0.709	1892.58	1902.59	6.120	1.15	10.01		1903
19	20.18	0.706	1901.36	1911.32	5.942	1.18	9.97		1911
20	21.20	0.701	1909.90	1919.82	5.774	1.20	9.93		1920
21	22.22	0.694	1918.25	1928.13	5.615	1.22	9.89		1928
22	23.23	0.686	1926.43	1936.27	5.459	1.23	9.84		1936
23	24.24	0.677	1934.47	1944.26	5.314	1.24	9.78		1944
24	25.25	0.668	1942.39	1952.12	5.178	1.25	9.73		1952
25	26.26	0.657	1950.20	1959.88	5.047	1.26	9.68		1960
26	27.26	0.646	1957.94	1967.54	4.922	1.26	9.61		1968
27	28.26	0.634	1965.59	1975.13	4.803	1.26	9.54	*	1975
28	29.25	0.622	1973.20	1982.67	4.692	1.25	9.46	*	1983
29	30.25	0.609	1980.76	1990.16	4.590	1.25	9.39	*	1990
30	31.24	0.596	1988.31	1997.62	4.491	1.24	9.32	*	1998
31	32.22	0.583	1995.84	2005.07	4.398	1.22	9.23	*	2005
32	33.21	0.570	2003.37	2012.51	4.313	1.21	9.14	*	2013
33	34.19	0.556	2010.91	2019.97	4.229	1.19	9.06	*	2020
34	35.17	0.543	2018.49	2027.44	4.151	1.17	8.95	*	2027
35	36.15	0.529	2026.10	2034.96	4.081	1.15	8.85	*	2035
36	37.13	0.515	2033.77	2042.53	4.012	1.13	8.75	*	<u>2045</u>
37	38.10	0.500	2041.52	2050.15	3.944	1.10	8.64	*	<u>2050</u>
38	39.07	0.486	2049.34	2057.86	3.881	1.07	8.51	*	2058
39	40.04	0.471	2057.26	2065.65	3.822	1.04	8.39	*	<u>2071</u>
40	41.01	0.456	2065.30	2073.56	3.765	1.01	8.26	*	2074
41	41.97	0.441	2073.47	2081.58	3.710	0.97	8.11	*	2082
42	42.93	0.426	2081.80	2089.75	3.654	0.93	7.95	*	2090
43	43.89	0.410	2090.30	<b>2098.08</b>	3.600	0.89	7.77	*	<b>2100</b>
44	44.85	0.394	<b>2098.99</b>	2106.58	3.550	0.85	7.59	*	2107
45	45.80	0.378	2107.91	2115.29	3.496	0.80	7.37	*	2115
46	46.75	0.362	2117.07	2124.21	3.444	0.75	7.13	*	2124
47	47.70	0.346	2126.51	2133.37	3.396	0.70	6.87	*	2133
48	48.65	0.330	2136.26	2142.82	3.347	0.65	6.55		2143
49	49.59	0.314	2146.37	2152.56	3.300	0.59	6.19		2153
50	50.53	0.298	2156.86	2162.64	3.259	0.53	5.78		2163
51	51.46	0.282	2167.80	2173.08	3.222	0.46	5.28		2173
52	52.39	0.267	2179.23	2183.93	3.192	0.39	4.70		2184
53	53.32	0.252	2191.23	2195.23	3.169	0.32	4.00		2195
54	54.24	0.238	2203.87	2207.03	3.153	0.24	3.16		2207
55	55.15	0.225	2217.24	2219.37	3.142	0.15	2.14		2219
56	56.06	0.212	2231.43	2232.33	3.135	0.06	0.90		2232
57	56.96	0.201	2246.58	2245.98	3.131	-0.04	-0.60		2246

58	57.85	0.190	2262.82	2260.40	3.140	-0.15	-2.42	2260
59	58.74	0.181	2280.34	2275.71	3.186	-0.26	-4.63	2276
60	59.61	0.173	2299.33	2291.99	3.287	-0.39	-7.35	2292
61	60.48	0.166	2320.10	2309.39	3.455	-0.52	-10.71	* 2309
62	61.35	0.162	2342.92	2328.06	3.695	-0.65	-14.86	* 2328
63	62.21	0.161	2368.21	2348.26	4.034	-0.79	-19.95	* 2348
64	63.07	0.163	<b>2396.45</b>	2370.40	4.460	-0.93	-26.04	* 2370
65	63.95	0.169	2428.22	<b>2395.20</b>	5.030	-1.05	-33.02	* <b>2400</b>
66	64.86	0.179	2464.37	2423.76	5.887	-1.14	-40.62	* 2424
67	65.83	0.190	2506.36	2458.22	7.119	-1.17	-48.14	* 2458
68	66.92	0.196	2557.28	2503.52	8.834	-1.08	-53.76	* 2504
69	68.28	0.174	2624.19	2575.77	11.457	-0.72	-48.42	* 2576
70	70.35	0.279	2718.83	2758.76	31.427	0.35	39.93	2759
71	72.06	0.376	2832.84	2964.02	46.157	1.06	131.17	* 2833
72	72.67	0.187	2956.65	3038.44	22.873	0.67	81.79	* 2957
73	72.92	0.057	3078.83	3068.63	6.939	-0.08	-10.20	3079

Table 14: Summary of Comparability Analysis – April Grade 10 Mathematics

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.34	0.014	1289.77	1337.68	1.955	0.34	47.91		1290
1	1.12	0.044	1432.06	1444.14	4.475	0.12	12.08		1444
2	2.23	0.082	1534.39	1548.30	5.067	0.23	13.90		1548
3	3.32	0.115	1596.17	1610.75	5.218	0.32	14.59		1611
4	4.41	0.145	1641.35	1656.24	5.241	0.41	14.89		1656
5	5.50	0.171	1677.45	1692.49	5.211	0.50	15.04		1692
6	6.57	0.195	1707.82	1722.92	5.159	0.57	15.10	*	1723
7	7.64	0.216	1734.24	1749.36	5.086	0.64	15.11	*	1749
8	8.71	0.235	1757.80	1772.90	5.004	0.71	15.10	*	1773
9	9.77	0.252	1779.16	1794.23	4.917	0.77	15.06	*	1794
10	10.82	0.268	1798.82	1813.84	4.837	0.82	15.02	*	1814
11	11.88	0.281	1817.11	1832.13	4.765	0.88	15.02	*	1832
12	12.92	0.293	1834.33	1849.23	4.676	0.92	14.90	*	1849
13	13.97	0.304	1850.54	1865.41	4.617	0.97	14.87	*	1865
14	15.01	0.314	1865.98	1880.82	4.561	1.01	14.84	*	1881
15	16.05	0.322	1880.77	1895.58	4.511	1.05	14.81	*	1896
16	17.08	0.329	1895.01	1909.80	4.463	1.08	14.79	*	1910
17	18.11	0.336	1908.78	1923.54	4.417	1.11	14.76	*	1924
18	19.14	0.341	1922.15	1936.87	4.365	1.14	14.72	*	1937
19	20.16	0.345	1935.16	1949.83	4.324	1.16	14.66	*	1950
20	21.18	0.348	1947.84	1962.50	4.288	1.18	14.66	*	1963
21	22.20	0.351	1960.29	1974.93	4.252	1.20	14.64	*	1975
22	23.22	0.353	1972.52	1987.14	4.216	1.22	14.62	*	1987
23	24.23	0.354	1984.58	1999.17	4.183	1.23	14.59	*	2007
24	25.24	0.354	1996.49	2011.06	4.150	1.24	14.57	*	2011
25	26.24	0.353	2008.29	2022.84	4.120	1.24	14.55	*	2023
26	27.25	0.352	2019.99	2034.53	4.090	1.25	14.53	*	2035
27	28.25	0.350	2031.64	2046.16	4.063	1.25	14.52	*	2054
28	29.25	0.347	2043.26	2057.76	4.037	1.25	14.50	*	2058
29	30.24	0.344	2054.87	2069.35	4.012	1.24	14.48	*	2069
30	31.24	0.340	2066.50	2080.97	3.989	1.24	14.47	*	2081
31	32.23	0.336	2078.18	<b>2092.63</b>	3.967	1.23	14.45	*	<b>2100</b>
32	33.21	0.330	<b>2089.93</b>	2104.36	3.946	1.21	14.44	*	2104
33	34.20	0.325	2101.78	2116.21	3.927	1.20	14.42	*	2116
34	35.18	0.318	2113.77	2128.18	3.909	1.18	14.41	*	2128
35	36.16	0.311	2125.92	2140.32	3.892	1.16	14.40	*	2140
36	37.14	0.303	2138.27	2152.66	3.876	1.14	14.39	*	2153
37	38.11	0.295	2150.86	2165.25	3.862	1.11	14.39	*	2165
38	39.08	0.286	2163.74	2178.12	3.848	1.08	14.38	*	2178
39	40.05	0.277	2176.96	2191.33	3.835	1.05	14.37	*	2191
40	41.02	0.267	2190.56	2204.93	3.822	1.02	14.37	*	2205
41	41.98	0.256	2204.63	2218.99	3.807	0.98	14.36	*	2219
42	42.94	0.244	2219.24	2233.60	3.794	0.94	14.36	*	2234
43	43.89	0.232	2234.49	2248.85	3.779	0.89	14.36	*	2249
44	44.85	0.220	2250.49	2264.86	3.760	0.85	14.36	*	2265
45	45.80	0.206	2267.41	2281.79	3.741	0.80	14.38	*	2282
46	46.74	0.192	2285.42	2299.82	3.725	0.74	14.40	*	2300
47	47.69	0.177	2304.79	2319.23	3.720	0.69	14.44	*	2319
48	48.63	0.161	2325.83	2340.35	3.731	0.63	14.52	*	2340
49	49.56	0.144	2349.04	2363.66	3.756	0.56	14.62	*	2364
50	50.49	0.127	<b>2375.09</b>	<b>2389.87</b>	3.795	0.49	14.78		<b>2400</b>
51	51.42	0.108	2405.05	2420.14	3.876	0.42	15.09		2420
52	52.35	0.089	2440.86	2456.33	3.975	0.35	15.47		2456
53	53.27	0.068	2485.61	2501.90	4.193	0.27	16.29		2502
54	54.18	0.047	2546.93	2565.41	4.770	0.18	18.48		2565
55	55.09	0.024	2648.78	2662.06	3.438	0.09	13.29		2662
56	55.73	0.007	2791.67	2752.86	1.052	-0.27	-38.81		2792



Table 15: Summary of Comparability Analysis – April Grade 10 Science<sup>#</sup>

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.31	0.008	1170.77	1220.85	1.350	0.31	50.08		1171
1	1.03	0.027	1332.51	1336.08	3.256	0.03	3.58		1336
2	2.06	0.053	1447.72	1451.87	3.879	0.06	4.15		1452
3	3.09	0.077	1516.83	1521.31	3.982	0.09	4.48		1521
4	4.12	0.099	1567.10	1571.77	4.045	0.12	4.67		1572
5	5.14	0.120	1607.08	1611.88	4.079	0.14	4.79		1612
6	6.17	0.139	1640.58	1645.46	4.097	0.17	4.88		1645
7	7.19	0.157	1669.62	1674.57	4.103	0.19	4.95		1675
8	8.22	0.174	1695.43	1700.44	4.104	0.22	5.01		1700
9	9.24	0.190	1718.78	1723.83	4.100	0.24	5.05		1724
10	10.26	0.205	1740.21	1745.31	4.095	0.26	5.10		1745
11	11.28	0.218	1760.11	1765.25	4.086	0.28	5.14		1765
12	12.29	0.230	1778.76	1783.93	4.076	0.29	5.17		1784
13	13.31	0.242	1796.38	1801.58	4.066	0.31	5.21		1802
14	14.33	0.252	1813.13	1818.40	4.071	0.33	5.27		1818
15	15.34	0.261	1829.24	1834.51	4.037	0.34	5.27		1835
16	16.36	0.270	1844.63	1849.94	4.024	0.36	5.30		1850
17	17.37	0.278	1859.51	1864.84	4.013	0.37	5.34		1865
18	18.38	0.284	1873.94	1879.31	4.001	0.38	5.37		1879
19	19.39	0.290	1888.00	1893.41	3.990	0.39	5.41		1893
20	20.40	0.295	1901.74	1907.18	3.979	0.40	5.44		1907
21	21.41	0.300	1915.21	1920.69	3.970	0.41	5.48		1921
22	22.42	0.303	1928.46	1933.98	3.960	0.42	5.52		1934
23	23.43	0.306	1941.52	1947.08	3.949	0.43	5.56		1947
24	24.44	0.308	1954.44	1960.04	3.940	0.44	5.60		1960
25	25.44	0.309	1967.25	1972.89	3.932	0.44	5.64		1973
26	26.45	0.309	1979.98	1985.66	3.923	0.45	5.68		<u>1993</u>
27	27.45	0.309	1992.66	1998.39	3.914	0.45	5.73		<u>1998</u>
28	28.46	0.308	2005.32	2011.09	3.905	0.46	5.77		2011
29	29.46	0.307	2017.99	2023.82	3.900	0.46	5.82		2024
30	30.46	0.304	2030.71	2036.59	3.893	0.46	5.87		<u>2046</u>
31	31.46	0.301	2043.51	2049.45	3.895	0.46	5.94		2049
32	32.46	0.297	2056.44	2062.43	3.885	0.46	5.99		2062
33	33.46	0.293	2069.50	2075.55	3.882	0.46	6.04		2076
34	34.45	0.288	2082.75	<b>2088.85</b>	3.878	0.45	6.10		<b>2100</b>
35	35.45	0.282	<b>2096.22</b>	2102.39	3.875	0.45	6.17		2102
36	36.44	0.275	2109.96	2116.19	3.873	0.44	6.23		2116
37	37.44	0.268	2124.02	2130.32	3.874	0.44	6.30		2130
38	38.43	0.260	2138.46	2144.84	3.874	0.43	6.38		2145
39	39.42	0.252	2153.34	2159.79	3.876	0.42	6.45		2160
40	40.41	0.242	2168.75	2175.28	3.878	0.41	6.53		2175
41	41.39	0.232	2184.77	2191.38	3.882	0.39	6.62		2191
42	42.38	0.221	2201.51	2208.22	3.889	0.38	6.71		2208
43	43.36	0.210	2219.12	2225.92	3.900	0.36	6.80		2226
44	44.35	0.197	2237.75	2244.66	3.912	0.35	6.91		2245
45	45.33	0.184	2257.63	2264.65	3.930	0.33	7.02		2265
46	46.31	0.170	2279.05	2286.19	3.953	0.31	7.15		2286
47	47.28	0.155	2302.38	2309.66	3.982	0.28	7.29		2310
48	48.26	0.139	2328.16	2335.61	4.021	0.26	7.45		2336
49	49.23	0.122	2357.18	2364.82	4.076	0.23	7.64		2365
50	50.20	0.105	<b>2390.65</b>	<b>2398.54</b>	4.157	0.20	7.89		<b>2400</b>
51	51.16	0.086	2430.61	2438.85	4.285	0.16	8.24		2439
52	52.13	0.066	2480.85	2489.68	4.527	0.13	8.82		2490
53	53.09	0.045	2549.93	2560.12	5.149	0.09	10.19		2560
54	54.05	0.023	2665.11	2672.50	3.705	0.05	7.39		2672
55	54.71	0.007	2826.25	2780.18	1.139	-0.29	-46.07		2826

#: Note that the paper conversion was used for the Final column.

Table 16: Summary of Comparability Analysis – April Grade 10 Social Studies

RAW	CBT_RS	RS_SD	PAP_SS	CBT_SS	SS_SD	RS_DIF	SS_DIF	SIG	Final
0	0.31	0.010	1312.07	1357.67	1.395	0.31	45.60		1312
1	1.04	0.031	1458.41	1462.40	3.287	0.04	3.99		1462
2	2.08	0.059	1563.23	1567.97	3.813	0.08	4.74		1568
3	3.11	0.084	1626.31	1631.50	3.932	0.11	5.19		1632
4	4.15	0.108	1672.34	1677.84	3.987	0.15	5.50		1678
5	5.19	0.130	1709.03	1714.79	4.011	0.19	5.76		1715
6	6.22	0.150	1739.85	1745.84	4.018	0.22	5.99		1746
7	7.26	0.168	1766.63	1772.84	4.015	0.26	6.21		1773
8	8.30	0.185	1790.48	1796.90	4.007	0.30	6.42		1797
9	9.33	0.201	1812.11	1818.73	3.995	0.33	6.63		1819
10	10.37	0.215	1832.00	1838.83	3.981	0.37	6.83		1839
11	11.40	0.228	1850.51	1857.55	3.966	0.40	7.04		1858
12	12.44	0.240	1867.90	1875.14	3.951	0.44	7.24		1875
13	13.47	0.250	1884.37	1891.81	3.932	0.47	7.44		1892
14	14.51	0.260	1900.07	1907.71	3.913	0.51	7.64		1908
15	15.54	0.268	1915.13	1922.98	3.893	0.54	7.84	*	1923
16	16.57	0.276	1929.66	1937.70	3.874	0.57	8.04	*	1938
17	17.60	0.282	1943.73	1951.98	3.854	0.60	8.25	*	1952
18	18.63	0.287	1957.43	1965.90	3.843	0.63	8.47	*	1966
19	19.66	0.291	1970.85	1979.49	3.813	0.66	8.64	*	1979
20	20.69	0.294	1983.97	1992.82	3.796	0.69	8.85	*	1993
21	21.71	0.297	1996.89	2005.94	3.779	0.71	9.05	*	2006
22	22.73	0.298	2009.65	2018.90	3.763	0.73	9.25	*	<u>2020</u>
23	23.75	0.298	2022.29	2031.75	3.748	0.75	9.45	*	<u>2032</u>
24	24.77	0.298	2034.86	2044.52	3.731	0.77	9.66	*	<u>2045</u>
25	25.79	0.296	2047.39	2057.25	3.716	0.79	9.86	*	<u>2060</u>
26	26.80	0.294	2059.93	2069.98	3.701	0.80	10.06	*	<u>2070</u>
27	27.81	0.291	2072.50	2082.75	3.687	0.81	10.26	*	<u>2083</u>
28	28.82	0.287	2085.14	<b>2095.60</b>	3.673	0.82	10.45	*	<b>2100</b>
29	29.82	0.282	<b>2097.91</b>	2108.56	3.658	0.82	10.65	*	<u>2109</u>
30	30.83	0.276	2110.83	2121.68	3.644	0.83	10.84	*	<u>2122</u>
31	31.82	0.270	2123.96	2134.99	3.631	0.82	11.03	*	<u>2135</u>
32	32.82	0.262	2137.34	2148.57	3.617	0.82	11.22	*	<u>2149</u>
33	33.81	0.254	2151.03	2162.45	3.609	0.81	11.41	*	<u>2162</u>
34	34.80	0.245	2165.09	2176.75	3.606	0.80	11.65	*	<u>2177</u>
35	35.78	0.236	2179.68	2191.48	3.584	0.78	11.80	*	<u>2191</u>
36	36.76	0.226	2194.75	2206.73	3.572	0.76	11.99	*	<u>2207</u>
37	37.74	0.215	2210.46	2222.63	3.559	0.74	12.17	*	<u>2223</u>
38	38.71	0.203	2226.93	2239.29	3.547	0.71	12.36	*	<u>2239</u>
39	39.68	0.190	2244.34	2256.88	3.535	0.68	12.54	*	<u>2257</u>
40	40.64	0.177	2262.86	2275.60	3.531	0.64	12.73	*	<u>2276</u>
41	41.60	0.163	2282.77	2295.71	3.531	0.60	12.94	*	<u>2296</u>
42	42.55	0.148	2304.42	2317.57	3.544	0.55	13.15	*	<u>2318</u>
43	43.50	0.133	2328.29	2341.68	3.567	0.50	13.39		<u>2342</u>
44	44.44	0.117	2355.10	2368.78	3.604	0.44	13.68		<u>2369</u>
45	45.38	0.100	<b>2385.95</b>	<b>2399.98</b>	3.665	0.38	14.04		<b>2400</b>
46	46.32	0.082	2422.67	2437.23	3.772	0.32	14.56		<u>2437</u>
47	47.24	0.063	2468.74	2484.18	3.981	0.24	15.45		<u>2484</u>
48	48.17	0.043	2531.87	2549.52	4.532	0.17	17.65		<u>2550</u>
49	49.09	0.022	2636.74	2649.45	3.258	0.09	12.71		<u>2649</u>
50	49.73	0.007	2783.27	2743.21	0.998	-0.27	-40.07		<u>2783</u>

**Table 17: Impact of Alternate Scoring Tables**

Grade/Language/Subject	Pass Rates (%) Comparison **		
	Paper w/Paper	Online w/Online	Online w/Alternate
Grade 7 English Reading	59.6	64.7	58.7
	26.5	20.3	20.3
Grade 7 English Math	58.5	64.6	57.7
	18.0	11.0	7.6
Grade 8 English Reading	46.1	49.1	47.4
	43.7	42.6	42.6
Grade 8 English Math	54.8	55.2	54.7
	18.3	18.2	15.6
Grade 8 English Science	42.9	49.9	46.5
	18.4	16.4	16.4
Grade 8 English Social Studies	51.1	55.7	53.9
	36.6	34.9	34.9
Grade 9 English Reading	62.3	56.7	70.0
	23.6	36.9	21.4
Grade 9 English Math	43.7	53.1	49.8
	17.2	18.3	15.3
Grade 10 ELA*	73.5	73.4	67.7
	11.3	14.3	18.7
Grade 10 English Math	49.9	55.2	52.5
	14.3	14.1	14.1
Grade 10 English Science	47.6	54.9	51.0
	11.8	11.0	11.0
Grade 10 English Social Studies	53.6	56.9	55.1
	33.4	34.5	34.5

\*: ELA requires an essay score of 2 or higher in addition to meeting the raw score cuts to pass.

\*\* : Pass rates based on various conversion tables. Top value is percentage of 'Met the Standard', bottom value is percentage of 'Commended'.

**Table 18: Result of Subgroup Analyses**

Grade/Language/Subject	Subgroup Analysis--Mean RS Difference (Effect Size) between Online and Paper over Replications*				
	Gender		Ethnicity		
	Male	Female	African American	Hispanic	White
Grade 7 English Reading	<b>-1.22</b> (-0.17)	<b>-1.30</b> (-0.20)	-0.72 (-0.10)	<b>-1.40</b> (-0.20)	<b>-1.25</b> (-0.21)
Grade 7 English Math	<b>-1.93</b> (-0.22)	<b>-1.36</b> (-0.16)	<b>-1.86</b> (-0.22)	<b>-1.53</b> (-0.18)	<b>-1.70</b> (-0.21)
Grade 8 English Reading	<b>-0.79</b> (-0.13)	<b>-0.68</b> (-0.12)	-0.67 (-0.10)	<b>-0.88</b> (-0.13)	<b>-0.70</b> (-0.14)
Grade 8 English Math	<b>-1.37</b> (-0.15)	<b>-1.26</b> (-0.15)	-1.24 (-0.13)	<b>-1.17</b> (-0.13)	<b>-1.37</b> (-0.17)
Grade 8 English Science	<b>-0.63</b> (-0.08)	<b>-0.91</b> (-0.11)	-0.50 (-0.06)	<b>-0.71</b> (-0.08)	<b>-0.89</b> (-0.12)
Grade 8 English Social Studies	<b>-0.63</b> (-0.08)	<b>-1.21</b> (-0.15)	<b>-1.09</b> (-0.13)	<b>-1.26</b> (-0.14)	<b>-0.69</b> (-0.10)
Grade 9 English Reading	<b>-0.70</b> (-0.17)	<b>-0.70</b> (-0.20)	<b>-0.59</b> (-0.15)	<b>-0.64</b> (-0.14)	<b>-0.74</b> (-0.23)
Grade 9 English Math	<b>-1.22</b> (-0.13)	<b>-1.25</b> (-0.13)	<b>-1.26</b> (-0.14)	<b>-0.97</b> (-0.11)	<b>-1.31</b> (-0.15)
Grade 10 ELA	-0.10 (-0.01)	0.27 (0.04)	-0.44 (-0.06)	-0.08 (-0.01)	0.22 (0.03)
Grade 10 English Math	<b>-0.93</b> (-0.08)	<b>-1.16</b> (-0.11)	-1.15 (-0.11)	<b>-1.07</b> (-0.09)	<b>-1.06</b> (-0.10)
Grade 10 English Science	-0.56 (-0.06)	-0.32 (-0.03)	-0.63 (-0.07)	0.14 (0.01)	<b>-0.73</b> (-0.08)
Grade 10 English Social Studies	<b>-0.68</b> (-0.09)	<b>-0.50</b> (-0.07)	-0.71 (-0.09)	-0.44 (-0.05)	<b>-0.69</b> (-0.10)

\*: RS Significant Differences ( $p < .05$ ) are in bold-face. Negative values indicate a lower mean RS for the online group.

**Table 19: Summary of Item-Level Analysis – April Grade 7 Reading**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.95	0.96	0.00	0.01	-0.47		-0.02
2	0.91	0.93	-0.02	0.01	-1.58		-0.06
3	0.94	0.95	-0.02	0.01	-1.71		-0.07
4	0.92	0.94	-0.02	0.01	-2.11	*	-0.09
5	0.85	0.91	-0.06	0.01	-4.75	*	-0.17
6	0.96	0.97	-0.01	0.01	-0.82		-0.04
7	0.88	0.88	0.00	0.01	-0.15		-0.01
8	0.87	0.88	0.00	0.01	-0.25		-0.01
9	0.95	0.94	0.01	0.01	1.00		0.04
10	0.90	0.91	-0.01	0.01	-1.12		-0.04
11	0.89	0.92	-0.02	0.01	-1.56		-0.07
12	0.92	0.94	-0.02	0.01	-1.56		-0.07
13	0.98	0.98	0.00	0.01	0.68		0.03
14	0.87	0.89	-0.02	0.01	-1.31		-0.05
15	0.78	0.82	-0.04	0.01	-3.00	*	-0.11
16	0.91	0.94	-0.03	0.01	-2.74	*	-0.11
17	0.80	0.82	-0.01	0.02	-0.77		-0.03
18	0.89	0.91	-0.02	0.01	-1.62		-0.07
19	0.85	0.86	0.00	0.02	-0.21		-0.01
20	0.69	0.75	-0.06	0.01	-4.00	*	-0.13
21	0.63	0.66	-0.04	0.02	-2.20	*	-0.08
22	0.87	0.90	-0.03	0.01	-1.86		-0.08
23	0.80	0.84	-0.03	0.02	-2.06	*	-0.09
24	0.69	0.71	-0.02	0.02	-1.14		-0.05
25	0.93	0.94	-0.01	0.01	-0.74		-0.03
26	0.73	0.74	-0.01	0.02	-0.49		-0.02
27	0.71	0.75	-0.04	0.02	-2.41	*	-0.09
28	0.80	0.84	-0.04	0.02	-2.78	*	-0.12
29	0.69	0.71	-0.03	0.02	-1.51		-0.06
30	0.32	0.39	-0.07	0.02	-3.74	*	-0.15
31	0.89	0.91	-0.01	0.01	-1.15		-0.05
32	0.57	0.58	-0.01	0.02	-0.59		-0.02
33	0.53	0.58	-0.05	0.02	-2.40	*	-0.10
34	0.70	0.73	-0.03	0.02	-1.84		-0.08
35	0.56	0.60	-0.04	0.02	-2.03	*	-0.08
36	0.76	0.77	-0.01	0.02	-0.81		-0.03
37	0.77	0.83	-0.05	0.01	-3.79	*	-0.13

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
38	0.75	0.79	-0.03	0.02	-2.02	*	-0.08
39	0.74	0.77	-0.02	0.02	-1.34		-0.06
40	0.63	0.62	0.01	0.02	0.56		0.02
41	0.59	0.65	-0.07	0.02	-3.23	*	-0.13
42	0.57	0.59	-0.03	0.02	-1.29		-0.06
43	0.71	0.73	-0.02	0.02	-0.83		-0.03
44	0.70	0.76	-0.06	0.02	-3.80	*	-0.14
45	0.73	0.76	-0.02	0.02	-1.59		-0.06
46	0.72	0.78	-0.05	0.02	-3.03	*	-0.13
47	0.81	0.84	-0.04	0.02	-2.19	*	-0.10
48	0.85	0.88	-0.04	0.01	-2.86	*	-0.11

**Table 20: Summary of Item-Level Analysis – Grade 7 Mathematics**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.76	0.87	-0.11	0.02	-5.39	*	-0.28
2	0.87	0.91	-0.04	0.02	-2.22	*	-0.11
3	0.70	0.76	-0.06	0.02	-3.19	*	-0.14
4	0.82	0.85	-0.03	0.02	-1.46		-0.08
5	0.64	0.77	-0.12	0.02	-5.07	*	-0.28
6	0.68	0.69	-0.01	0.02	-0.49		-0.02
7	0.61	0.69	-0.08	0.02	-3.29	*	-0.17
8	0.57	0.66	-0.09	0.03	-3.49	*	-0.19
9	0.76	0.79	-0.03	0.02	-1.38		-0.07
10	0.64	0.68	-0.04	0.02	-1.52		-0.08
11	0.84	0.82	0.01	0.02	0.57		0.03
12	0.76	0.82	-0.06	0.02	-3.18	*	-0.15
13	0.77	0.78	-0.01	0.02	-0.52		-0.03
14	0.59	0.63	-0.04	0.02	-1.67		-0.08
15	0.62	0.63	-0.01	0.02	-0.25		-0.01
16	0.57	0.55	0.02	0.03	0.84		0.04
17	0.75	0.78	-0.02	0.02	-1.09		-0.05
18	0.68	0.69	-0.01	0.03	-0.37		-0.02
19	0.58	0.57	0.01	0.03	0.50		0.03
20	0.64	0.64	0.00	0.02	-0.08		0.00
21	0.53	0.60	-0.07	0.02	-3.40	*	-0.15
22	0.74	0.78	-0.04	0.02	-2.24	*	-0.10
23	0.50	0.52	-0.03	0.02	-1.13		-0.05
24	0.67	0.64	0.03	0.03	1.32		0.07
25	0.46	0.52	-0.05	0.02	-2.32	*	-0.11
26	0.34	0.41	-0.07	0.02	-2.77	*	-0.14
27	0.60	0.65	-0.05	0.02	-1.98	*	-0.09
28	0.55	0.54	0.01	0.02	0.30		0.01
29	0.72	0.69	0.03	0.02	1.52		0.07
30	0.45	0.50	-0.05	0.02	-2.20	*	-0.11
31	0.62	0.65	-0.03	0.03	-1.23		-0.07
32	0.43	0.51	-0.08	0.02	-3.22	*	-0.15
33	0.61	0.68	-0.07	0.02	-2.88	*	-0.15
34	0.58	0.64	-0.06	0.02	-2.68	*	-0.13
35	0.72	0.75	-0.03	0.02	-1.41		-0.08
36	0.63	0.69	-0.06	0.02	-2.91	*	-0.13
37	0.68	0.74	-0.06	0.02	-2.61	*	-0.13

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
38	0.48	0.48	0.00	0.02	0.03		0.00
39	0.69	0.70	-0.01	0.02	-0.64		-0.03
40	0.70	0.70	0.01	0.03	0.34		0.02
41	0.72	0.78	-0.06	0.02	-2.88	*	-0.15
42	0.61	0.65	-0.05	0.02	-1.98	*	-0.10
43	0.54	0.58	-0.04	0.02	-1.46		-0.07
44	0.82	0.81	0.00	0.02	0.21		0.01
45	0.70	0.72	-0.02	0.02	-0.85		-0.04
46	0.64	0.73	-0.09	0.02	-3.80	*	-0.19
47	0.84	0.88	-0.03	0.02	-1.88		-0.09
48	0.85	0.82	0.03	0.02	1.81		0.09



**Table 21: Summary of Item-Level Analysis – Grade 8 Reading**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.96	0.97	-0.01	0.01	-1.65		-0.05
2	0.91	0.93	-0.02	0.01	-3.06	*	-0.09
3	0.93	0.94	-0.01	0.01	-1.22		-0.03
4	0.65	0.66	0.00	0.01	-0.34		-0.01
5	0.68	0.70	-0.02	0.01	-1.18		-0.04
6	0.84	0.84	0.00	0.01	0.01		0.00
7	0.93	0.93	0.01	0.01	1.04		0.03
8	0.87	0.89	-0.02	0.01	-1.97	*	-0.06
9	0.97	0.97	-0.01	0.00	-1.11		-0.03
10	0.83	0.85	-0.03	0.01	-2.51	*	-0.08
11	0.88	0.90	-0.02	0.01	-1.96		-0.06
12	0.91	0.93	-0.01	0.01	-1.45		-0.04
13	0.91	0.92	-0.01	0.01	-1.63		-0.04
14	0.90	0.93	-0.03	0.01	-3.27	*	-0.09
15	0.92	0.93	-0.01	0.01	-1.76		-0.05
16	0.93	0.95	-0.02	0.01	-3.03	*	-0.08
17	0.95	0.95	0.00	0.01	0.57		0.02
18	0.88	0.89	-0.01	0.01	-0.55		-0.02
19	0.86	0.88	-0.02	0.01	-2.65	*	-0.07
20	0.92	0.92	-0.01	0.01	-0.62		-0.02
21	0.77	0.82	-0.05	0.01	-4.29	*	-0.13
22	0.84	0.86	-0.02	0.01	-2.54	*	-0.06
23	0.92	0.92	0.00	0.01	0.00		0.00
24	0.79	0.79	0.00	0.01	-0.06		0.00
25	0.86	0.90	-0.04	0.01	-4.63	*	-0.12
26	0.90	0.90	0.00	0.01	-0.21		-0.01
27	0.88	0.87	0.01	0.01	0.55		0.02
28	0.70	0.74	-0.05	0.01	-4.15	*	-0.11
29	0.85	0.87	-0.01	0.01	-1.31		-0.04
30	0.85	0.85	0.00	0.01	0.03		0.00
31	0.69	0.71	-0.02	0.01	-1.29		-0.04
32	0.84	0.88	-0.04	0.01	-3.40	*	-0.10
33	0.86	0.87	-0.01	0.01	-0.90		-0.02
34	0.74	0.77	-0.03	0.01	-2.16	*	-0.06
35	0.90	0.91	-0.01	0.01	-1.11		-0.03
36	0.90	0.91	-0.02	0.01	-1.92		-0.05
37	0.81	0.84	-0.03	0.01	-3.10	*	-0.08

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
38	0.70	0.74	-0.04	0.01	-2.82	*	-0.08
39	0.88	0.88	0.00	0.01	-0.06		0.00
40	0.79	0.82	-0.03	0.01	-2.76	*	-0.08
41	0.94	0.95	-0.02	0.01	-2.29	*	-0.07
42	0.92	0.93	-0.01	0.01	-1.21		-0.04
43	0.90	0.93	-0.03	0.01	-4.71	*	-0.11
44	0.76	0.78	-0.02	0.01	-1.35		-0.04
45	0.82	0.84	-0.02	0.01	-1.78		-0.05
46	0.86	0.87	0.00	0.01	-0.33		-0.01
47	0.76	0.78	-0.02	0.01	-2.06	*	-0.06
48	0.81	0.80	0.00	0.01	0.34		0.01

**Table 22: Summary of Item-Level Analysis – Grade 8 Mathematics**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.93	0.93	0.00	0.01	0.08		0.00
2	0.86	0.90	-0.04	0.01	-3.48	*	-0.12
3	0.82	0.87	-0.05	0.01	-3.43	*	-0.13
4	0.77	0.81	-0.03	0.02	-2.25	*	-0.08
5	0.79	0.81	-0.02	0.01	-1.44		-0.05
6	0.78	0.78	0.00	0.02	-0.12		-0.01
7	0.80	0.82	-0.02	0.02	-1.60		-0.06
8	0.64	0.70	-0.06	0.02	-3.31	*	-0.12
9	0.84	0.86	-0.02	0.01	-1.97		-0.07
10	0.78	0.77	0.01	0.01	0.49		0.02
11	0.50	0.57	-0.06	0.02	-3.89	*	-0.13
12	0.69	0.71	-0.02	0.02	-1.39		-0.05
13	0.82	0.87	-0.05	0.01	-3.91	*	-0.14
14	0.68	0.67	0.01	0.02	0.67		0.02
15	0.50	0.50	0.00	0.02	-0.01		0.00
16	0.60	0.62	-0.02	0.02	-1.14		-0.04
17	0.64	0.66	-0.03	0.02	-1.76		-0.06
18	0.75	0.79	-0.04	0.02	-2.36	*	-0.09
19	0.65	0.70	-0.05	0.02	-2.73	*	-0.11
20	0.76	0.81	-0.04	0.01	-3.05	*	-0.11
21	0.75	0.77	-0.02	0.02	-1.62		-0.06
22	0.50	0.56	-0.06	0.02	-3.61	*	-0.13
23	0.73	0.75	-0.02	0.02	-1.47		-0.05
24	0.59	0.62	-0.03	0.02	-1.76		-0.06
25	0.49	0.58	-0.09	0.02	-5.54	*	-0.18
26	0.67	0.71	-0.04	0.02	-2.57	*	-0.09
27	0.93	0.93	0.00	0.01	0.08		0.00
28	0.86	0.90	-0.04	0.01	-3.48	*	-0.12
29	0.82	0.87	-0.05	0.01	-3.43	*	-0.13
30	0.77	0.81	-0.03	0.02	-2.25	*	-0.08
31	0.79	0.81	-0.02	0.01	-1.44		-0.05
32	0.78	0.78	0.00	0.02	-0.12		-0.01
33	0.80	0.82	-0.02	0.02	-1.60		-0.06
34	0.64	0.70	-0.06	0.02	-3.31	*	-0.12
35	0.84	0.86	-0.02	0.01	-1.97		-0.07
36	0.78	0.77	0.01	0.01	0.49		0.02
37	0.60	0.65	-0.05	0.02	-2.84	*	-0.10

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
38	0.80	0.82	-0.02	0.01	-1.61		-0.06
39	0.50	0.53	-0.02	0.02	-1.25		-0.05
40	0.71	0.72	-0.01	0.01	-1.04		-0.03
41	0.80	0.83	-0.03	0.02	-1.56		-0.07
42	0.52	0.59	-0.08	0.02	-4.32	*	-0.16
43	0.77	0.78	0.00	0.01	-0.09		0.00
44	0.72	0.72	0.00	0.02	0.08		0.00
45	0.71	0.73	-0.02	0.02	-1.11		-0.04
46	0.57	0.56	0.01	0.02	0.59		0.02
47	0.45	0.48	-0.03	0.02	-1.99		-0.07
48	0.59	0.62	-0.03	0.02	-2.15	*	-0.07
49	0.52	0.54	-0.02	0.01	-1.07		-0.03
50	0.67	0.64	0.02	0.02	1.12		0.05
51	0.69	0.70	0.00	0.02	-0.24		-0.01
52	0.72	0.76	-0.05	0.02	-3.29	*	-0.11
53	0.62	0.63	-0.01	0.02	-0.92		-0.03
54	0.47	0.52	-0.05	0.02	-2.95	*	-0.11
55	0.78	0.80	-0.01	0.02	-1.03		-0.04
56	0.76	0.79	-0.03	0.02	-1.82		-0.07
57	0.78	0.80	-0.02	0.01	-1.66		-0.05
58	0.87	0.88	-0.01	0.01	-0.58		-0.02
59	0.76	0.77	-0.02	0.02	-1.00		-0.04
60	0.88	0.89	-0.01	0.01	-1.09		-0.04

**Table 23: Summary of Item-Level Analysis – Grade 8 Science**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.91	0.91	0.00	0.00	-0.60		-0.01
2	0.87	0.90	-0.03	0.00	-6.71	*	-0.10
3	0.58	0.62	-0.04	0.01	-5.84	*	-0.09
4	0.81	0.86	-0.05	0.01	-9.74	*	-0.14
5	0.56	0.57	-0.01	0.01	-1.40		-0.02
6	0.70	0.72	-0.01	0.01	-1.94		-0.03
7	0.74	0.74	0.00	0.01	0.12		0.00
8	0.79	0.79	0.00	0.01	-0.58		-0.01
9	0.75	0.76	-0.01	0.01	-0.79		-0.01
10	0.61	0.66	-0.04	0.01	-6.13	*	-0.09
11	0.70	0.71	-0.01	0.01	-1.18		-0.02
12	0.84	0.86	-0.02	0.01	-3.76	*	-0.07
13	0.71	0.69	0.02	0.01	2.25	*	0.03
14	0.66	0.69	-0.04	0.01	-4.85	*	-0.08
15	0.52	0.51	0.02	0.01	2.45	*	0.03
16	0.69	0.71	-0.02	0.01	-2.60	*	-0.04
17	0.58	0.59	0.00	0.01	-0.59		-0.01
18	0.51	0.54	-0.04	0.01	-4.75	*	-0.07
19	0.55	0.58	-0.03	0.01	-4.44	*	-0.07
20	0.83	0.85	-0.02	0.01	-3.45	*	-0.05
21	0.43	0.43	0.00	0.01	0.09		0.00
22	0.50	0.52	-0.02	0.01	-3.32	*	-0.05
23	0.73	0.73	0.00	0.01	-0.36		-0.01
24	0.70	0.71	-0.02	0.01	-2.42	*	-0.04
25	0.40	0.41	-0.01	0.01	-1.65		-0.03
26	0.57	0.58	-0.01	0.01	-1.73		-0.03
27	0.79	0.79	0.00	0.01	-0.13		0.00
28	0.61	0.64	-0.03	0.01	-4.02	*	-0.06
29	0.56	0.63	-0.07	0.01	-9.57	*	-0.15
30	0.58	0.59	-0.01	0.01	-1.79		-0.02
31	0.61	0.60	0.01	0.01	0.70		0.01
32	0.51	0.54	-0.03	0.01	-3.42	*	-0.05
33	0.65	0.65	0.00	0.01	0.06		0.00
34	0.63	0.65	-0.02	0.01	-2.13	*	-0.03
35	0.66	0.68	-0.01	0.01	-1.94		-0.03
36	0.69	0.69	0.00	0.01	0.56		0.01
37	0.71	0.73	-0.01	0.01	-1.52		-0.02

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
38	0.63	0.65	-0.02	0.01	-2.84	*	-0.04
39	0.63	0.65	-0.02	0.01	-2.33	*	-0.04
40	0.61	0.63	-0.02	0.01	-2.37	*	-0.04
41	0.66	0.68	-0.02	0.01	-2.80	*	-0.05
42	0.76	0.75	0.01	0.01	1.06		0.02
43	0.66	0.62	0.03	0.01	4.27	*	0.07
44	0.75	0.75	0.00	0.01	-0.16		0.00
45	0.88	0.88	0.00	0.01	0.24		0.00
46	0.78	0.79	-0.01	0.01	-1.31		-0.02
47	0.87	0.88	-0.01	0.01	-2.77	*	-0.04
48	0.86	0.87	-0.01	0.01	-1.32		-0.02
49	0.83	0.83	-0.01	0.01	-1.27		-0.02
50	0.64	0.74	-0.10	0.01	-12.64	*	-0.22

**Table 24: Summary of Item-Level Analysis – Grade 8 Social Studies**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.91	0.91	0.00	0.00	-0.60		-0.01
2	0.87	0.90	-0.03	0.00	-6.71	*	-0.10
3	0.58	0.62	-0.04	0.01	-5.84	*	-0.09
4	0.81	0.86	-0.05	0.01	-9.74	*	-0.14
5	0.56	0.57	-0.01	0.01	-1.40		-0.02
6	0.70	0.72	-0.01	0.01	-1.94		-0.03
7	0.74	0.74	0.00	0.01	0.12		0.00
8	0.79	0.79	0.00	0.01	-0.58		-0.01
9	0.75	0.76	-0.01	0.01	-0.79		-0.01
10	0.61	0.66	-0.04	0.01	-6.13	*	-0.09
11	0.70	0.71	-0.01	0.01	-1.18		-0.02
12	0.84	0.86	-0.02	0.01	-3.76	*	-0.07
13	0.71	0.69	0.02	0.01	2.25	*	0.03
14	0.66	0.69	-0.04	0.01	-4.85	*	-0.08
15	0.52	0.51	0.02	0.01	2.45	*	0.03
16	0.69	0.71	-0.02	0.01	-2.60	*	-0.04
17	0.58	0.59	0.00	0.01	-0.59		-0.01
18	0.51	0.54	-0.04	0.01	-4.75	*	-0.07
19	0.55	0.58	-0.03	0.01	-4.44	*	-0.07
20	0.83	0.85	-0.02	0.01	-3.45	*	-0.05
21	0.43	0.43	0.00	0.01	0.09		0.00
22	0.50	0.52	-0.02	0.01	-3.32	*	-0.05
23	0.73	0.73	0.00	0.01	-0.36		-0.01
24	0.70	0.71	-0.02	0.01	-2.42	*	-0.04
25	0.40	0.41	-0.01	0.01	-1.65		-0.03
26	0.57	0.58	-0.01	0.01	-1.73		-0.03
27	0.79	0.79	0.00	0.01	-0.13		0.00
28	0.61	0.64	-0.03	0.01	-4.02	*	-0.06
29	0.56	0.63	-0.07	0.01	-9.57	*	-0.15
30	0.58	0.59	-0.01	0.01	-1.79		-0.02
31	0.61	0.60	0.01	0.01	0.70		0.01
32	0.51	0.54	-0.03	0.01	-3.42	*	-0.05
33	0.65	0.65	0.00	0.01	0.06		0.00
34	0.63	0.65	-0.02	0.01	-2.13	*	-0.03
35	0.66	0.68	-0.01	0.01	-1.94		-0.03
36	0.69	0.69	0.00	0.01	0.56		0.01
37	0.71	0.73	-0.01	0.01	-1.52		-0.02

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
38	0.63	0.65	-0.02	0.01	-2.84	*	-0.04
39	0.63	0.65	-0.02	0.01	-2.33	*	-0.04
40	0.61	0.63	-0.02	0.01	-2.37	*	-0.04
41	0.66	0.68	-0.02	0.01	-2.80	*	-0.05
42	0.76	0.75	0.01	0.01	1.06		0.02
43	0.66	0.62	0.03	0.01	4.27	*	0.07
44	0.75	0.75	0.00	0.01	-0.16		0.00
45	0.88	0.88	0.00	0.01	0.24		0.00
46	0.78	0.79	-0.01	0.01	-1.31		-0.02
47	0.87	0.88	-0.01	0.01	-2.77	*	-0.04
48	0.86	0.87	-0.01	0.01	-1.32		-0.02



**Table 25: Summary of Item-Level Analysis – Grade 9 Reading**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.98	0.99	-0.01	0.00	-2.38	*	-0.07
2	0.95	0.96	-0.01	0.01	-1.87		-0.05
3	0.74	0.75	0.00	0.01	-0.29		-0.01
4	0.79	0.78	0.00	0.01	0.34		0.01
5	0.97	0.98	-0.01	0.01	-1.88		-0.06
6	0.97	0.97	0.00	0.00	-0.08		0.00
7	0.90	0.91	-0.01	0.01	-0.74		-0.02
8	0.78	0.81	-0.03	0.01	-3.04	*	-0.08
9	0.89	0.90	0.00	0.01	-0.51		-0.01
10	0.91	0.93	-0.02	0.01	-2.43	*	-0.07
11	0.64	0.66	-0.03	0.01	-2.29	*	-0.06
12	0.97	0.97	0.00	0.00	-0.43		-0.01
13	0.62	0.65	-0.03	0.01	-2.14	*	-0.06
14	0.98	0.98	0.00	0.00	0.59		0.02
15	0.89	0.92	-0.03	0.01	-3.93	*	-0.11
16	0.87	0.89	-0.02	0.01	-2.44	*	-0.06
17	0.86	0.85	0.01	0.01	0.95		0.03
18	0.84	0.85	-0.01	0.01	-0.92		-0.03
19	0.99	0.99	0.00	0.00	0.07		0.00
20	0.95	0.96	0.00	0.01	-0.58		-0.02
21	0.95	0.92	0.02	0.01	3.58	*	0.10
22	0.86	0.87	-0.01	0.01	-1.08		-0.03
23	0.92	0.92	0.00	0.01	-0.17		0.00
24	0.97	0.98	0.00	0.00	-0.32		-0.01
25	0.99	0.99	0.00	0.00	0.00		0.00
26	0.90	0.93	-0.03	0.01	-4.21	*	-0.12
27	0.98	0.98	0.00	0.00	0.50		0.01
28	0.98	0.98	0.00	0.00	0.80		0.02
29	0.72	0.73	-0.01	0.01	-1.21		-0.03
30	0.95	0.96	-0.01	0.01	-1.26		-0.03
31	0.77	0.80	-0.03	0.01	-2.37	*	-0.07
32	0.94	0.94	0.00	0.01	-0.09		0.00
33	0.77	0.89	-0.12	0.01	-11.30	*	-0.33
34	1.35	1.48	-0.13	0.01	-9.08	*	-0.25
35	1.17	1.26	-0.09	0.01	-6.78	*	-0.20
36	0.98	1.08	-0.10	0.01	-6.59	*	-0.19

**Table 26: Summary of Item-Level Analysis – Grade 9 Mathematics**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.91	0.92	-0.01	0.01	-2.48	*	-0.05
2	0.91	0.93	-0.02	0.01	-2.91	*	-0.07
3	0.79	0.82	-0.03	0.01	-3.81	*	-0.08
4	0.74	0.76	-0.02	0.01	-1.93		-0.04
5	0.74	0.75	-0.02	0.01	-2.02	*	-0.04
6	0.81	0.84	-0.03	0.01	-4.11	*	-0.09
7	0.83	0.82	0.00	0.01	0.56		0.01
8	0.71	0.69	0.02	0.01	1.54		0.04
9	0.88	0.88	0.00	0.01	-0.25		-0.01
10	0.48	0.52	-0.04	0.01	-3.39	*	-0.08
11	0.78	0.79	-0.01	0.01	-1.46		-0.03
12	0.47	0.47	0.00	0.01	-0.15		0.00
13	0.41	0.51	-0.10	0.01	-8.31	*	-0.20
14	0.73	0.76	-0.03	0.01	-3.97	*	-0.08
15	0.82	0.86	-0.04	0.01	-5.05	*	-0.10
16	0.41	0.43	-0.02	0.01	-1.63		-0.04
17	0.64	0.66	-0.02	0.01	-2.87	*	-0.05
18	0.46	0.47	0.00	0.01	-0.40		-0.01
19	0.64	0.66	-0.02	0.01	-1.70		-0.04
20	0.79	0.79	0.00	0.01	-0.26		-0.01
21	0.55	0.56	0.00	0.01	-0.37		-0.01
22	0.70	0.69	0.01	0.01	0.72		0.02
23	0.57	0.58	-0.02	0.01	-1.44		-0.03
24	0.57	0.59	-0.02	0.01	-2.32	*	-0.05
25	0.80	0.81	-0.01	0.01	-0.71		-0.01
26	0.77	0.79	-0.02	0.01	-1.87		-0.04
27	0.61	0.65	-0.03	0.01	-3.65	*	-0.07
28	0.53	0.58	-0.05	0.01	-5.52	*	-0.11
29	0.71	0.73	-0.02	0.01	-2.58	*	-0.05
30	0.45	0.47	-0.03	0.01	-2.72	*	-0.06
31	0.82	0.82	0.00	0.01	-0.10		0.00
32	0.53	0.55	-0.02	0.01	-1.70		-0.04
33	0.63	0.64	-0.01	0.01	-1.16		-0.02
34	0.51	0.53	-0.02	0.01	-2.21	*	-0.04
35	0.55	0.56	-0.02	0.01	-1.59		-0.03
36	0.59	0.61	-0.02	0.01	-2.21	*	-0.04
37	0.50	0.57	-0.07	0.01	-6.68	*	-0.14

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
38	0.64	0.66	-0.02	0.01	-1.90		-0.04
39	0.59	0.67	-0.08	0.01	-8.29	*	-0.16
40	0.60	0.60	0.00	0.01	-0.12		0.00
41	0.40	0.46	-0.06	0.01	-5.75	*	-0.12
42	0.59	0.62	-0.03	0.01	-3.31	*	-0.07
43	0.66	0.68	-0.02	0.01	-1.99	*	-0.04
44	0.56	0.57	-0.01	0.01	-0.75		-0.02
45	0.71	0.72	-0.01	0.01	-0.88		-0.02
46	0.69	0.74	-0.05	0.01	-5.30	*	-0.10
47	0.71	0.73	-0.02	0.01	-1.81		-0.04
48	0.66	0.70	-0.04	0.01	-3.83	*	-0.08
49	0.65	0.69	-0.04	0.01	-3.71	*	-0.08
50	0.84	0.85	-0.01	0.01	-0.79		-0.02
51	0.65	0.72	-0.08	0.01	-8.65	*	-0.16
52	0.89	0.91	-0.02	0.01	-3.26	*	-0.07

**Table 27: Summary of Item-Level Analysis – Grade 10 ELA**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.98	0.97	0.01	0.01	1.57		0.06
2	0.93	0.93	0.01	0.01	0.62		0.02
3	0.89	0.91	-0.02	0.01	-1.89		-0.07
4	0.90	0.91	-0.01	0.01	-1.03		-0.04
5	0.88	0.88	-0.01	0.01	-0.44		-0.02
6	0.97	0.97	0.00	0.01	-0.23		-0.01
7	0.80	0.82	-0.02	0.01	-1.21		-0.04
8	0.86	0.87	-0.02	0.01	-1.23		-0.04
9	0.97	0.97	0.00	0.01	-0.24		-0.01
10	0.84	0.84	0.00	0.01	0.11		0.00
11	0.84	0.84	0.00	0.01	-0.18		-0.01
12	0.81	0.82	0.00	0.01	-0.32		-0.01
13	0.96	0.96	0.00	0.01	-0.23		-0.01
14	0.97	0.98	-0.01	0.01	-2.21	*	-0.09
15	0.99	0.99	0.00	0.00	0.41		0.02
16	0.80	0.81	-0.01	0.01	-0.38		-0.01
17	0.66	0.71	-0.05	0.02	-3.16	*	-0.11
18	0.75	0.76	-0.01	0.02	-0.52		-0.02
19	0.93	0.92	0.01	0.01	0.55		0.02
20	0.95	0.94	0.01	0.01	1.55		0.06
21	0.81	0.83	-0.02	0.02	-1.37		-0.05
22	0.94	0.93	0.01	0.01	0.76		0.03
23	0.77	0.81	-0.04	0.02	-2.44	*	-0.09
24	0.93	0.93	0.00	0.01	-0.19		-0.01
25	0.90	0.90	0.00	0.01	-0.40		-0.01
26	0.88	0.87	0.02	0.01	1.36		0.05
27	0.79	0.79	0.00	0.02	-0.27		-0.01
28	0.60	0.66	-0.07	0.02	-4.03	*	-0.14
29	1.32	1.37	-0.05	0.02	-2.03	*	-0.08
30	1.32	1.40	-0.08	0.02	-3.32	*	-0.12
31	1.07	1.12	-0.05	0.02	-2.84	*	-0.10
32	0.94	0.95	-0.01	0.01	-1.36		-0.05
33	0.55	0.62	-0.07	0.02	-3.53	*	-0.14
34	0.87	0.85	0.02	0.01	1.31		0.04
35	0.95	0.95	0.00	0.01	-0.02		0.00
36	0.87	0.89	-0.02	0.01	-1.28		-0.05
37	0.89	0.88	0.01	0.01	0.84		0.03

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
38	0.88	0.88	0.00	0.01	-0.02		0.00
39	0.95	0.96	0.00	0.01	-0.49		-0.02
40	0.92	0.92	-0.01	0.01	-0.51		-0.02
41	0.92	0.90	0.02	0.01	2.02	*	0.07
42	0.92	0.94	-0.02	0.01	-1.96	*	-0.08
43	0.95	0.95	-0.01	0.01	-0.73		-0.03
44	0.81	0.83	-0.02	0.01	-1.55		-0.05
45	0.83	0.84	0.00	0.01	-0.38		-0.01
46	0.94	0.94	0.00	0.01	0.11		0.00
47	0.92	0.92	0.00	0.01	0.07		0.00
48	0.96	0.97	0.00	0.01	-0.39		-0.01
49	0.80	0.81	-0.02	0.01	-1.22		-0.04
50	0.94	0.94	0.00	0.01	0.56		0.02
51	0.87	0.88	-0.01	0.01	-0.41		-0.02
52	10.42	9.80	0.62	0.11	5.45	*	0.18

**Table 28: Summary of Item-Level Analysis – Grade 10 Mathematics**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.90	0.92	-0.02	0.01	-1.97		-0.08
2	0.84	0.86	-0.01	0.01	-0.98		-0.03
3	0.68	0.70	-0.02	0.02	-1.27		-0.04
4	0.90	0.89	0.00	0.01	0.26		0.01
5	0.67	0.66	0.01	0.02	0.57		0.02
6	0.77	0.78	-0.01	0.02	-0.33		-0.01
7	0.89	0.90	-0.01	0.01	-0.99		-0.04
8	0.57	0.58	0.00	0.02	-0.19		-0.01
9	0.75	0.78	-0.03	0.02	-1.80		-0.06
10	0.43	0.40	0.03	0.02	1.44		0.05
11	0.76	0.77	-0.01	0.02	-0.61		-0.02
12	0.56	0.58	-0.02	0.02	-0.80		-0.03
13	0.52	0.51	0.00	0.02	0.18		0.01
14	0.52	0.54	-0.02	0.02	-0.89		-0.04
15	0.46	0.52	-0.06	0.02	-3.20	*	-0.13
16	0.81	0.81	0.00	0.01	-0.17		-0.01
17	0.50	0.51	-0.01	0.02	-0.72		-0.03
18	0.79	0.82	-0.03	0.02	-1.86		-0.07
19	0.59	0.58	0.02	0.02	0.84		0.03
20	0.64	0.63	0.02	0.02	1.19		0.04
21	0.57	0.66	-0.09	0.02	-4.79	*	-0.18
32	0.47	0.51	-0.04	0.02	-2.30	*	-0.08
33	0.67	0.71	-0.04	0.02	-2.41	*	-0.09
34	0.57	0.56	0.02	0.02	0.90		0.03
35	0.63	0.64	-0.01	0.02	-0.62		-0.02
36	0.46	0.39	0.07	0.02	3.61	*	0.13
37	0.51	0.53	-0.02	0.02	-0.80		-0.04
38	0.52	0.56	-0.04	0.02	-2.73	*	-0.08
39	0.38	0.49	-0.11	0.02	-6.44	*	-0.23
40	0.83	0.84	-0.01	0.01	-0.75		-0.03
41	0.73	0.78	-0.05	0.01	-3.57	*	-0.12
42	0.49	0.52	-0.03	0.02	-1.76		-0.06
43	0.55	0.57	-0.02	0.02	-1.04		-0.04
44	0.86	0.86	0.01	0.01	0.40		0.02
45	0.63	0.62	0.01	0.02	0.52		0.02
46	0.61	0.63	-0.01	0.02	-0.80		-0.03
47	0.78	0.78	0.00	0.02	0.21		0.01

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
48	0.39	0.39	0.00	0.02	-0.17		-0.01
49	0.77	0.80	-0.03	0.01	-1.96		-0.07
50	0.68	0.72	-0.03	0.02	-2.13	*	-0.07
51	0.64	0.65	-0.01	0.02	-0.71		-0.03
52	0.74	0.73	0.01	0.02	0.69		0.02
53	0.38	0.44	-0.06	0.02	-2.92	*	-0.12
54	0.77	0.75	0.02	0.02	1.39		0.06
55	0.65	0.70	-0.05	0.02	-3.01	*	-0.11
56	0.65	0.64	0.02	0.02	1.04		0.04
57	0.82	0.83	-0.01	0.01	-1.04		-0.04
58	0.74	0.76	-0.02	0.02	-1.04		-0.04
59	0.52	0.56	-0.04	0.02	-2.03		-0.08
60	0.70	0.74	-0.04	0.02	-2.66	*	-0.09
61	0.82	0.81	0.01	0.01	0.76		0.03
62	0.72	0.76	-0.04	0.01	-2.75	*	-0.09
63	0.69	0.73	-0.04	0.02	-2.67	*	-0.09
64	0.64	0.72	-0.08	0.02	-5.20	*	-0.18
65	0.77	0.82	-0.05	0.01	-3.36	*	-0.12
66	0.85	0.90	-0.05	0.01	-3.52	*	-0.14

**Table 29: Summary of Item-Level Analysis – Grade 10 Science**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.80	0.86	-0.06	0.01	-5.07	*	-0.16
2	0.83	0.82	0.01	0.01	0.67		0.02
3	0.82	0.84	-0.02	0.01	-1.21		-0.04
4	0.79	0.76	0.03	0.02	2.02		0.07
5	0.77	0.78	-0.02	0.01	-1.18		-0.04
6	0.72	0.79	-0.07	0.02	-4.22	*	-0.16
7	0.83	0.85	-0.02	0.01	-1.34		-0.05
8	0.80	0.79	0.01	0.01	0.63		0.02
9	0.51	0.56	-0.04	0.02	-2.44	*	-0.09
10	0.73	0.75	-0.01	0.02	-0.92		-0.03
11	0.75	0.77	-0.02	0.02	-1.51		-0.05
12	0.79	0.79	0.01	0.01	0.55		0.02
13	0.70	0.68	0.02	0.02	1.28		0.05
14	0.69	0.70	-0.01	0.02	-0.70		-0.03
15	0.78	0.78	0.00	0.01	-0.03		0.00
16	0.66	0.64	0.02	0.02	1.09		0.04
17	0.87	0.85	0.02	0.01	1.31		0.05
18	0.59	0.62	-0.03	0.02	-1.85		-0.07
19	0.65	0.67	-0.02	0.02	-1.15		-0.04
20	0.84	0.81	0.02	0.01	2.19	*	0.06
31	0.68	0.70	-0.02	0.02	-1.14		-0.04
32	0.65	0.66	0.00	0.02	-0.13		0.00
33	0.55	0.57	-0.02	0.02	-1.46		-0.05
34	0.60	0.58	0.02	0.02	1.32		0.04
35	0.54	0.55	-0.01	0.02	-0.55		-0.02
36	0.58	0.57	0.01	0.02	0.85		0.03
37	0.62	0.62	0.01	0.02	0.38		0.02
38	0.47	0.48	-0.01	0.02	-0.73		-0.03
39	0.52	0.53	-0.01	0.02	-0.43		-0.02
40	0.45	0.51	-0.06	0.02	-3.31	*	-0.11
41	0.55	0.57	-0.02	0.02	-1.05		-0.04
42	0.54	0.55	-0.02	0.02	-1.15		-0.04
43	0.49	0.47	0.02	0.02	1.23		0.04
44	0.54	0.52	0.02	0.02	0.97		0.03
45	0.78	0.78	0.00	0.02	0.06		0.00
46	0.70	0.72	-0.02	0.02	-1.23		-0.04
47	0.64	0.62	0.02	0.02	1.08		0.04



ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
48	0.56	0.59	-0.03	0.02	-1.76		-0.06
49	0.57	0.60	-0.03	0.02	-1.72		-0.06
50	0.66	0.70	-0.03	0.02	-2.15	*	-0.07
51	0.69	0.68	0.02	0.02	0.99		0.04
52	0.61	0.58	0.03	0.02	1.50		0.06
53	0.46	0.51	-0.05	0.02	-2.66	*	-0.10
54	0.71	0.70	0.01	0.02	0.36		0.01
55	0.61	0.66	-0.04	0.02	-2.75	*	-0.09
56	0.85	0.86	0.00	0.01	-0.34		-0.01
57	0.73	0.74	-0.02	0.01	-1.22		-0.04
58	0.73	0.73	0.00	0.02	-0.24		-0.01
59	0.74	0.72	0.02	0.01	1.31		0.04
60	0.71	0.71	0.01	0.02	0.37		0.02
61	0.77	0.76	0.00	0.02	0.29		0.01
62	0.78	0.80	-0.02	0.01	-1.72		-0.09
63	0.78	0.76	0.02	0.01	1.30		-0.09
64	0.66	0.69	-0.03	0.02	-1.65		-0.18
65	0.82	0.83	-0.01	0.01	-0.47		-0.12

**Table 30: Summary of Item-Level Analysis – Grade 10 Social Studies**

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
1	0.78	0.80	-0.02	0.01	-2.17	*	-0.06
2	0.54	0.56	-0.02	0.01	-1.14		-0.03
3	0.65	0.66	-0.01	0.01	-0.75		-0.02
4	0.68	0.72	-0.04	0.01	-3.03	*	-0.09
5	0.67	0.71	-0.04	0.02	-2.85	*	-0.09
6	0.76	0.76	0.01	0.01	0.49		0.01
7	0.68	0.71	-0.02	0.01	-1.94		-0.05
8	0.71	0.77	-0.06	0.01	-4.55	*	-0.13
9	0.88	0.88	0.00	0.01	0.42		0.01
10	0.73	0.74	0.00	0.01	-0.29		-0.01
11	0.75	0.75	-0.01	0.01	-0.57		-0.02
12	0.94	0.95	-0.01	0.01	-0.92		-0.03
13	0.80	0.79	0.01	0.01	0.72		0.02
14	0.84	0.84	0.00	0.01	0.32		0.01
15	0.84	0.85	-0.01	0.01	-1.21		-0.03
16	0.84	0.84	0.00	0.01	0.09		0.00
17	0.81	0.84	-0.03	0.01	-2.72	*	-0.09
18	0.79	0.80	-0.01	0.01	-0.88		-0.02
19	0.87	0.87	-0.01	0.01	-0.71		-0.02
20	0.70	0.72	-0.02	0.01	-1.26		-0.04
21	0.88	0.89	-0.01	0.01	-0.92		-0.03
22	0.79	0.82	-0.03	0.01	-3.21	*	-0.08
23	0.87	0.87	0.00	0.01	0.22		0.01
23	0.71	0.73	-0.02	0.01	-1.73		-0.05
25	0.86	0.88	-0.02	0.01	-2.14	*	-0.06
36	0.89	0.91	-0.01	0.01	-1.21		-0.04
37	0.91	0.93	-0.01	0.01	-1.52		-0.05
38	0.80	0.79	0.00	0.01	0.36		0.01
39	0.93	0.91	0.01	0.01	1.81		0.05
40	0.93	0.92	0.01	0.01	1.25		0.04
41	0.89	0.89	0.00	0.01	0.36		0.01
42	0.89	0.84	0.05	0.01	4.42	*	0.13
43	0.83	0.84	-0.01	0.01	-0.94		-0.03
44	0.74	0.78	-0.04	0.01	-3.58	*	-0.10
45	0.85	0.85	0.00	0.01	0.06		0.00
46	0.83	0.83	0.00	0.01	-0.07		0.00
47	0.83	0.83	0.00	0.01	-0.33		-0.01

ITEM	CBT_PVAL	PAP_PVAL	DIF_PVAL	DIF_STD	Z_DIF	SIG	EFFECT_SIZE
48	0.82	0.82	0.00	0.01	0.48		0.01
49	0.79	0.81	-0.02	0.01	-1.58		-0.05
50	0.76	0.80	-0.04	0.01	-3.85	*	-0.10
51	0.74	0.79	-0.05	0.01	-3.70	*	-0.11
52	0.84	0.85	-0.01	0.01	-0.92		-0.03
53	0.78	0.79	0.00	0.01	-0.29		-0.01
54	0.68	0.73	-0.05	0.01	-3.77	*	-0.12
55	0.73	0.75	-0.02	0.01	-1.31		-0.04
56	0.87	0.87	0.01	0.01	0.72		0.02
57	0.70	0.76	-0.06	0.01	-4.48	*	-0.13
58	0.82	0.81	0.01	0.01	0.76		0.02
59	0.59	0.59	0.00	0.01	-0.18		-0.01
60	0.84	0.84	0.00	0.01	0.14		0.00