

Executive Summary

Report on the Study of the Alignment of Student Assignments to the Academic Standards in the State of Nevada (Senate Bill 184, Chapter 420, Statutes of Nevada 2007)

for the collection period March 10 through May 02, 2008

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As part of a 100-school, statewide curriculum analysis project contracted by the Legislative Counsel Bureau, this report is a statistical study of student assignments collected from Nevada public classrooms. Funding for this project was provided through Senate Bill 184, Chapter 420, Statutes of Nevada 2007.

Using its Ruby™ curriculum analysis service, The Standards Company LLC collected and analyzed student assignments in English language arts and mathematics from grades 3-8 during the period of March 10 to May 2, 2008. Although not all results required of this study have been generated at this time, the data displayed in the tables and figures in this summary is complete. This document is an executive summary of the most telling results found so far, which indicate (1) the enacted curricula in both English language arts and mathematics miss the targeted grade level by wide margins, most notably in mathematics, (2) the depth-of-knowledge levels of low-performing schools in mathematics was significantly lower than high-performing schools, (3) letter grades received from students attending schools of low socioeconomic status were significantly higher than those attending schools of high socioeconomic status, and (4) a preponderance of collected assignments correlated to workbook samples completed independently.

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1 Introduction

1.1 The need to measure the enacted curriculum

The content taught to students on a daily basis (the enacted curriculum) significantly influences how much they learn. The enacted curriculum is an especially important indicator for analyzing the achievement gap between students. Even in cases where the adopted curriculum is fully aligned with state and national standards, there can be a sharp distinction between the enacted and adopted curriculum. The reasons for such a disparity are fourfold:

1. Teachers sometimes supplement state-adopted content when they feel it falls short of their own expectations of what constitutes rigorous content, or they weaken state-adopted content when they feel it is too difficult for their students.
2. Teachers often find curriculum that they feel compelled to deliver out of their own personal interests or the personal interests of their students.
3. Teacher's perceptions of what the standards expect them to teach may not match the intent of the standards writers.
4. Teachers may assign questions and problems that do not match the levels of rigor expected by the writers of the standards.

1.2 The scope of this *Ruby*TM report

In January 2008, the Legislative Counsel Bureau of the Nevada State Legislature, in response to enacted state legislation,¹ contracted with The Standards Company LLC to collect student work for grades 3-8 in the areas of mathematics and English language arts from 100 public schools throughout the state of Nevada. The service provided by The Standards Company LLC, titled *Ruby*TM, analyzed the student assignments for the following issues:

1. Alignment - the percentage of student assignments that correspond to academic content standards is one of the most important factors in student success.
2. Extent of coverage (standard sampling) - one means of increasing student success is ensuring that they are taught content spanning a wide range of standards.
3. Cognitive rigor - higher-order thinking skills and sophisticated projects are essential elements of academic rigor.
4. Letter-grade analysis - measuring the enacted curriculum is one of the best ways to understand the sources of frustration when state test scores do not meet the achievement recorded in students' semester grades.

Statewide collection began in March 2008 and ended in May 2008. Each participating school collected student work for five consecutive days during this period.

As part of the project scope, each school participating in the study received an individual school report reflecting the student work collected from its own teaching staff, thus providing school staff with information covering a broad range of issues affecting student achievement. Individual school reports were mailed or emailed on August 18, 2008.

¹Senate Bill 184, Chapter 420, Statutes of Nevada 2007.

2 Description of reports

We now describe the reports related to curriculum analysis, beginning in this section with a general discussion of the reports. Throughout this report, the reader should keep in mind the following:

1. The final report is not due until December 19, 2008. This executive summary, which details results accumulated up to this point, is being submitted to the Legislative Counsel Bureau on September 30, 2008 and does not constitute the final report required by the agreement between the Legislative Counsel Bureau and The Standards Company LLC, signed February 27, 2008.
2. Although The Standards Company LLC has accumulated all the data required of the study, the company has not been able to generate all the necessary reports required of the agreement. Specifically, the following are unfinished at this time but will be included in the final report:
 1. Extent-of-coverage results, which describe the frequency in which certain standards appeared in student assignments and a comparison to the frequency in which the same standards appear in state assessments.
 2. Alignment to Nevada English language arts performance standards.
 3. A technical manual that describes the collection process and provides a statistical analysis of the results.
3. The results shown in this executive summary represent finalized data and will not change henceforth.
4. These reports reflect only one week of collection at each participating school, hardly representative of the entire school year.
5. Percentages that should in theory sum to 100 might not due to rounding.

2.1 Alignment to Standards

Grade-level instruction provides an equal opportunity for all students to succeed. Curricular materials that are aligned to grade-level standards ensure that students are sufficiently challenged and provide a common baseline for judging student achievement. Therefore, one of the most important curricular measurements is the percentage of assignments aligned to state content standards.

Student assignments often address more than one state standard, so a clear understanding of what constitutes the enacted grade level of an assignment must be established at the outset of any study. The definition of the enacted grade level used in our reports rests on a fundamental premise:

If a student would be able to complete an assignment to proficiency (70%) by possessing content knowledge aligning to a particular grade level (as defined by the Nevada state content standards), then that grade level is deemed the enacted grade level of the assignment.

Two hypothetical examples will clarify this issue:

1. An assignment collected from a fifth-grade class contains ten questions, with the first question aligned to a first-grade standard, the second question aligning to a second-grade standard, and the remaining eight questions aligning to fifth-grade standards. In this case, students need a fifth-grade level of knowledge to score proficiently on the assignment - the enacted grade level for this assignment is therefore "fifth grade" (that is, the assignment is "on grade level").
2. The assignment instead comprises eight questions that align to second-grade standards, with the remaining two questions aligning to fifth-grade standards. In this case, a student would only need to possess a second-grade understanding of content to score proficiently on the assignment, so the assignment aligns to second-grade standards (that is, the enacted grade level is "second grade").

2.1.1 Reading the alignment-to-standards chart

Using fictitious data, we now describe how one interprets the alignment-to-standards figures in this report.

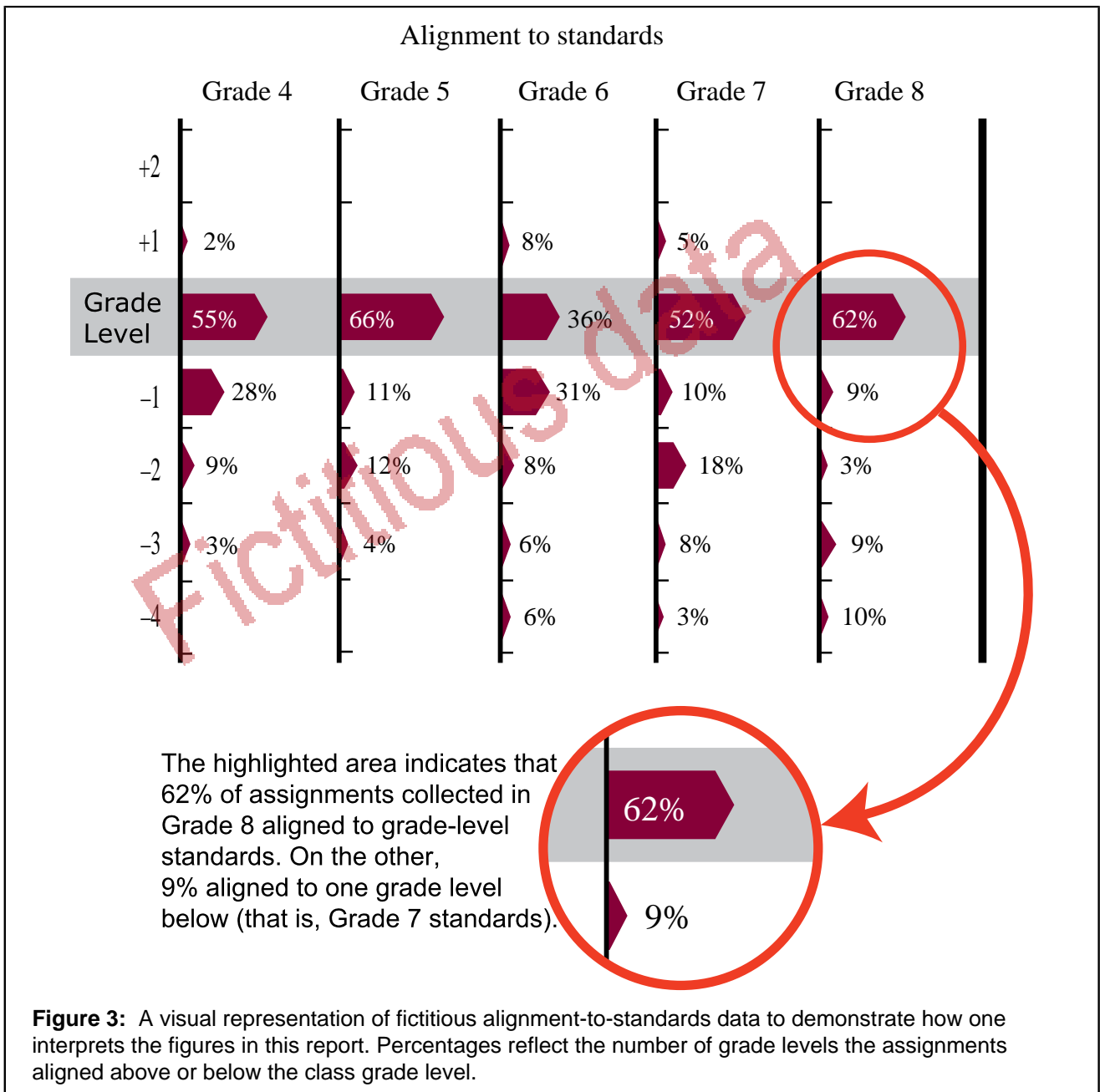


Figure 3: A visual representation of fictitious alignment-to-standards data to demonstrate how one interprets the figures in this report. Percentages reflect the number of grade levels the assignments aligned above or below the class grade level.

2.2 Cognitive Rigor

Although coverage of the standards in the classroom is an important indicator of student learning, the enacted curriculum should also display myriad levels of cognitive skill required by the students to complete independent work to proficiency. Therefore, The Standards Company LLC measured the rigor associated with each assignment using two common indicators, Bloom's Taxonomy and depth of knowledge (DOK), then combined the results into a section of the report called *cognitive rigor*. The Bloom's Taxonomy level associated with a particular student assignment corresponds to the question appearing on the assignment that possesses the highest Bloom's Taxonomy level. The depth-of-knowledge level, on the other hand, corresponds to the assignment as a *whole*.

2.2.1 Bloom's Taxonomy

Higher-order questions form an integral part of quality instruction. Not only do student responses to higher-order questions illustrate their true understanding of academic content, answering higher-order questions can enhance a student's ability to communicate knowledge centered on sophisticated issues. Bloom's Taxonomy[1] is a useful categorization scheme for assessing the cognitive level of questions. Originally published in 1956, the taxonomy was revised in 2001.[2] The Standards Company LLC uses the revised Bloom's Taxonomy. For example, according to the revised Bloom's Taxonomy:

1. asking students to recall who made a specific statement in *Romeo and Juliet* lies at Level 1, the lowest level ("remember").
2. asking students to recast the statement in their own words raises the Bloom's Taxonomy level to at least Level 2 ("understand").
3. asking students to deconstruct the statement to determine the speaker's motive or intentions would constitute Level 4 ("analyze").

As the Bloom's Taxonomy level of questions increases, student engagement, especially among gifted students, also increases. Higher-order questions can therefore invigorate a classroom by increasing interest in subject material.

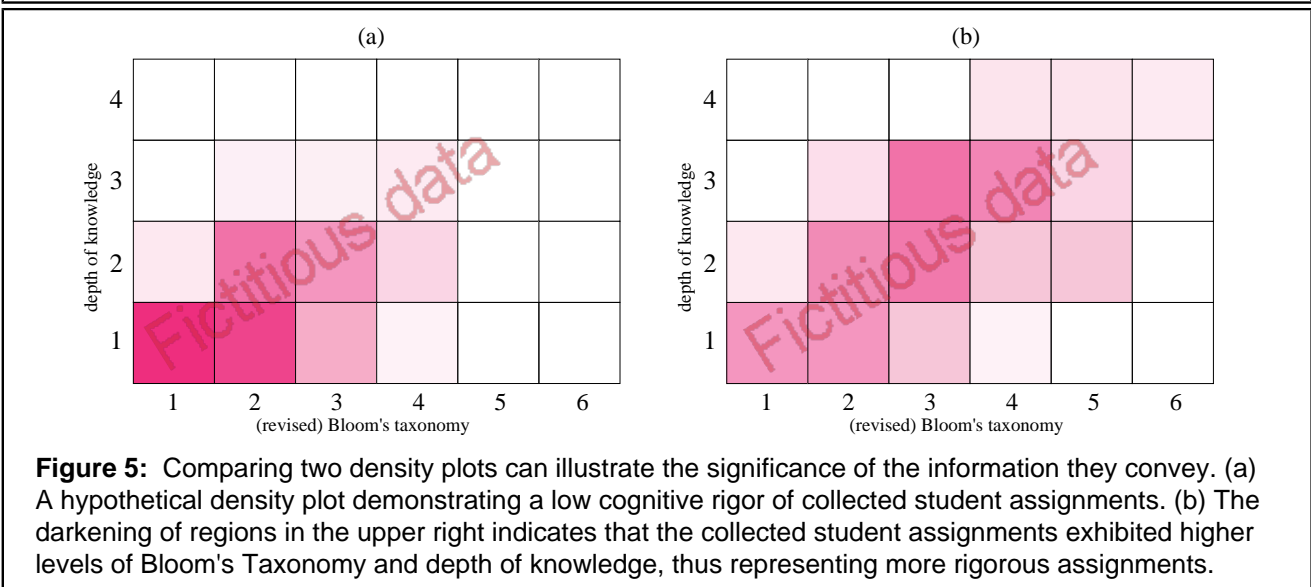
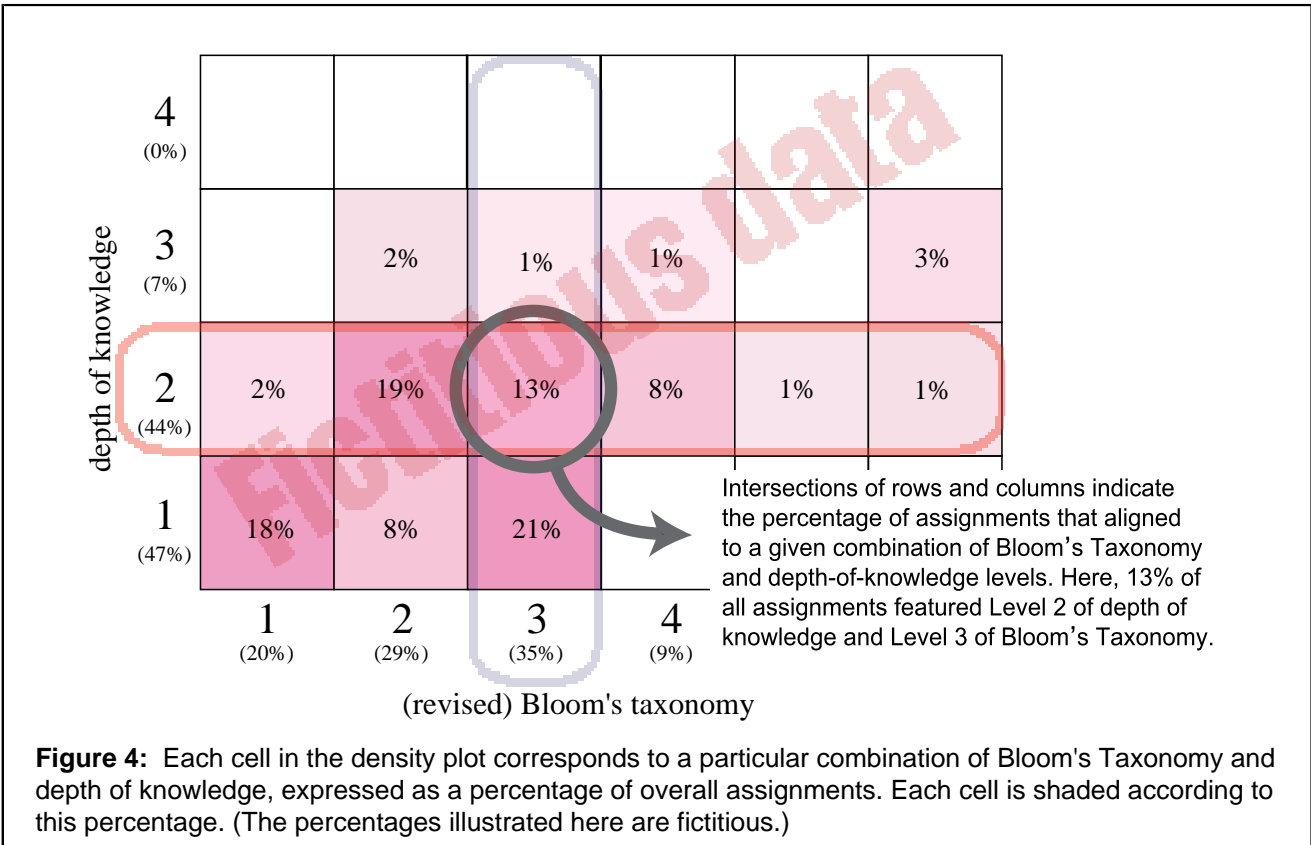
2.2.2 Depth of knowledge

The depth-of-knowledge levels developed by Norman Webb are often used to correlate the complexity of problems students are expected to be taught and how this complexity coincides with questions found on state tests.[3-13] There are four levels of depth of knowledge, with Level 1 signifying problems of the least complexity. For example:

1. reading a dictionary to find the meanings of an unknown word is a Level 1 depth-of-knowledge activity.
2. analyzing and describing the characteristics of various types of literature corresponds to a Level 3 depth-of-knowledge activity.

2.2.3 Reading the cognitive rigor density plot

As stated previously, The Standards Company LLC measures cognitive rigor using Bloom's Taxonomy and depth of knowledge. The figures in this section illustrate how one interprets the resulting density plots.



2.3 Letter-grade analysis

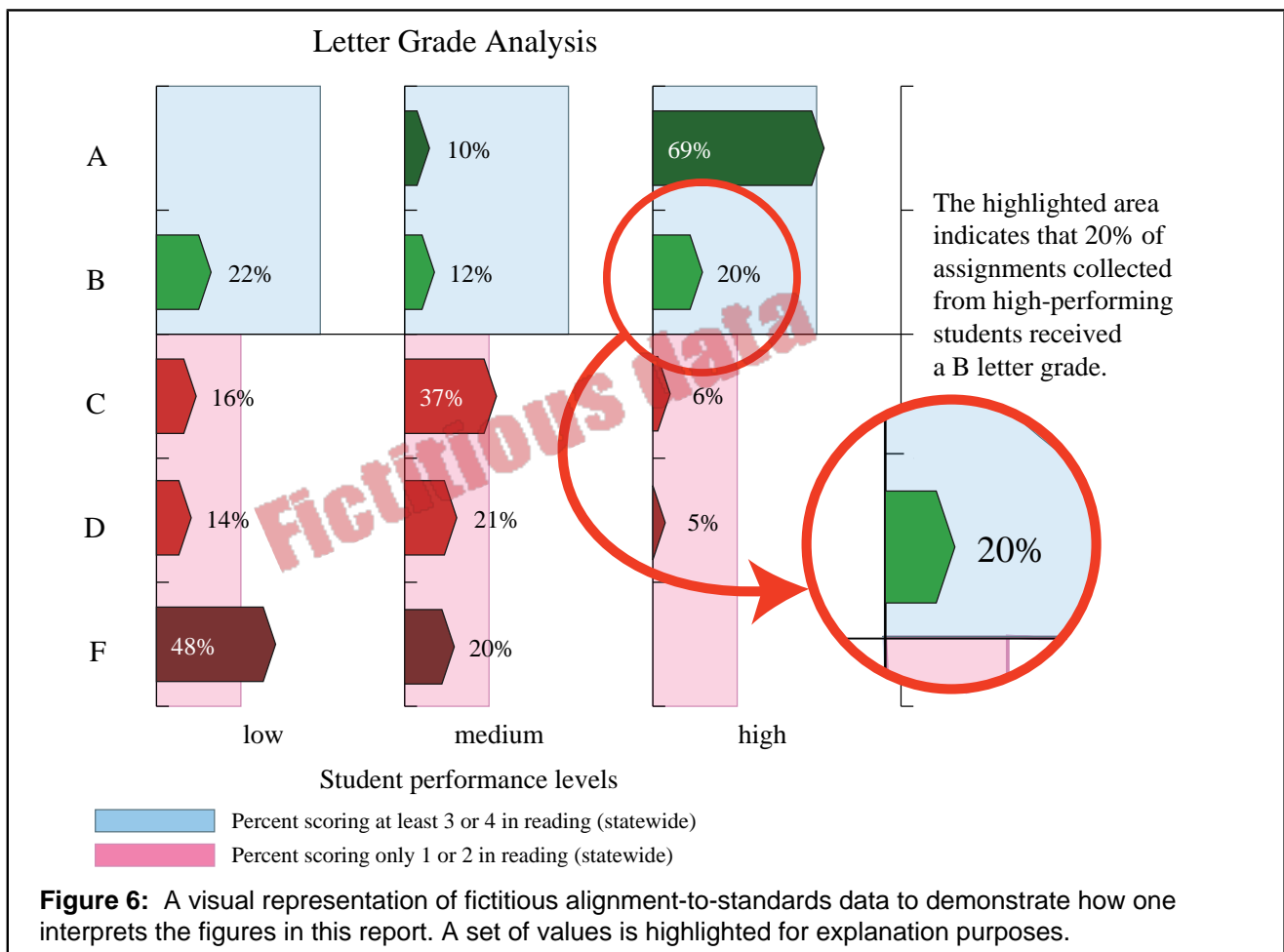
The letter grades teachers assign students can often appear artificially high, especially if higher grades appear frequently on assignments collected from students deemed "low performing" by their teachers. However, the issue of grade inflation should be discussed in light of two factors that frequently occur:

1. Students receive grades higher than their performance warrants (*grade inflation*).
2. Students earn appropriate grades for the performance they display, but on content that is easier than appropriate (*content deflation*).

Examining the letter-grade analysis results in this study in light of standards alignment and cognitive rigor often determines which of the two factors is the most prevalent.

2.3.1 Reading the letter-grade-analysis chart

Using fictitious data, we now describe how one interprets the letter-grade-analysis figures in this report.



3 Results of the study

The research scope of The Standards Company LLC is centered on the belief that test scores are driven largely by two factors: curriculum and instruction. The most telling point in the delivery of both occurs at the point of contact between student and teacher, which is denoted with the term "enacted." The purpose of this study was to examine thoroughly the state of the *enacted curriculum*.

It is important to note that teachers, using data labels provided by The Standards Company LLC, provided much of the data tabulated in this analysis. As one example, teachers explicitly noted whether an assignment corresponded to a textbook, workbook, or quiz. Naturally, some of this (self-declared) data was more open to interpretation by the teacher than others.

Many of the results of this study provide significant insight into teaching practices in the state of Nevada. The following lists what the curriculum analysts at The Standards Company LLC consider to be the most telling results of the study. The final section of this report provides suggestions that the analysts think will help the state of Nevada improve the state of the enacted curriculum.

1. Alignment to standards was poor in English language arts and especially poor in mathematics. Although a majority of student work fell within one grade level above or below grade level standards, a large percentage was off grade level by at least two grade levels. For example, 18% of eighth-grade mathematics aligned to sixth-grade standards or lower.
2. The most marked drop in alignment for English language arts occurred in sixth grade. This was largely due to a large percentage of fifth-grade content; in fact, fifth-grade content readily appeared throughout the higher grade levels, possibly indicating that a certain set of fifth-grade standards were repeatedly retaught. This trend appeared in all categories of schools.
3. Mathematics featured a consistent and marked decrease in alignment as the grade level increased, resulting in only 40% of assignments meeting grade level standards by eighth grade. The widest gap between the enacted curriculum and state content standards appeared in eighth-grade classes taught in high-performing schools (34% alignment to standards).
4. As stated above, low- and high-performing schools differed little with respect to the concepts and skills addressed in student work; that is, the alignment to standards of low- and high-performing schools looked similar. However, *the most marked difference between low- and high-performing schools appeared when examining cognitive rigor*. The Standards Company LLC measures cognitive rigor by interposing Bloom's Taxonomy and the depth-of-knowledge levels of Norman Webb onto a two-dimensional density plot. The colored grids displayed in the results do not provide a recognizable pattern by themselves when comparing schools listed in the three major categories. However, the depth-of-knowledge levels in mathematics are much more telling with respect to high- and low-performing schools: *With the exception of third grade, depth-of-knowledge levels in mathematics were significantly lower for low-performing schools than high-performing schools*. (This trend did not appear in English language arts.)
5. Letter grades received from students residing in areas of low socioeconomic status were significantly higher than their more affluent counterparts. This result held regardless of whether the work was collected from a (teacher-designated) low-, medium-, or high- performing student.
6. The source of assignments was also included as part of this study. There were no consistent differences in the source of assignments among the three categories of schools defined in this study. However, the use of teacher-created materials increased significantly as the grade level increased.
7. The preponderance of assignments for all categories of schools was labeled "independent work." However, grade levels 3-5 featured more tests and quizzes than grade levels 6-8.

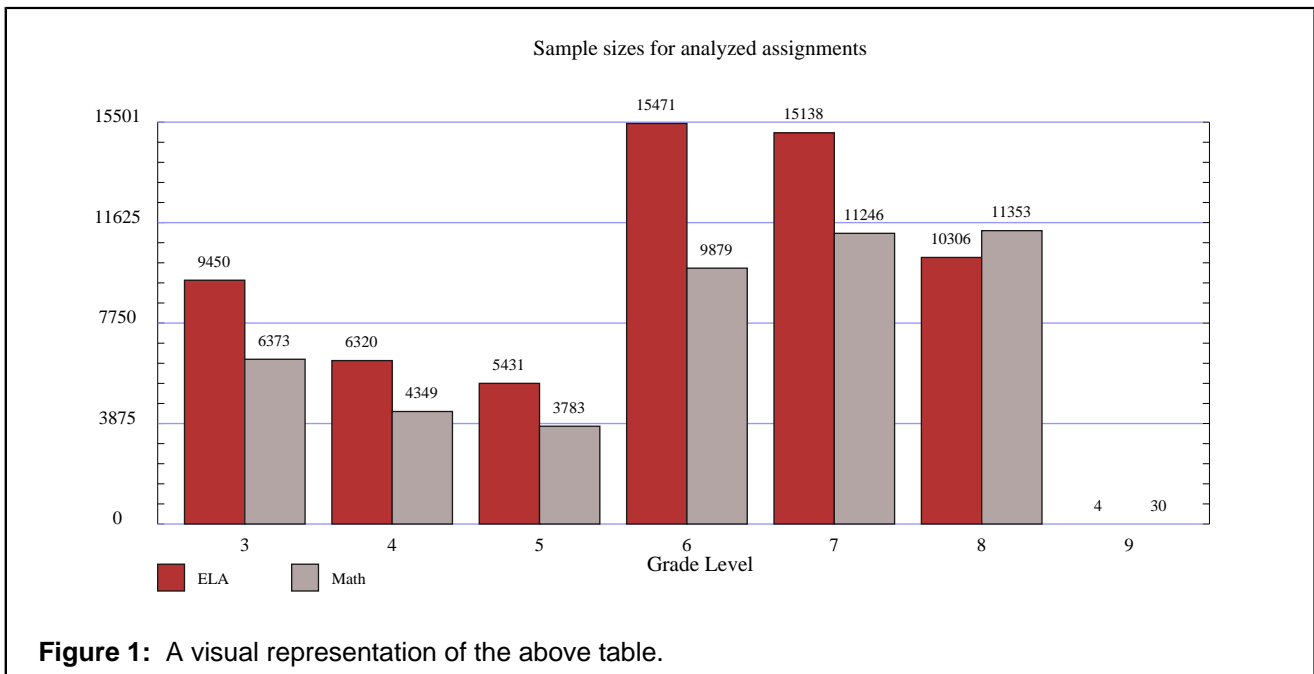
8. The use of student groups to complete assignments was scant through all categories of schools, with independently-completed assignments forming roughly 80% of the collection. Interestingly, the use of group-based activities was more prevalent in low-performing schools in comparison to high-performing schools. Results disaggregated according to socioeconomic status and rurality showed no discernable pattern. Whether the state of Nevada desires more group-based activities on the part of the students is perhaps worthy of future discussion.

We now present actual results generated in this study, beginning with the sample size data for the one-week collection. As stated previously, the number of tables and figures generated from a study of this scale is vast, so we have included in this summary only those that we think are especially illuminating. However, since the alignment-to-standards results probably interests the reader more than any other measure, we have included comparisons among all three categories of schools, whether we thought the results were profound or not.

3.1 Sample sizes of analyzed assignments by subject

Table 1: Sample size of collected student assignments, with 109,099 assignments in all. Although teachers submitted assignments for high-, medium-, and low-performing students, The Standards Company LLC considers all three to comprise a single assignment, not three distinct assignments. The data is visually displayed in the below figure.

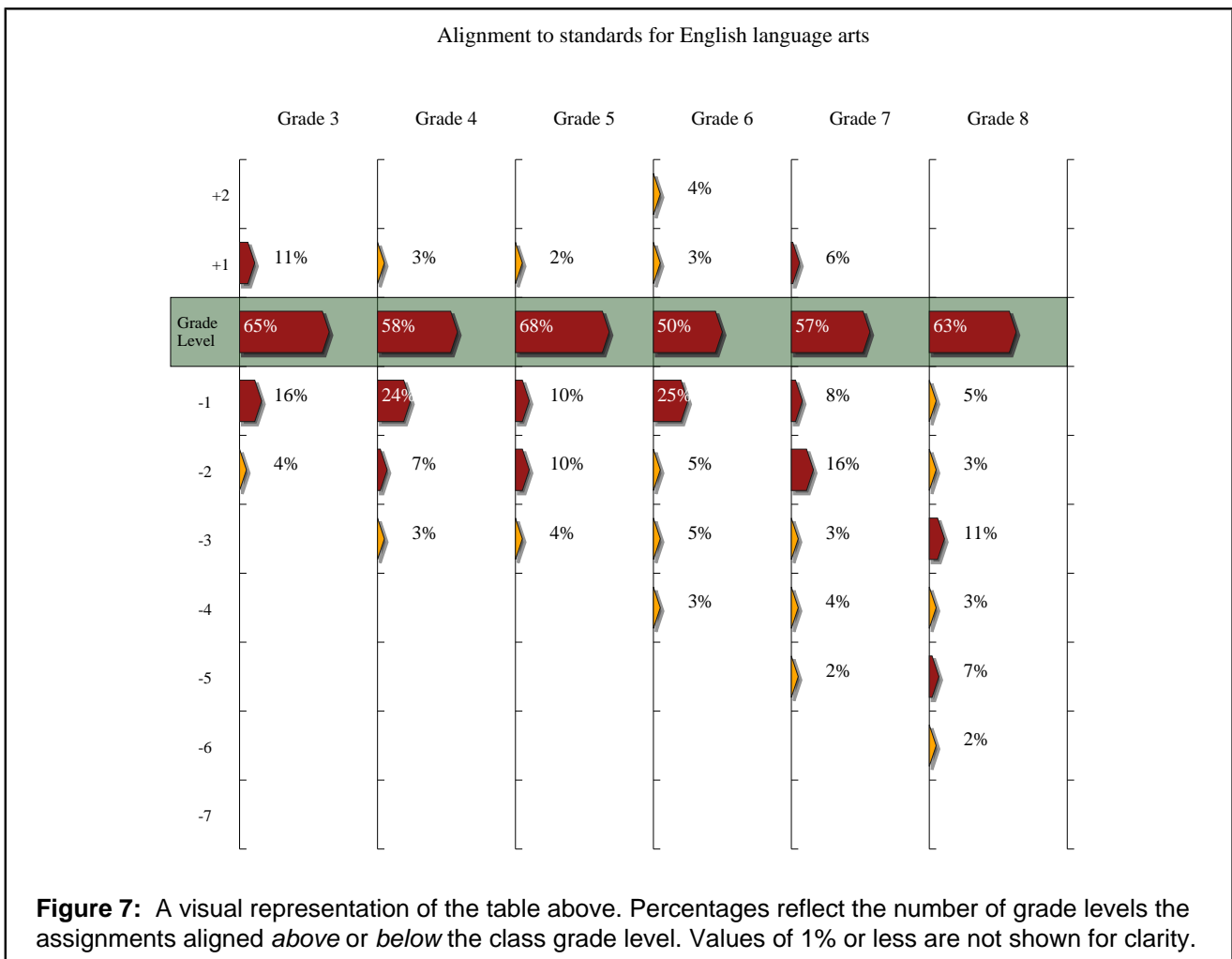
Grade	Sample sizes for collected assignments		
	Ela	Math	Combined
3	9,450 (8%)	6,373 (5%)	15,823 (14%)
4	6,320 (5%)	4,349 (3%)	10,669 (9%)
5	5,431 (4%)	3,783 (3%)	9,214 (8%)
6	15,471 (14%)	9,879 (9%)	25,350 (23%)
7	15,138 (13%)	11,246 (10%)	26,384 (24%)
8	10,306 (9%)	11,353 (10%)	21,659 (19%)
9	4 (0%)	30 (0%)	34 (0%)
Total	62,120 (56%)	47,013 (43%)	109,133 (100%)



3.2 Alignment to standards - English language arts

Table 3: Alignment to Nevada state content standards for student assignments in English language arts. Rows represent the official grade level of the classes as denoted by the teachers. Columns represent the enacted grade level of the assignments as determined by state content standards. Percentages in bold correspond to grade-level content. These results are displayed visually in the figure below.

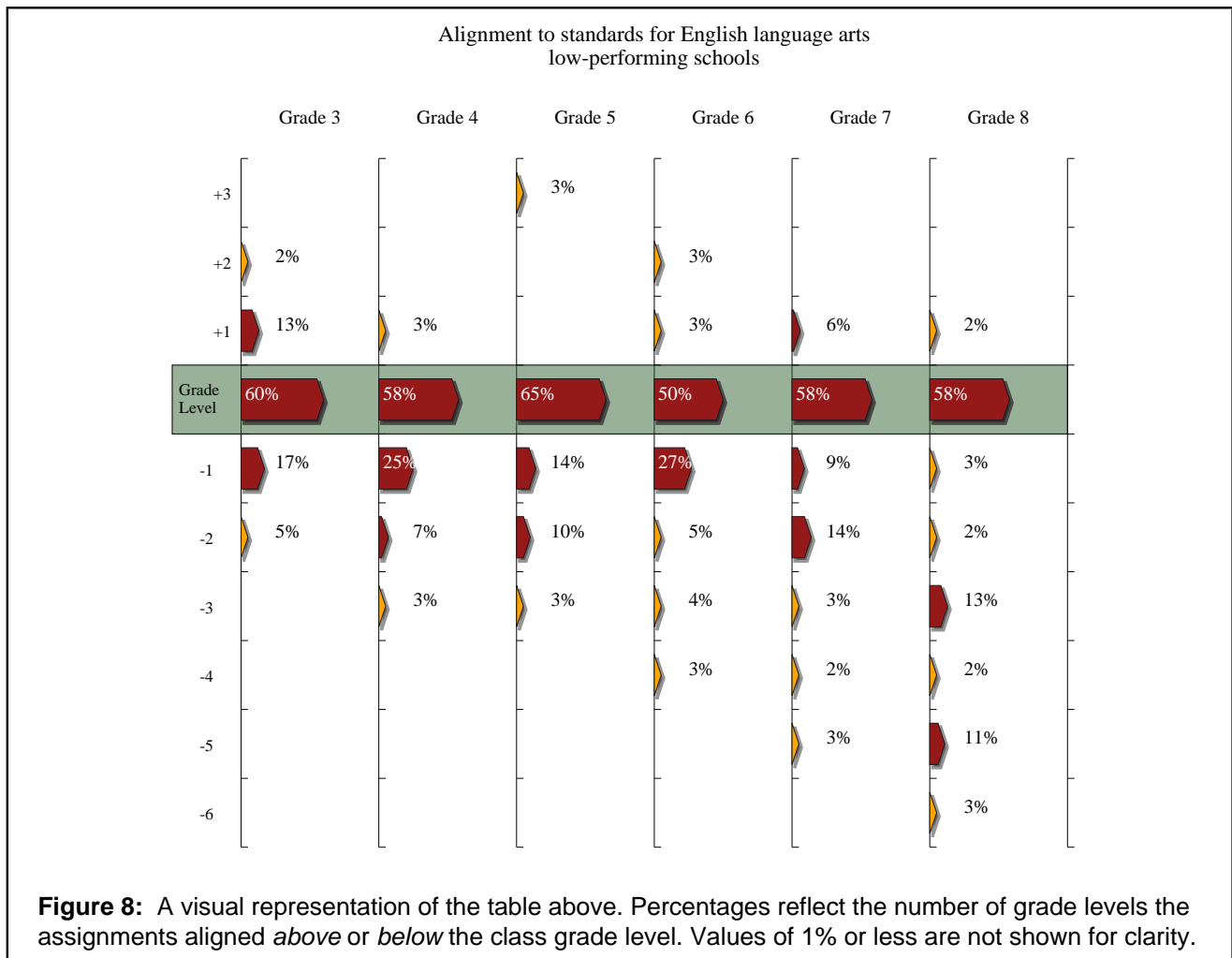
Grade	Enacted grade level for English language arts									
	0	1	2	3	4	5	6	7	8	9
3	0%	4%	16%	65%	11%	1%	0%	0%	0%	0%
4	0%	3%	7%	24%	58%	3%	0%	0%	0%	0%
5	0%	1%	4%	10%	10%	68%	2%	0%	1%	0%
6	0%	1%	3%	5%	5%	25%	50%	3%	4%	0%
7	0%	0%	2%	4%	3%	16%	8%	57%	6%	0%
8	0%	0%	2%	7%	3%	11%	3%	5%	63%	1%



3.3 Alignment to standards - English language arts (low-performing schools)

Table 4: Same as the previous table but specifically for low-performing schools. These results are displayed visually in the figure below.

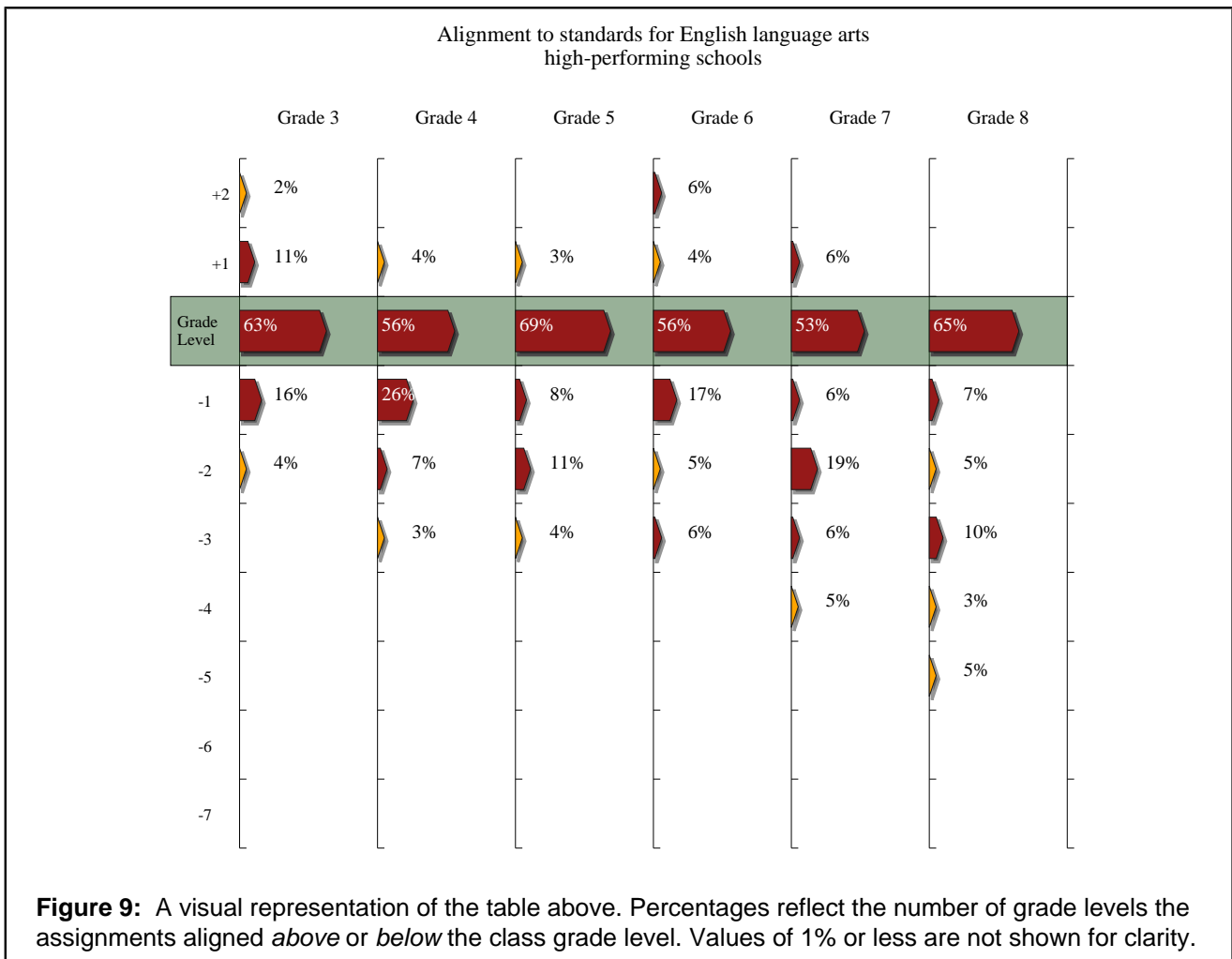
Grade	Enacted grade level for English language arts (low-performing schools)									
	0	1	2	3	4	5	6	7	8	9
3	0%	5%	17%	60%	13%	2%	0%	0%	0%	0%
4	0%	3%	7%	25%	58%	3%	0%	0%	0%	0%
5	0%	1%	3%	10%	14%	65%	1%	0%	3%	0%
6	0%	0%	3%	4%	5%	27%	50%	3%	3%	0%
7	0%	1%	3%	2%	3%	14%	9%	58%	6%	0%
8	0%	1%	3%	11%	2%	13%	2%	3%	58%	2%



3.4 Alignment-to-standards results (high-performing schools)

Table 5: Same as the previous table but specifically for high-performing schools. These results are displayed visually in the figure below.

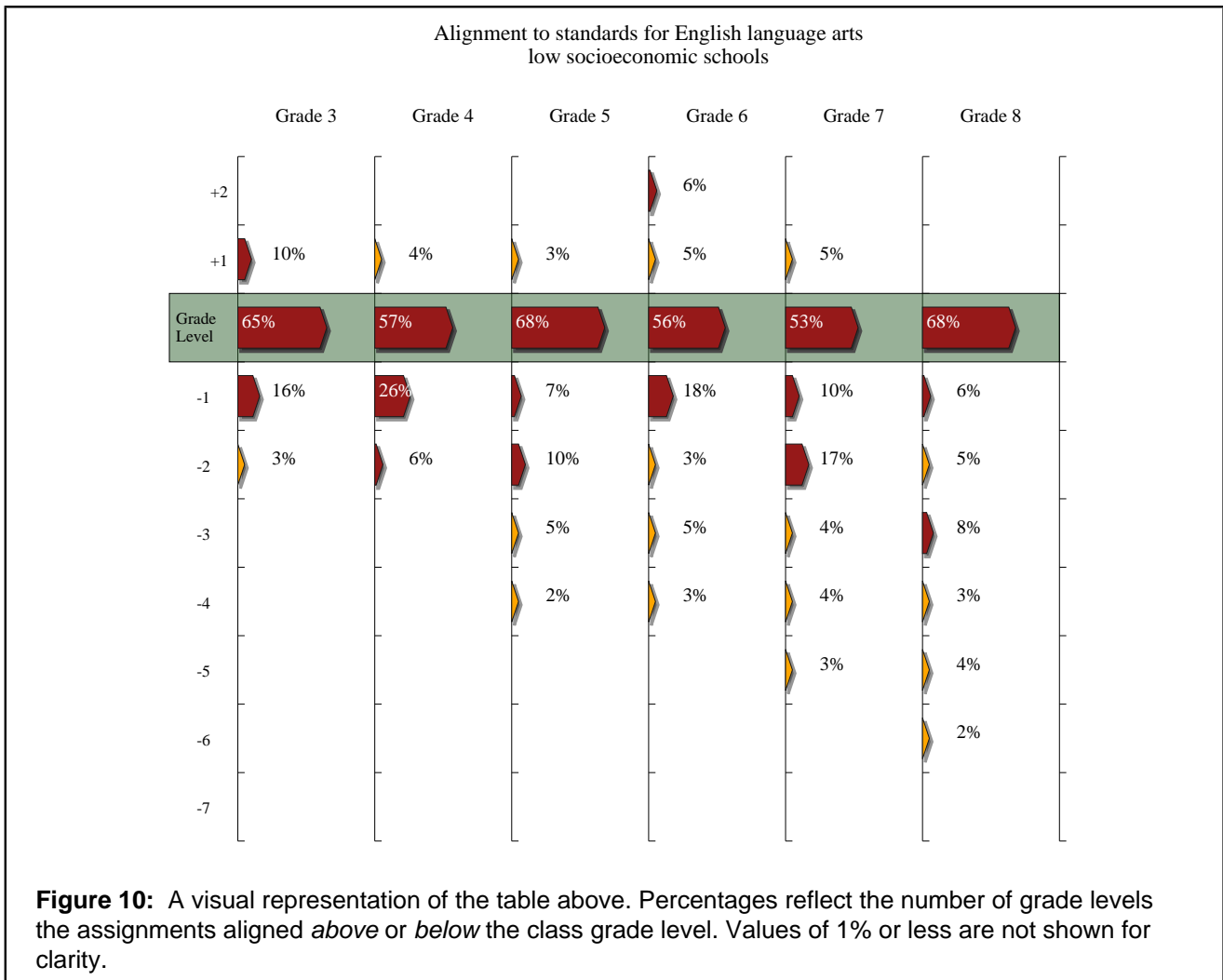
		Enacted grade level for English language arts (high-performing schools)								
Grade	0	1	2	3	4	5	6	7	8	
3	0%	4%	16%	63%	11%	2%	0%	0%	0%	
4	0%	3%	7%	26%	56%	4%	0%	0%	1%	
5	0%	1%	4%	11%	8%	69%	3%	0%	0%	
6	0%	1%	1%	6%	5%	17%	56%	4%	6%	
7	0%	0%	0%	5%	6%	19%	6%	53%	6%	
8	0%	0%	1%	5%	3%	10%	5%	7%	65%	



3.5 Alignment to standards - English language arts (low socioeconomic status)

Table 6: Alignment to Nevada state content standards for student assignments in English language arts for schools located in relatively poor communities. These results are displayed visually in the figure below.

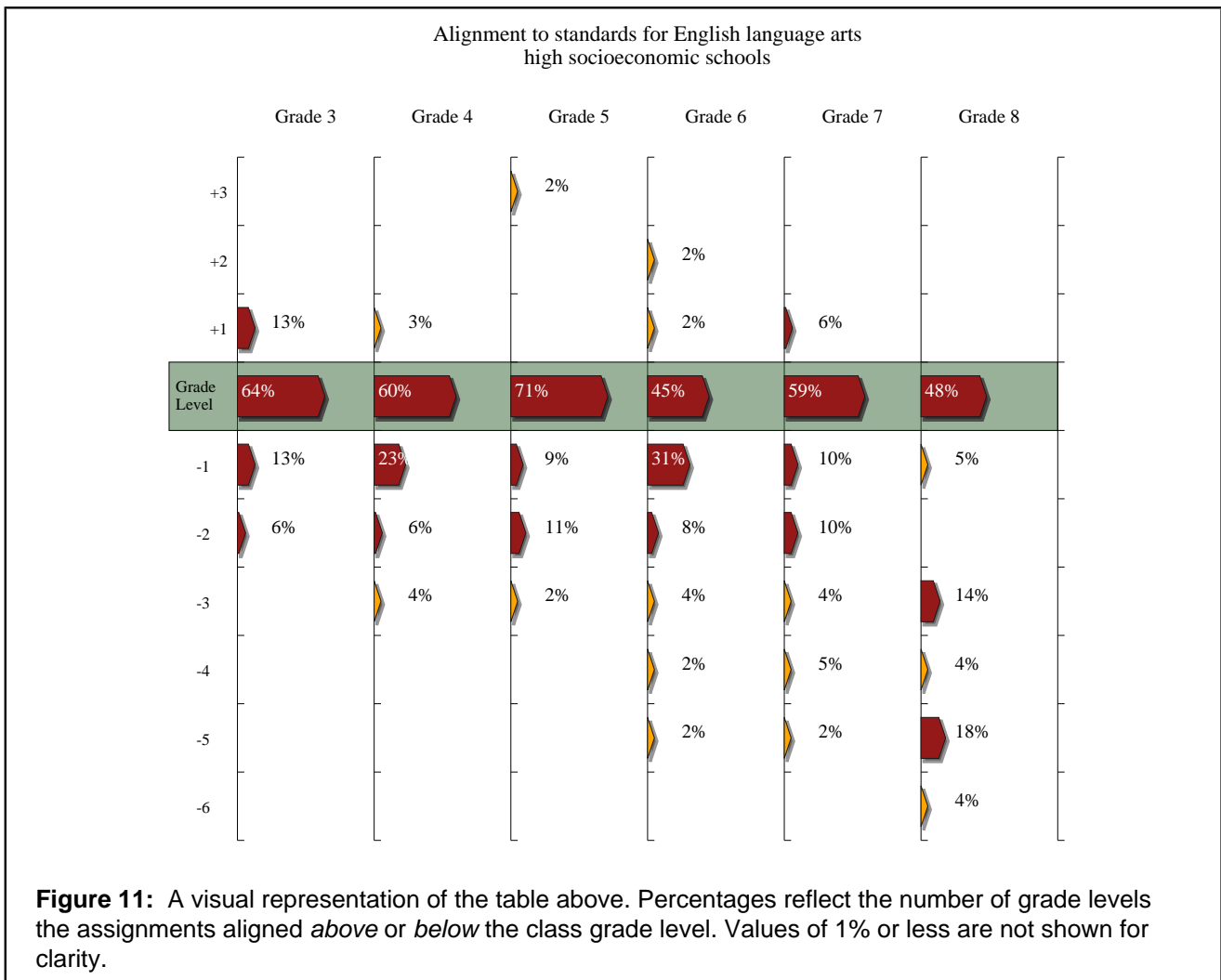
Grade	Enacted grade level for English language arts (low socioeconomic schools)								
	0	1	2	3	4	5	6	7	8
3	0%	3%	16%	65%	10%	1%	0%	0%	0%
4	0%	1%	6%	26%	57%	4%	0%	0%	0%
5	0%	2%	5%	10%	7%	68%	3%	1%	0%
6	0%	0%	3%	5%	3%	18%	56%	5%	6%
7	0%	0%	3%	4%	4%	17%	10%	53%	5%
8	0%	0%	2%	4%	3%	8%	5%	6%	68%



3.6 Alignment to standards - English language arts (high socioeconomic status)

Table 7: Same as the previous table but specifically for schools located in relatively affluent communities. These results are displayed visually in the figure below.

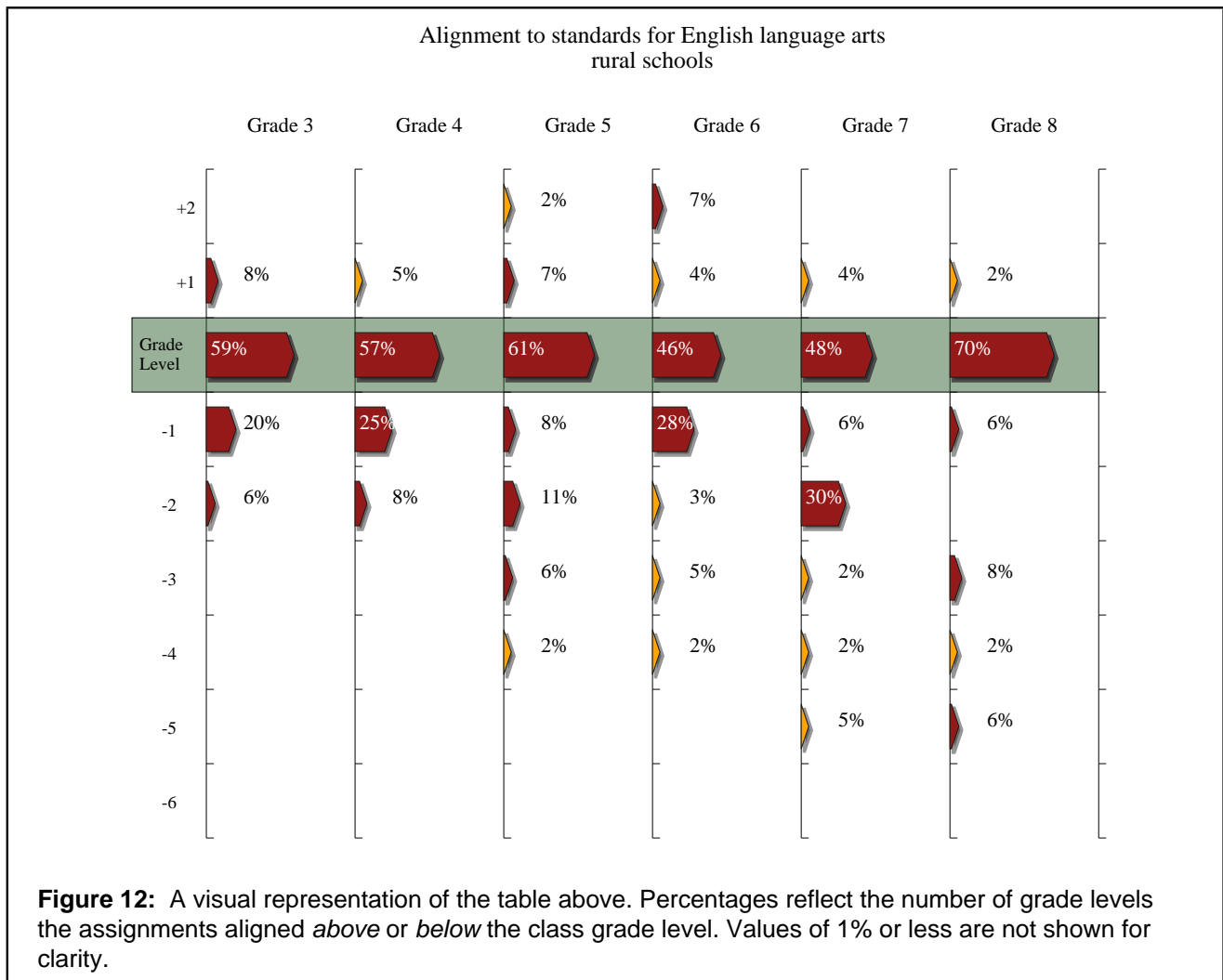
		Enacted grade level for English language arts (high socioeconomic schools)								
Grade	0	1	2	3	4	5	6	7	8	
3	0%	6%	13%	64%	13%	1%	0%	0%	0%	
4	0%	4%	6%	23%	60%	3%	0%	0%	1%	
5	0%	0%	2%	11%	9%	71%	1%	0%	2%	
6	0%	2%	2%	4%	8%	31%	45%	2%	2%	
7	0%	1%	2%	5%	4%	10%	10%	59%	6%	
8	0%	0%	4%	18%	4%	14%	0%	5%	48%	



3.7 Alignment to standards - English language arts (rural schools)

Table 8: Alignment to Nevada state content standards for student assignments in English language arts for schools located in relatively rural areas. These results are displayed visually in the figure below.

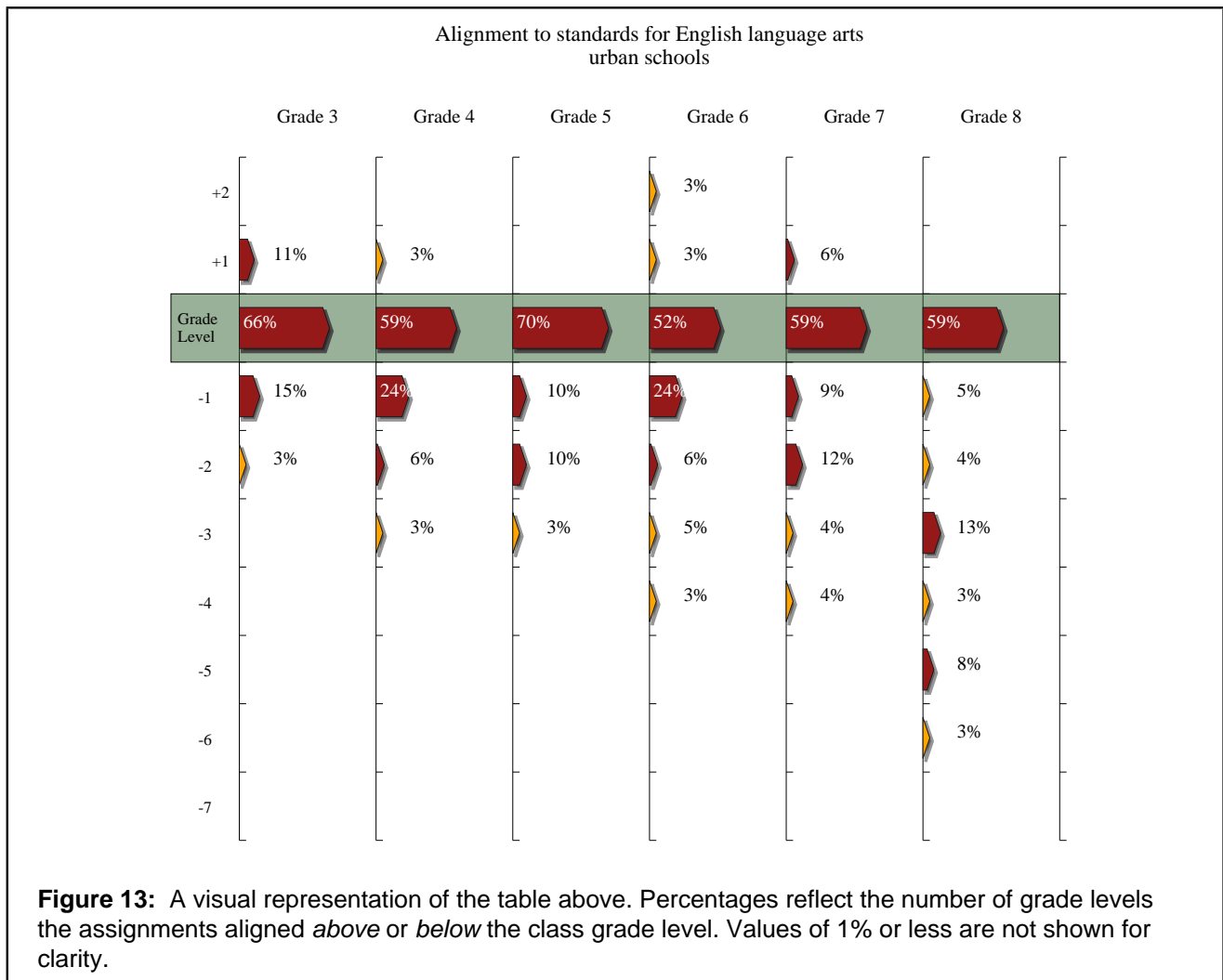
Grade	Enacted grade level for English language arts (rural schools)									
	0	1	2	3	4	5	6	7	8	9
3	0%	6%	20%	59%	8%	1%	0%	0%	1%	0%
4	0%	1%	8%	25%	57%	5%	0%	0%	0%	0%
5	0%	2%	6%	11%	8%	61%	7%	2%	0%	0%
6	0%	0%	2%	5%	3%	28%	46%	4%	7%	0%
7	0%	0%	5%	2%	2%	30%	6%	48%	4%	0%
8	0%	0%	1%	6%	2%	8%	1%	6%	70%	2%



3.8 Alignment to standards - English language arts (urban schools)

Table 9: Same as the previous table but specifically for urban schools. These results are displayed visually in the figure below.

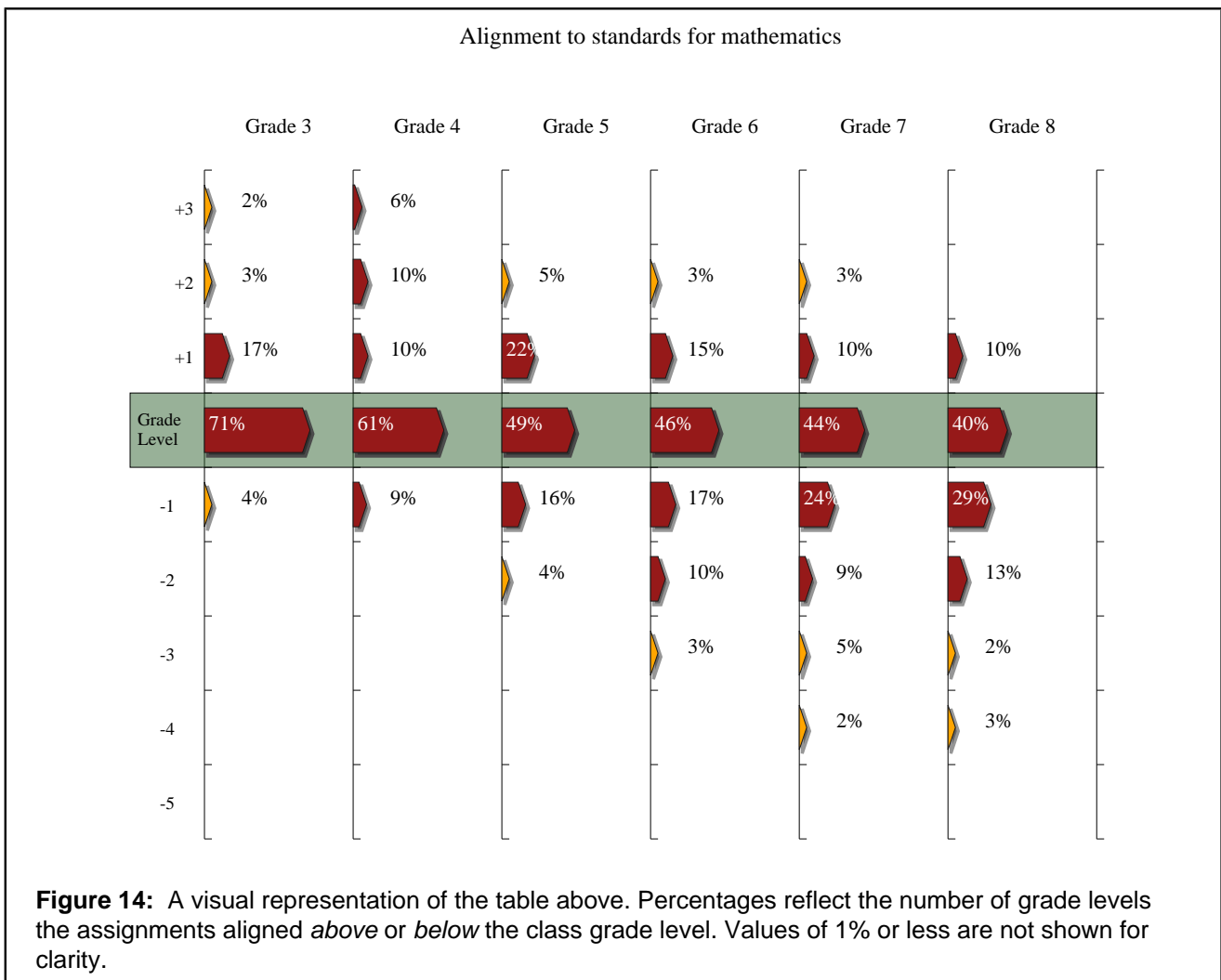
Grade	Enacted grade level for English language arts (urban schools)								
	0	1	2	3	4	5	6	7	8
3	0%	3%	15%	66%	11%	1%	0%	0%	0%
4	0%	3%	6%	24%	59%	3%	0%	0%	0%
5	0%	1%	3%	10%	10%	70%	1%	0%	1%
6	0%	1%	3%	5%	6%	24%	52%	3%	3%
7	0%	0%	1%	4%	4%	12%	9%	59%	6%
8	0%	1%	3%	8%	3%	13%	4%	5%	59%



3.9 Alignment to standards - mathematics

Table 10: Alignment to Nevada state content standards for student assignments in mathematics. Rows represent the official grade level of the classes as denoted by the teachers. Columns represent the enacted grade level of the assignments as determined by state content standards. Percentages in bold correspond to grade-level content. These results are displayed visually in the figure below.

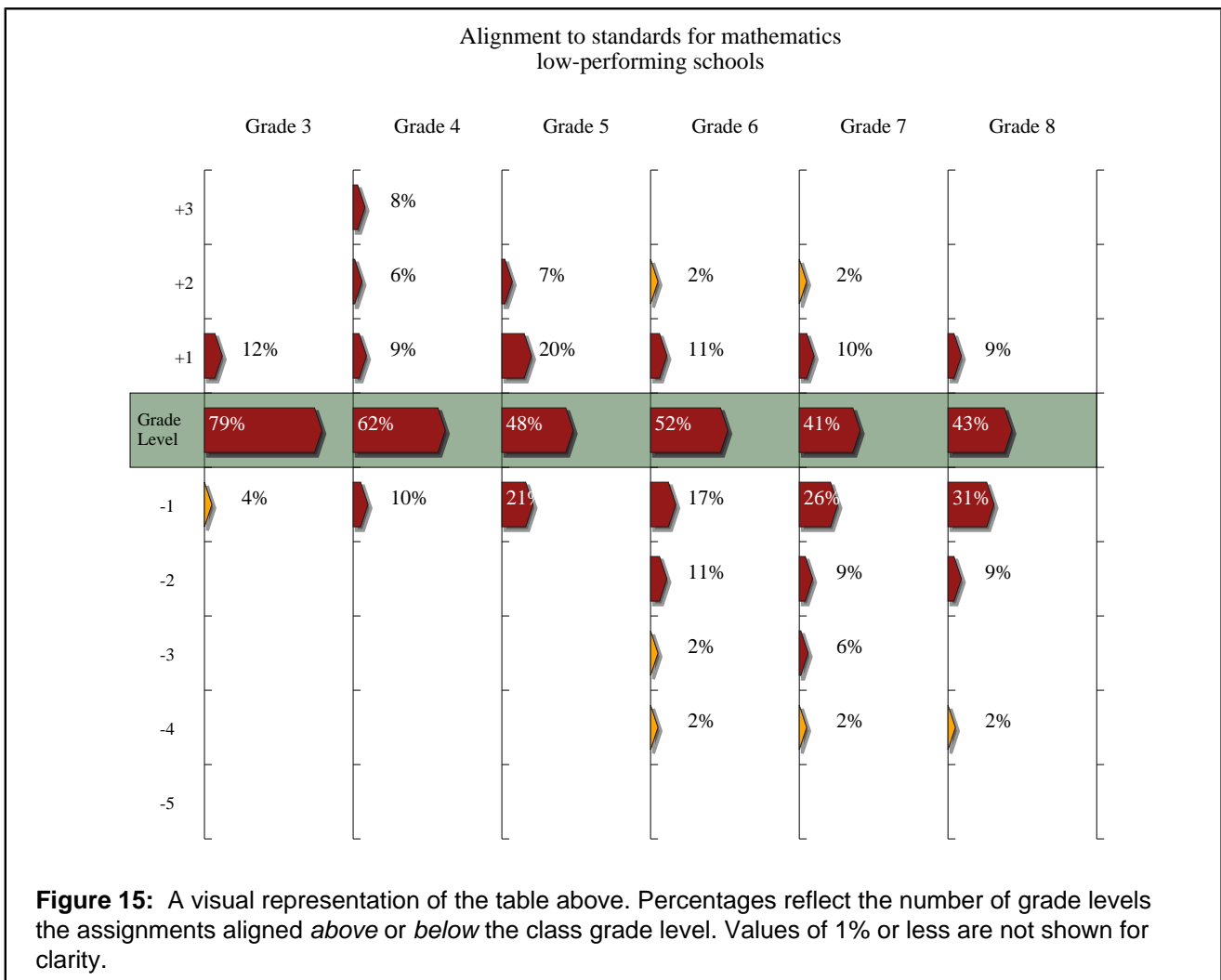
Grade	Enacted grade level for mathematics								
	1	2	3	4	5	6	7	8	9
3	0%	4%	71%	17%	3%	2%	1%	0%	0%
4	0%	1%	9%	61%	10%	10%	6%	0%	0%
5	0%	0%	4%	16%	49%	22%	5%	0%	0%
6	0%	1%	3%	10%	17%	46%	15%	3%	0%
7	0%	0%	2%	5%	9%	24%	44%	10%	3%
8	0%	0%	0%	3%	2%	13%	29%	40%	10%



3.10 Alignment to standards - mathematics (low-performing schools)

Table 11: Same as the previous table but specifically for low-performing schools. Rows represent the official grade level of the classes as denoted by the teachers. Columns represent the enacted grade level of the assignments as determined by state content standards. Percentages in bold correspond to grade-level content. These results are displayed visually in the figure below.

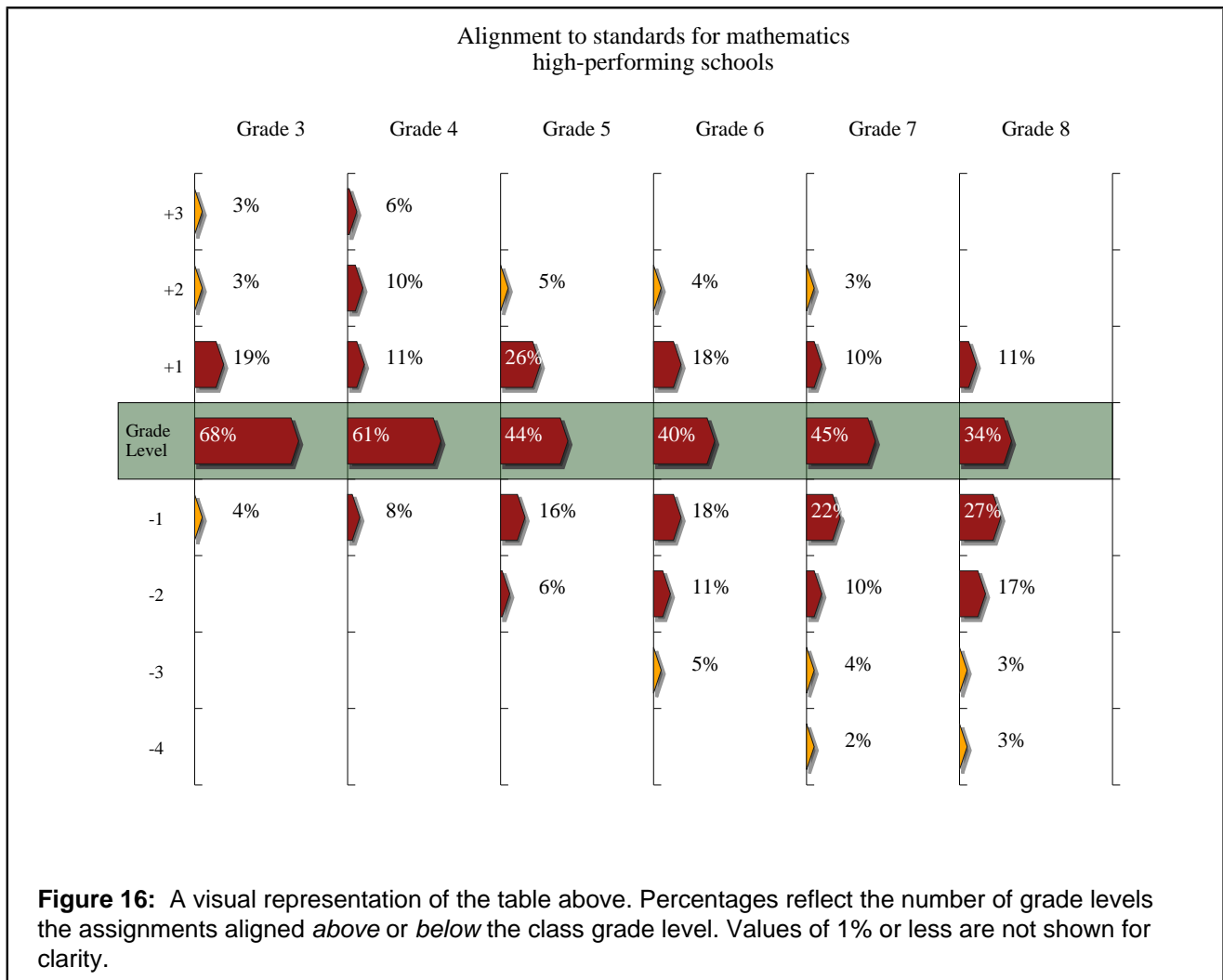
Grade	Enacted grade level for mathematics (low-performing schools)								
	1	2	3	4	5	6	7	8	9
3	0%	4%	79%	12%	1%	0%	0%	0%	0%
4	0%	1%	10%	62%	9%	6%	8%	0%	1%
5	0%	0%	1%	21%	48%	20%	7%	0%	0%
6	0%	2%	2%	11%	17%	52%	11%	2%	0%
7	0%	1%	2%	6%	9%	26%	41%	10%	2%
8	0%	0%	0%	2%	1%	9%	31%	43%	9%



3.11 Alignment to standards - mathematics (high-performing schools)

Table 12: Same as the previous table but specifically for high-performing schools. These results are displayed visually in the figure below.

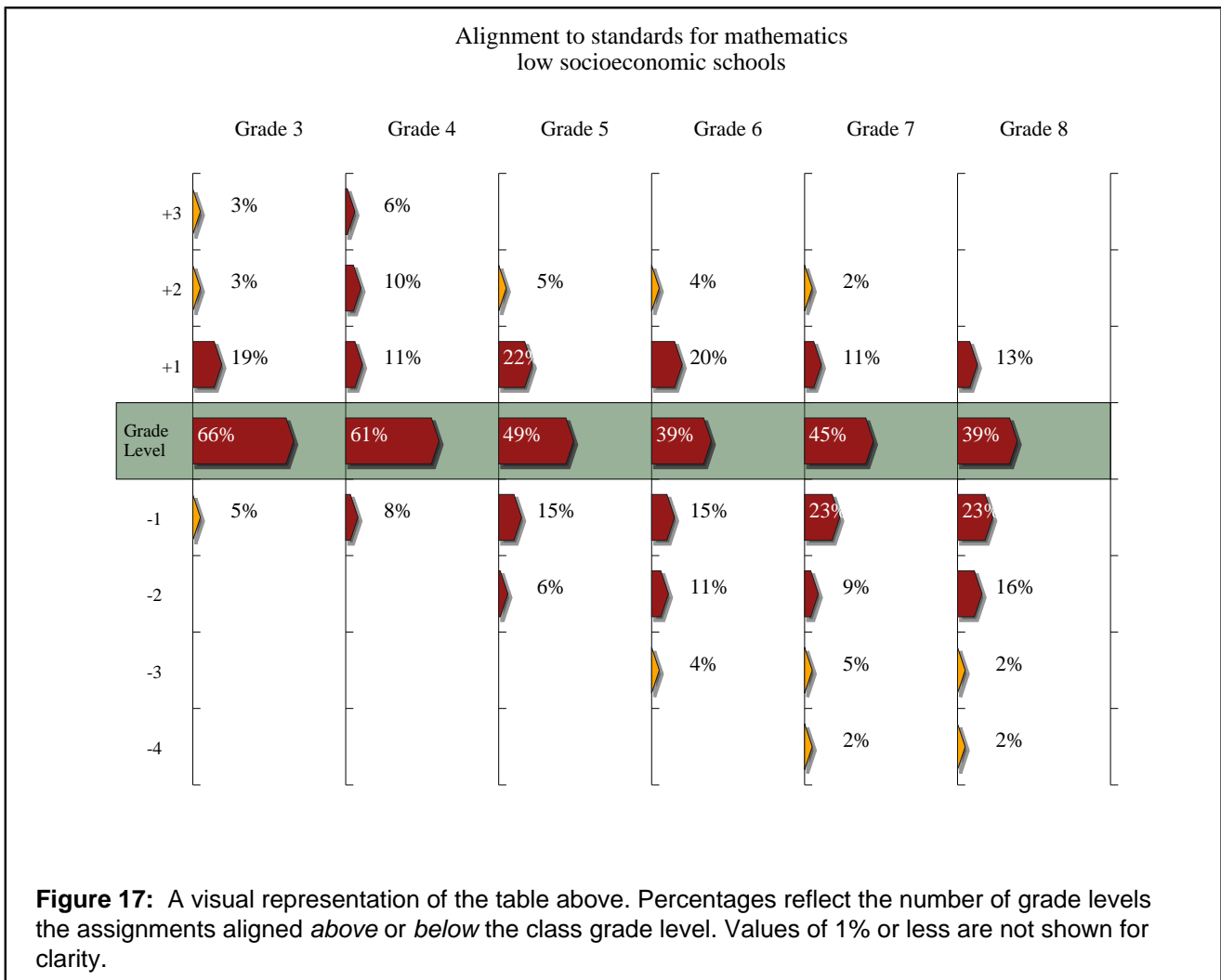
Grade	Enacted grade level for mathematics (high-performing schools)								
	1	2	3	4	5	6	7	8	9
3	0%	4%	68%	19%	3%	3%	0%	0%	0%
4	0%	0%	8%	61%	11%	10%	6%	0%	0%
5	0%	0%	6%	16%	44%	26%	5%	0%	1%
6	0%	1%	5%	11%	18%	40%	18%	4%	0%
7	0%	0%	2%	4%	10%	22%	45%	10%	3%
8	0%	0%	1%	3%	3%	17%	27%	34%	11%



3.12 Alignment to standards - mathematics (low socioeconomic status)

Table 13: Alignment to Nevada state content standards for student assignments in mathematics for schools located in relatively poor communities. These results are displayed visually in the figure below.

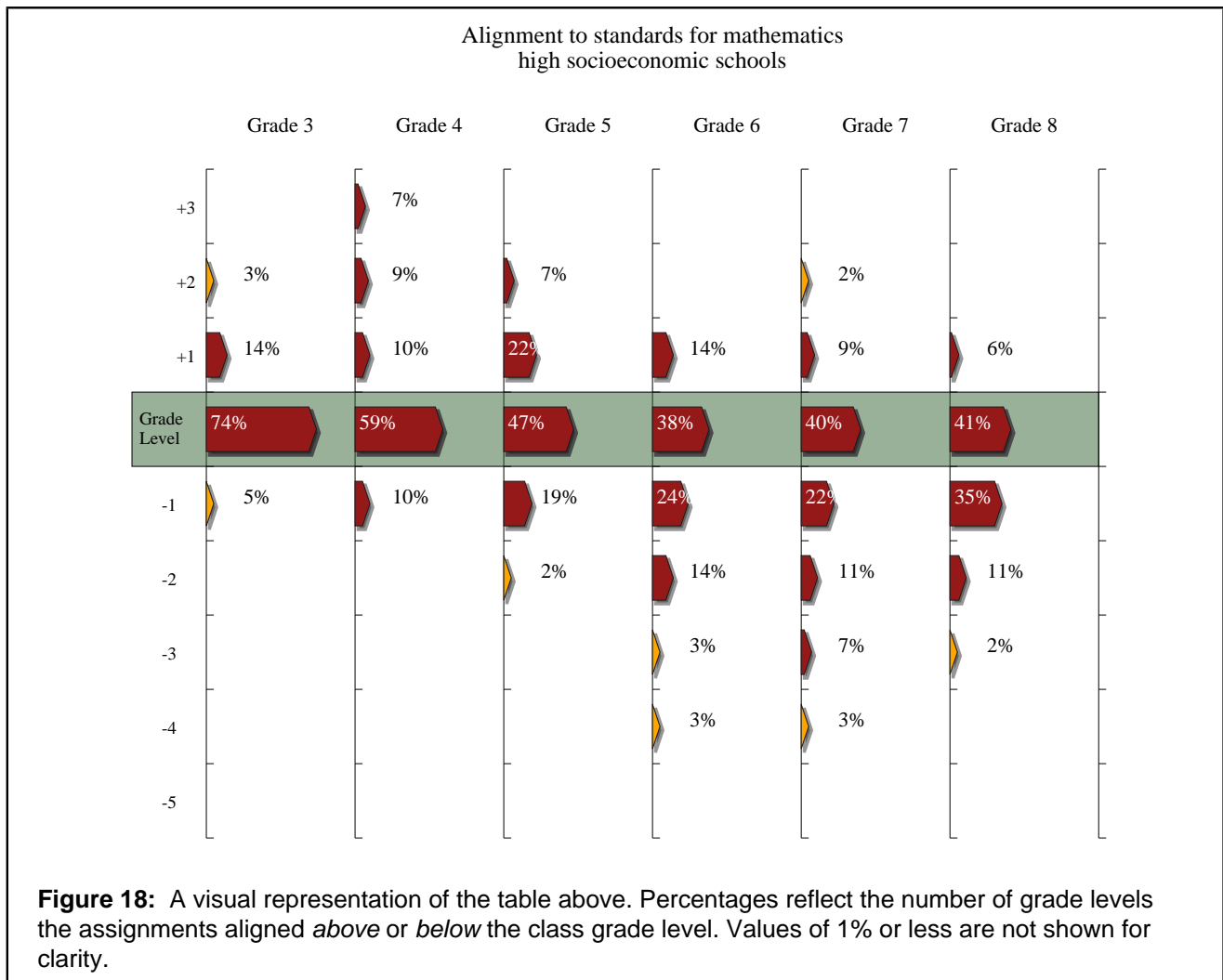
		Enacted grade level for mathematics (low socioeconomic schools)								
Grade		1	2	3	4	5	6	7	8	9
3		0%	5%	66%	19%	3%	3%	1%	0%	0%
4		0%	1%	8%	61%	11%	10%	6%	0%	0%
5		0%	0%	6%	15%	49%	22%	5%	0%	1%
6		0%	1%	4%	11%	15%	39%	20%	4%	0%
7		0%	0%	2%	5%	9%	23%	45%	11%	2%
8		0%	0%	1%	2%	2%	16%	23%	39%	13%



3.13 Alignment to standards - mathematics (high socioeconomic status)

Table 14: Same as the previous table but specifically for schools located in relatively affluent communities. These results are displayed visually in the figure below.

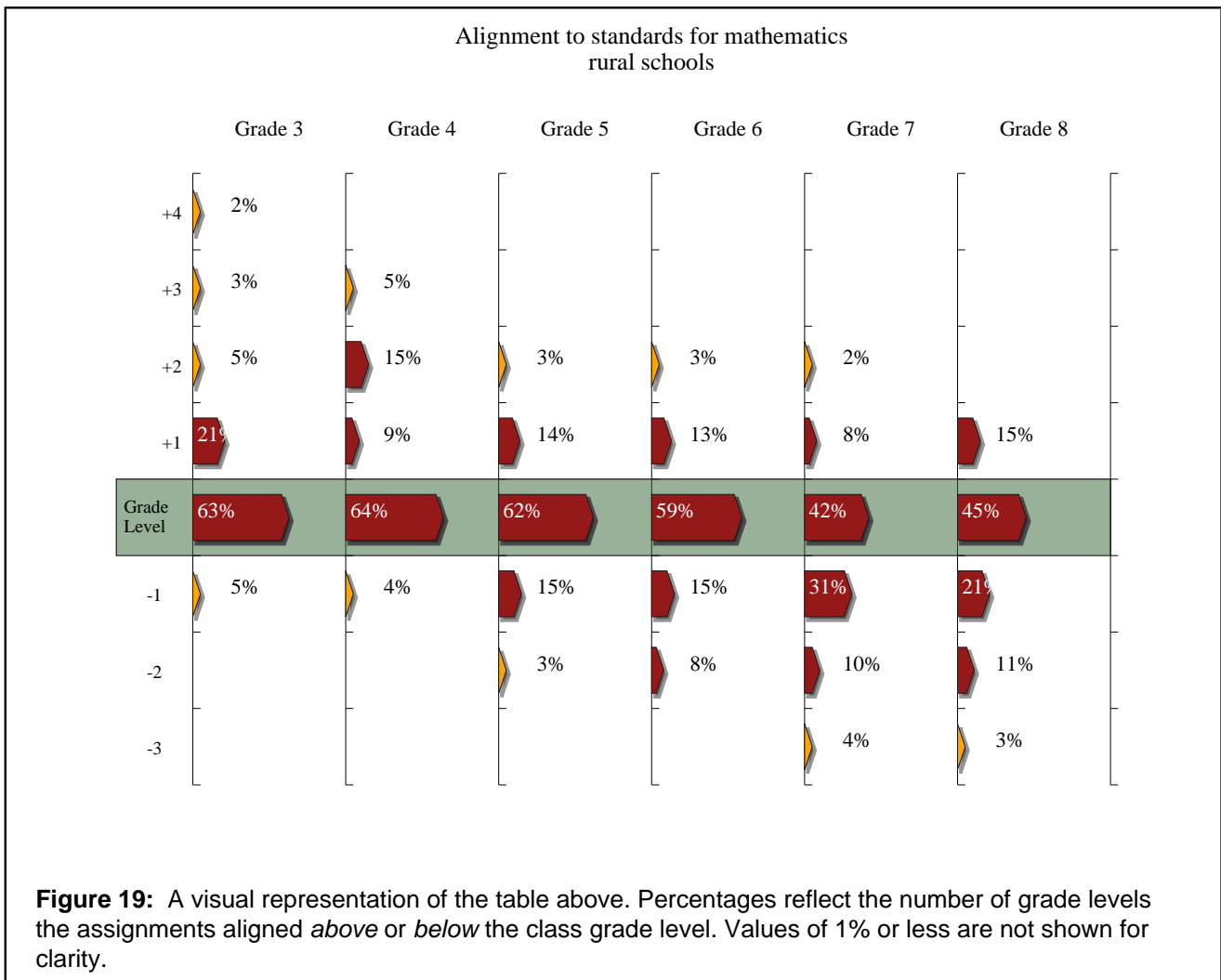
		Enacted grade level for mathematics (high socioeconomic schools)								
Grade	1	2	3	4	5	6	7	8	9	
3	0%	5%	74%	14%	3%	0%	0%	0%	0%	
4	1%	0%	10%	59%	10%	9%	7%	0%	1%	
5	0%	0%	2%	19%	47%	22%	7%	0%	0%	
6	0%	3%	3%	14%	24%	38%	14%	0%	0%	
7	0%	1%	3%	7%	11%	22%	40%	9%	2%	
8	0%	0%	0%	1%	2%	11%	35%	41%	6%	



3.14 Alignment to standards - mathematics (rural schools)

Table 15: Alignment to Nevada state content standards for student assignments in mathematics for schools located in relatively rural areas. These results are displayed visually in the figure below.

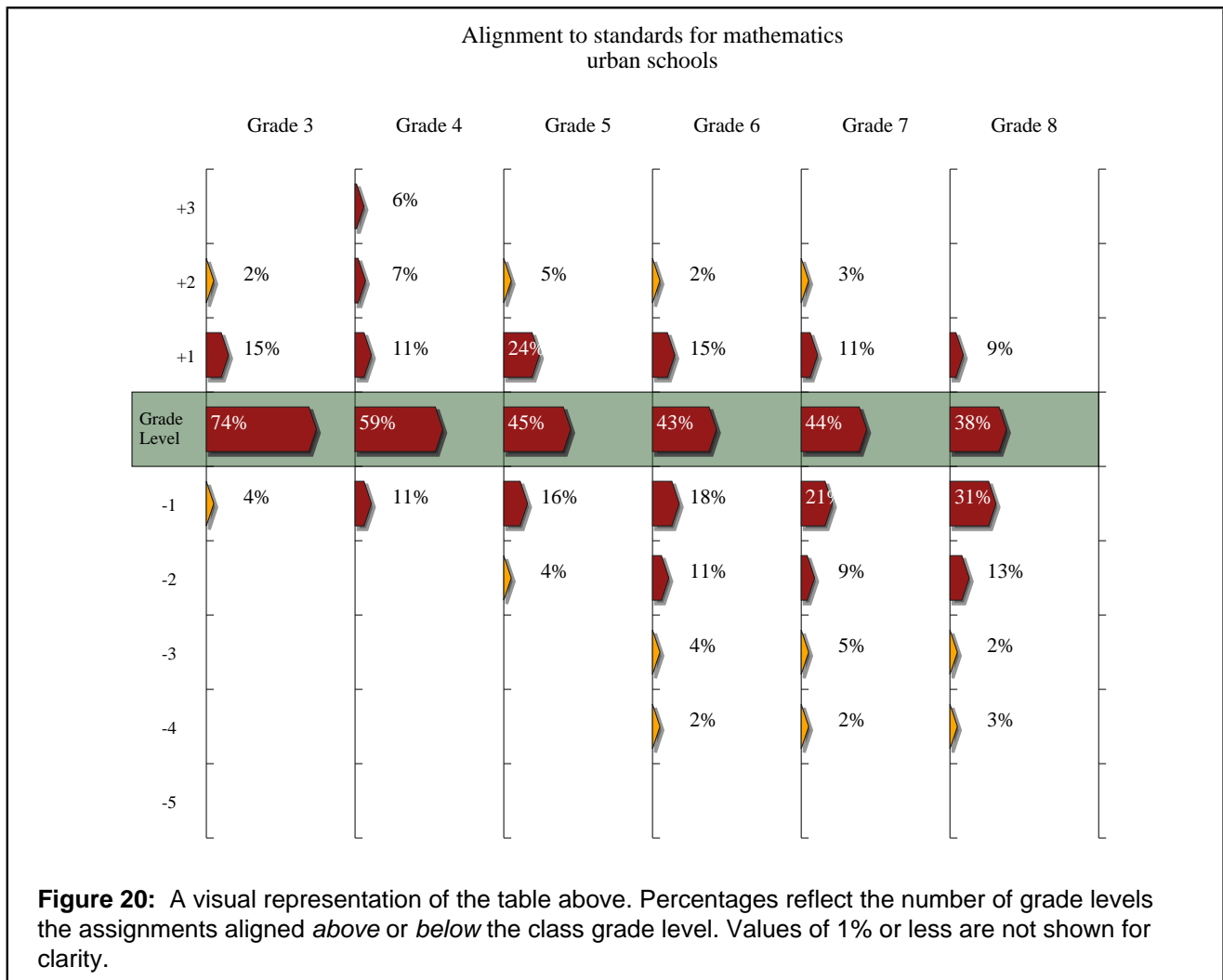
Grade	Enacted grade level for mathematics (rural schools)								
	1	2	3	4	5	6	7	8	9
3	0%	5%	63%	21%	5%	3%	2%	0%	0%
4	0%	0%	4%	64%	9%	15%	5%	0%	0%
5	0%	0%	3%	15%	62%	14%	3%	0%	0%
6	0%	0%	0%	8%	15%	59%	13%	3%	0%
7	0%	0%	0%	4%	10%	31%	42%	8%	2%
8	0%	0%	0%	1%	3%	11%	21%	45%	15%



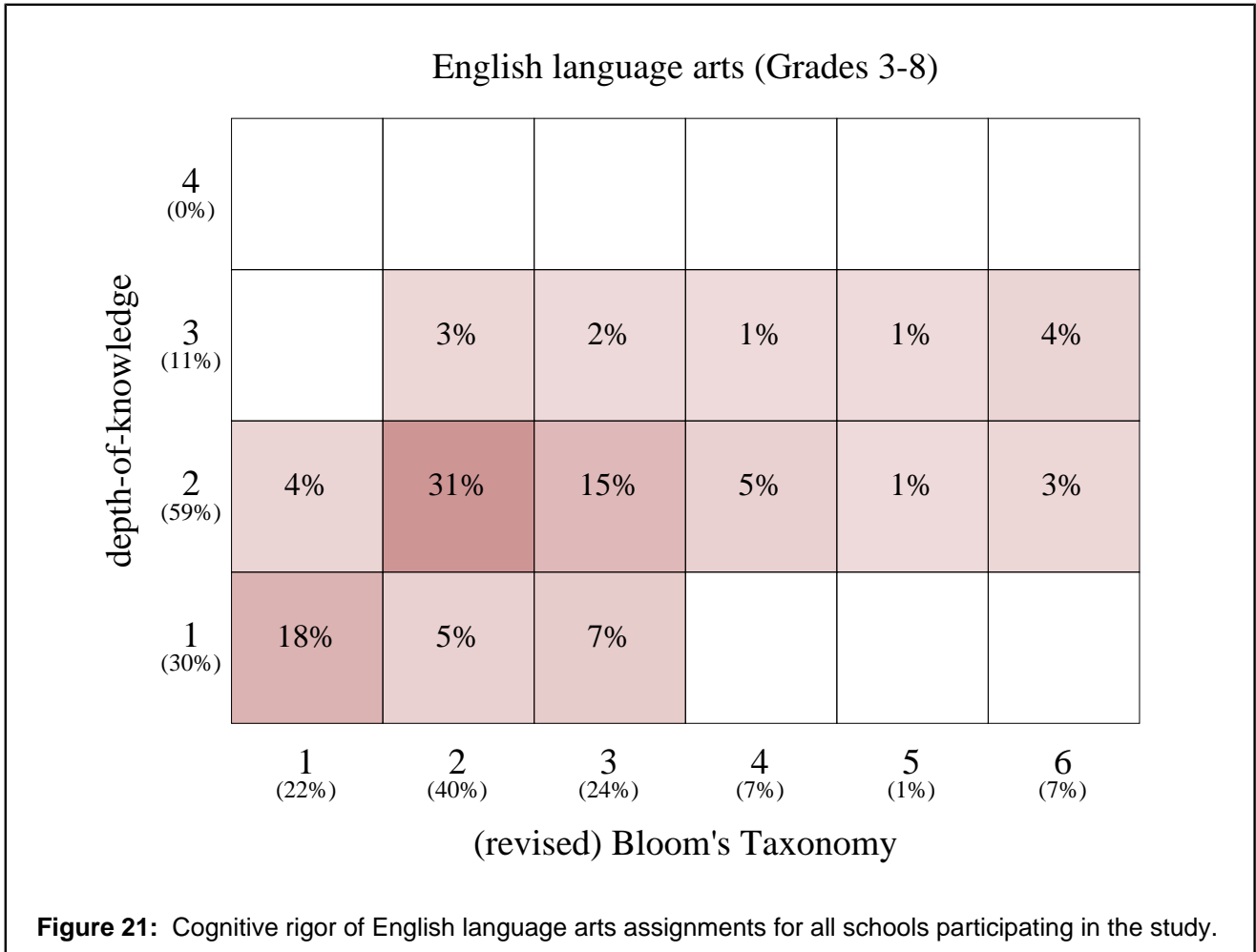
3.15 Alignment to standards - mathematics (urban schools)

Table 16: Same as the previous table but specifically for schools located in relatively urban areas. These results are displayed visually in the figure below.

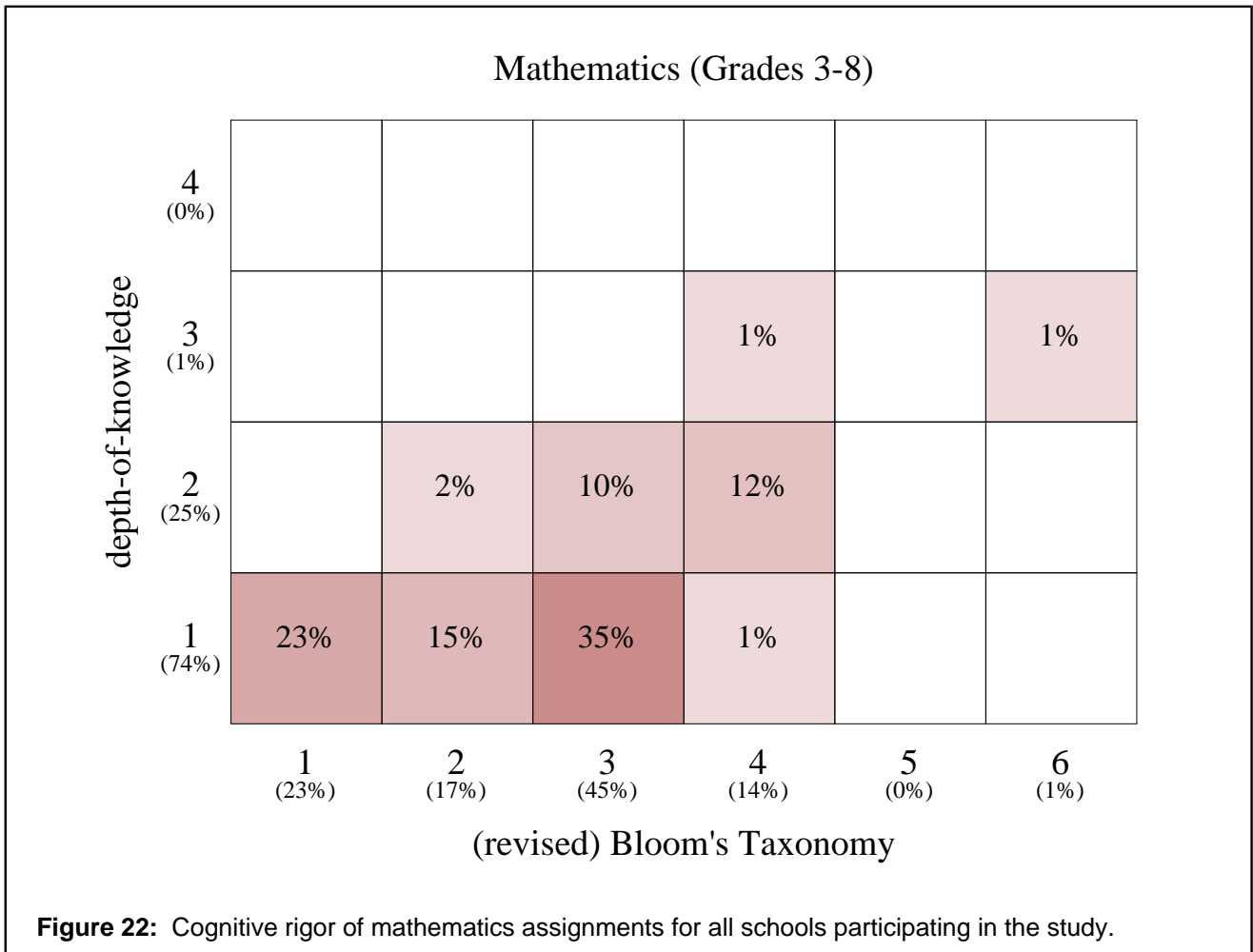
Grade	Enacted grade level for mathematics (urban schools)								
	1	2	3	4	5	6	7	8	9
3	0%	4%	74%	15%	2%	1%	0%	0%	0%
4	0%	1%	11%	59%	11%	7%	6%	0%	0%
5	0%	0%	4%	16%	45%	24%	5%	0%	1%
6	0%	2%	4%	11%	18%	43%	15%	2%	0%
7	0%	0%	2%	5%	9%	21%	44%	11%	3%
8	0%	0%	1%	3%	2%	13%	31%	38%	9%



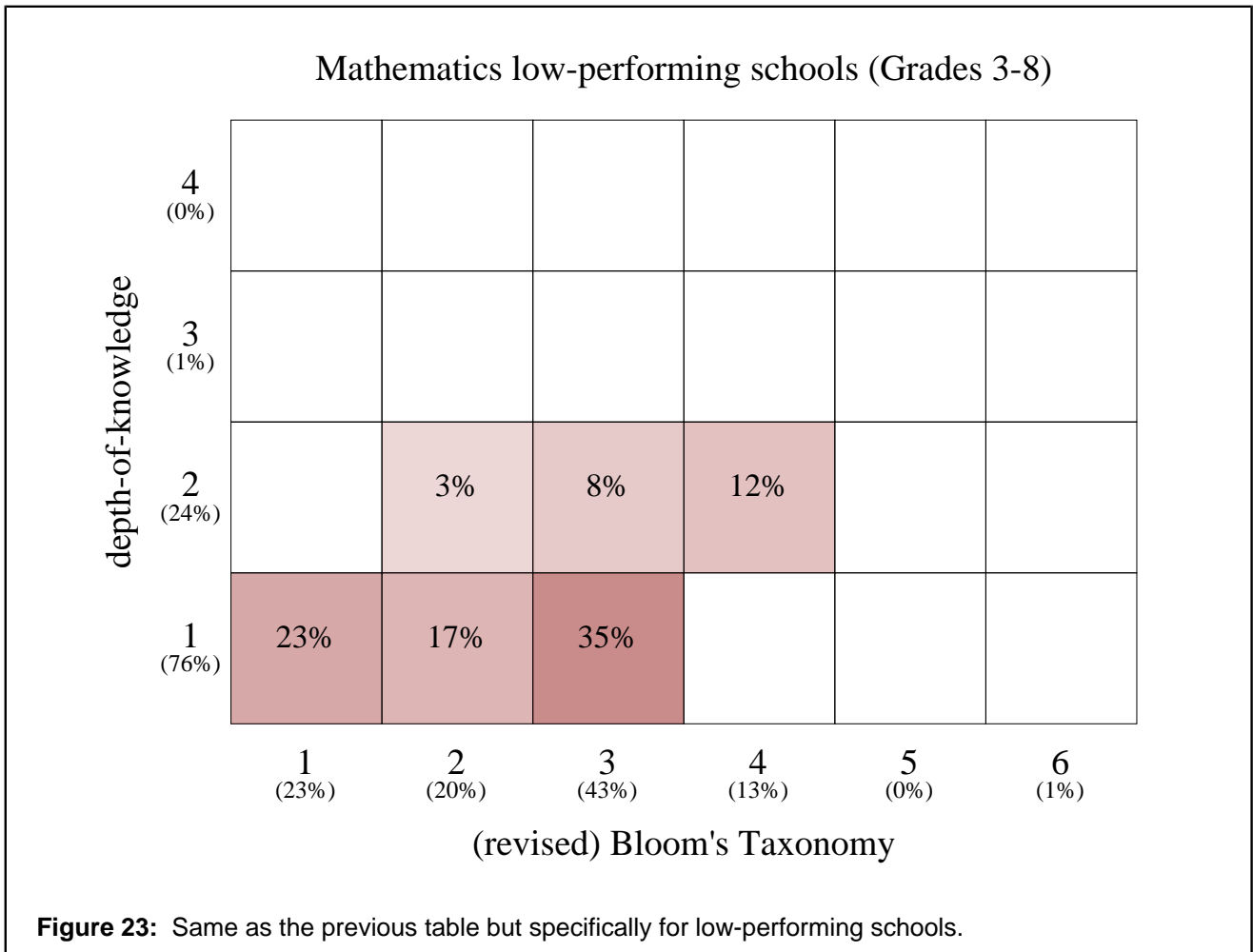
3.16 Cognitive rigor results - English language arts



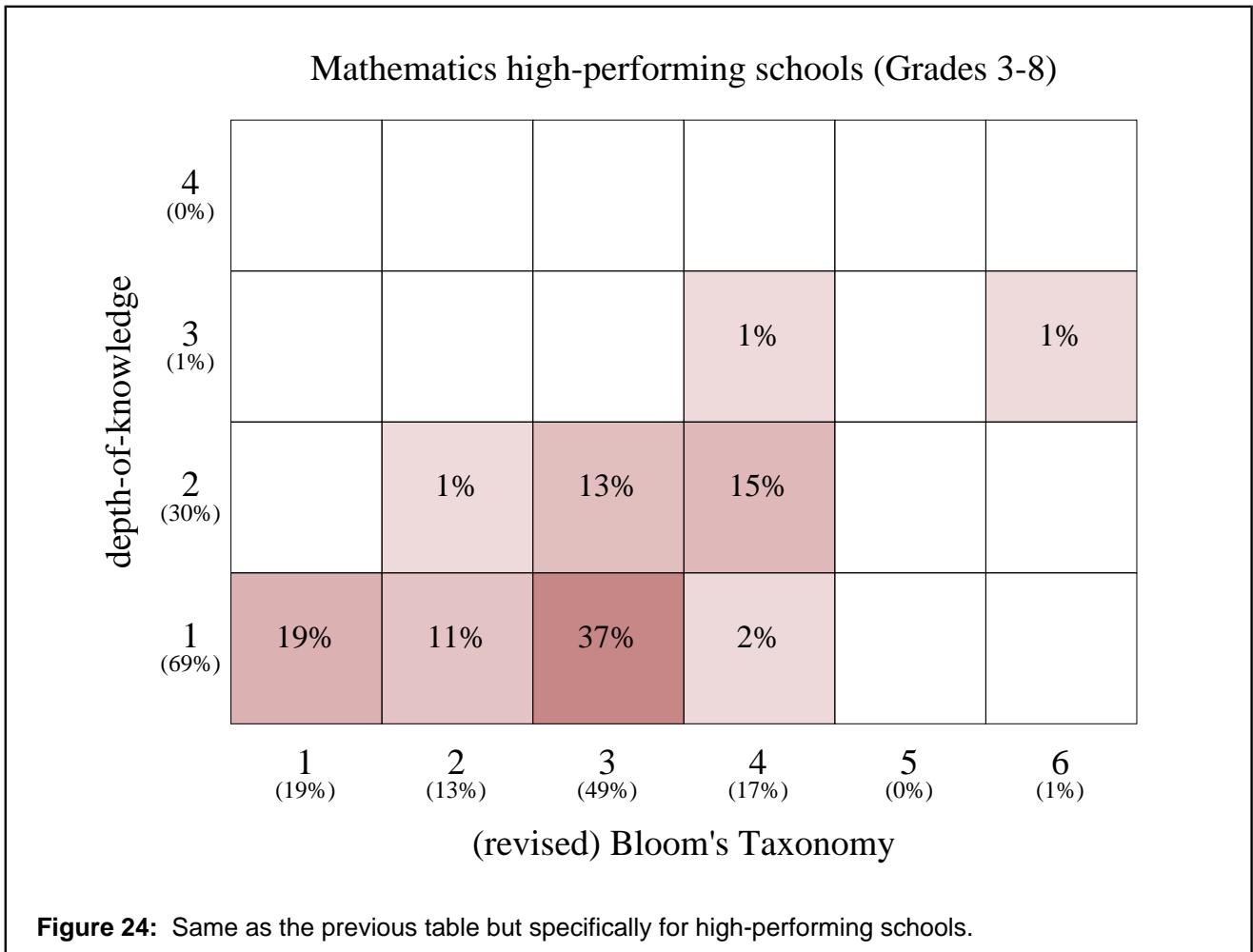
3.17 Cognitive rigor results - mathematics



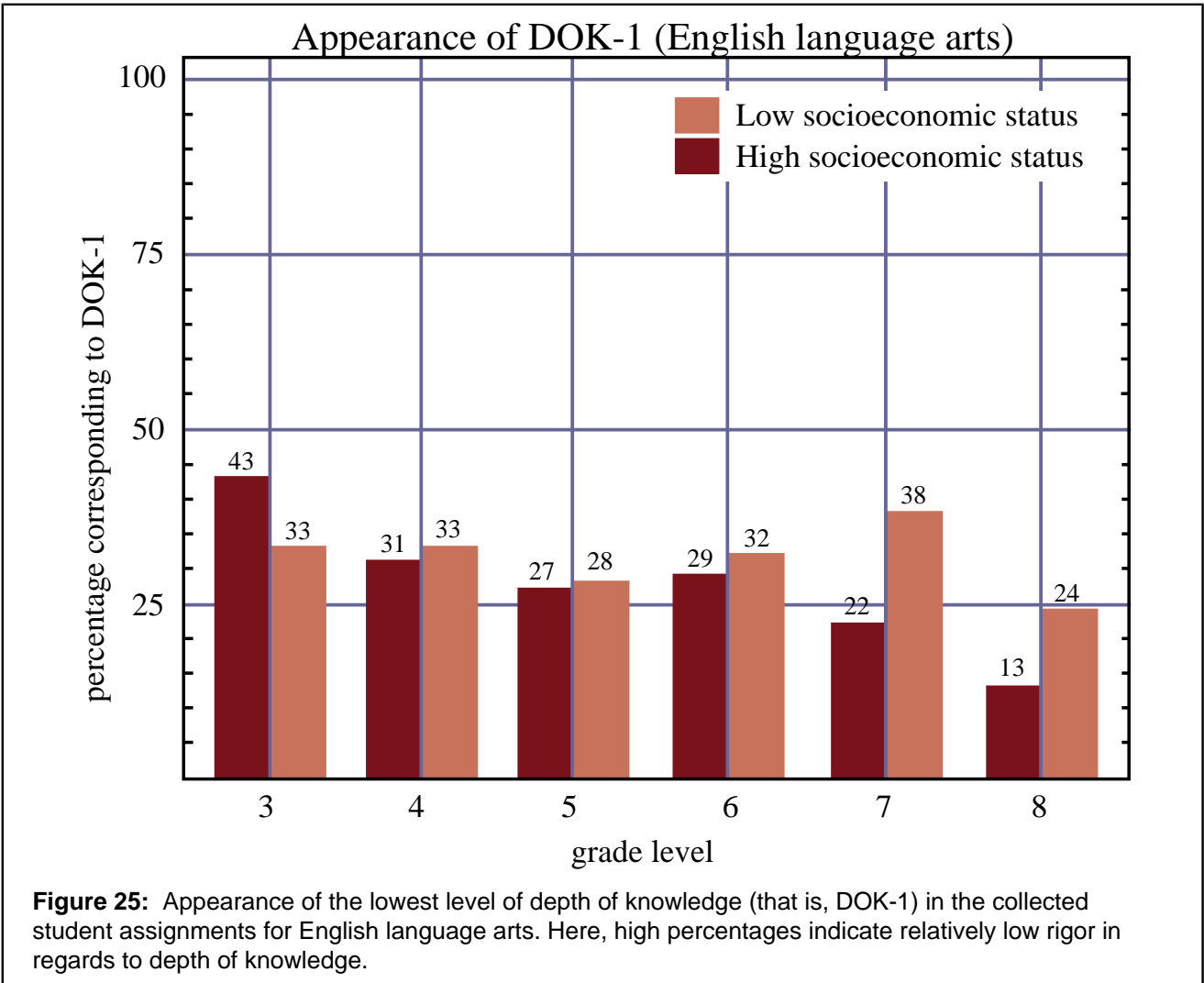
3.18 Cognitive rigor results - mathematics (low-performing schools)



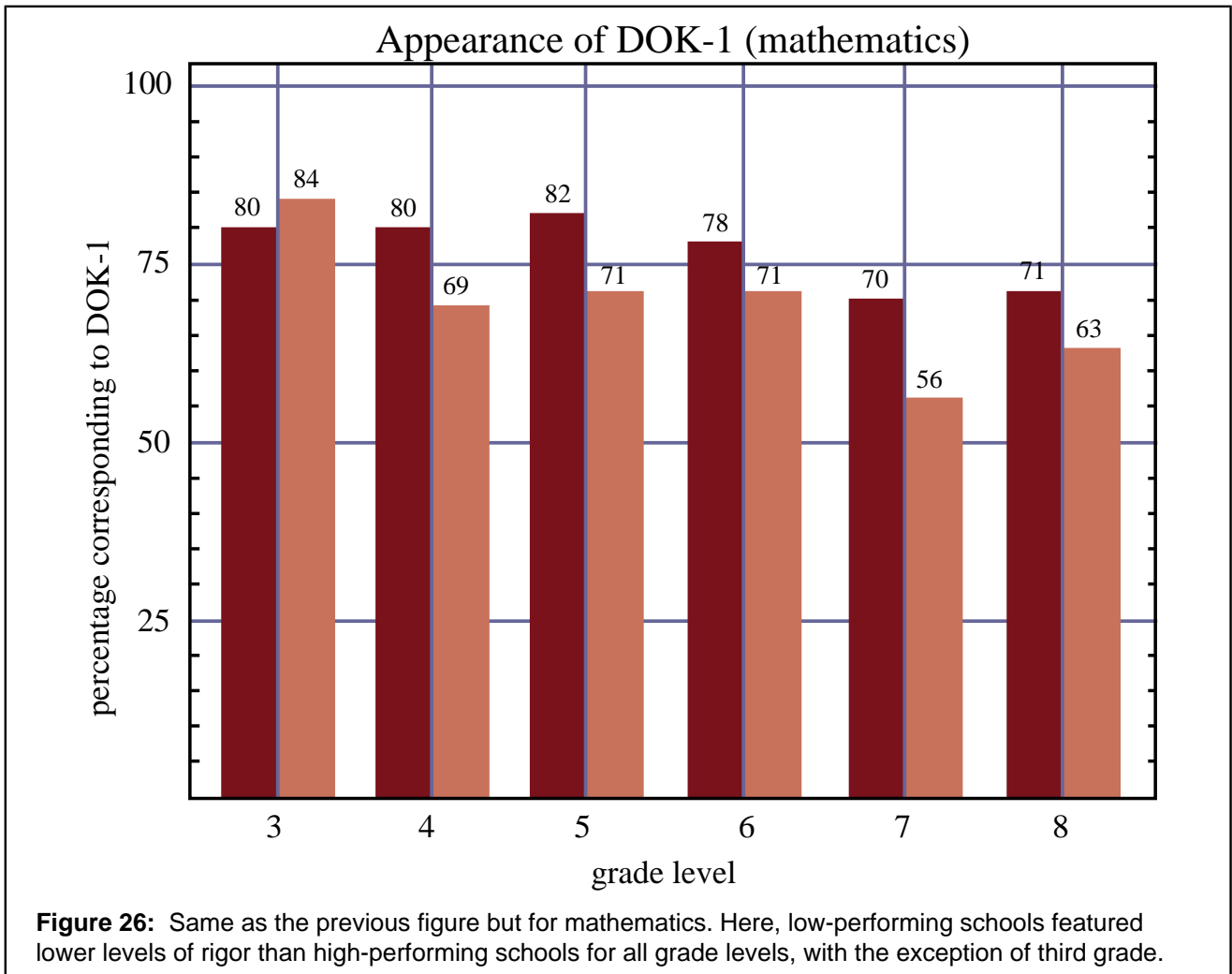
3.19 Cognitive rigor results - mathematics (high-performing schools)



3.20 Appearance of depth-of-knowledge level 1 - mathematics



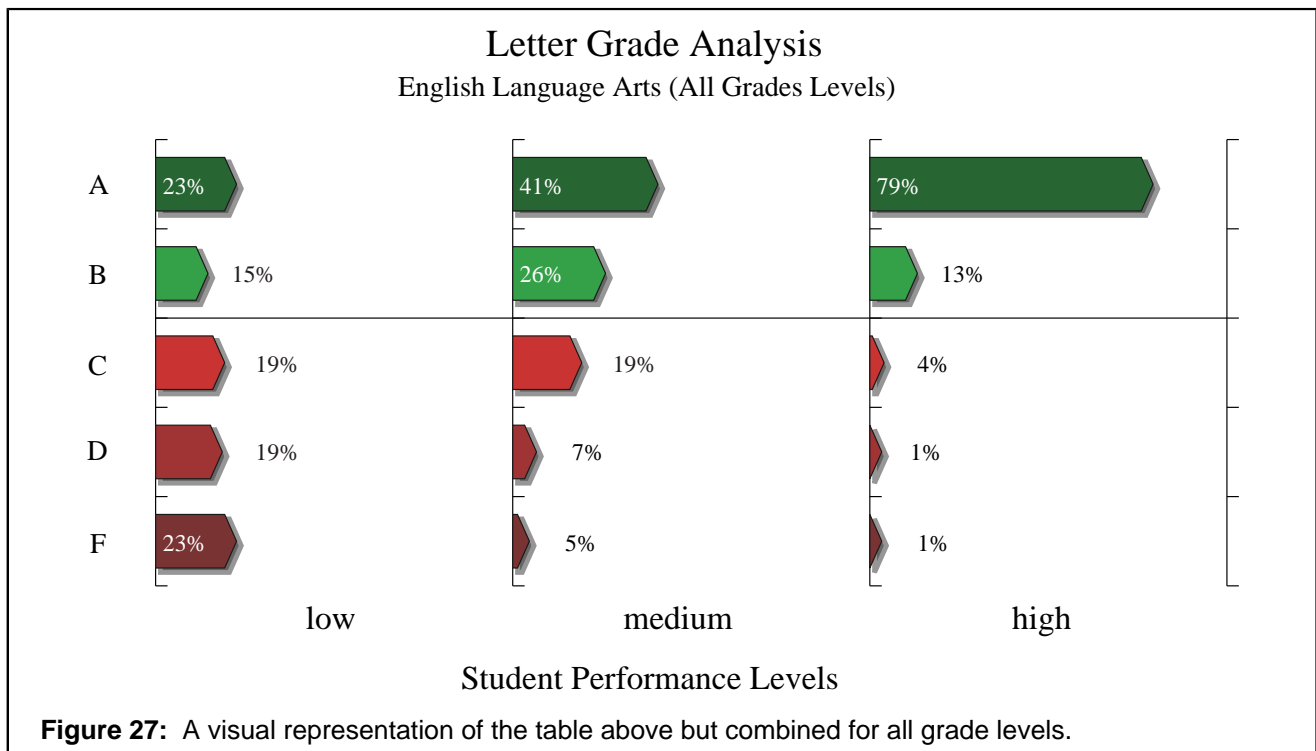
3.21 Appearance of depth of knowledge level 1 - English language arts



3.22 Letter-grade analysis - English language arts

Table 17: Letter grades received by students on English language art assignments for all schools included in the study. Composite results for all grade levels are displayed visually in the figure below.

Subject		Letter grade analysis (English language arts)				
		A	B	C	D	F
Grade 3	High-performing	79%	13%	4%	1%	1%
	Medium-performing	47%	24%	14%	8%	5%
	Low-performing	24%	16%	16%	16%	25%
Grade 4	High-performing	80%	12%	5%	0%	0%
	Medium-performing	45%	23%	20%	6%	4%
	Low-performing	25%	19%	18%	18%	18%
Grade 5	High-performing	80%	13%	3%	1%	0%
	Medium-performing	45%	23%	19%	5%	5%
	Low-performing	22%	17%	20%	14%	23%
Grade 6	High-performing	79%	13%	3%	1%	1%
	Medium-performing	35%	32%	18%	7%	5%
	Low-performing	18%	14%	22%	21%	22%
Grade 7	High-performing	78%	13%	4%	1%	1%
	Medium-performing	37%	25%	24%	7%	5%
	Low-performing	24%	12%	19%	17%	25%
Grade 8	High-performing	78%	13%	3%	2%	0%
	Medium-performing	39%	26%	21%	7%	5%
	Low-performing	22%	13%	18%	25%	20%



3.23 Letter-grade analysis - mathematics

Table 18: Same as the previous table but specifically for mathematics. Composite results for all grade levels are displayed visually in the figure below.

Subject		Letter grade analysis (mathematics)				
		A	B	C	D	F
Grade 3	High-performing	79%	11%	5%	1%	1%
	Medium-performing	50%	21%	14%	8%	5%
	Low-performing	30%	14%	14%	12%	27%
Grade 4	High-performing	76%	12%	5%	3%	2%
	Medium-performing	43%	23%	15%	10%	7%
	Low-performing	21%	15%	23%	12%	26%
Grade 5	High-performing	74%	19%	4%	0%	0%
	Medium-performing	36%	22%	20%	9%	10%
	Low-performing	17%	12%	15%	19%	35%
Grade 6	High-performing	71%	15%	5%	3%	3%
	Medium-performing	36%	23%	20%	8%	11%
	Low-performing	20%	13%	14%	13%	37%
Grade 7	High-performing	67%	16%	6%	5%	4%
	Medium-performing	35%	20%	19%	7%	15%
	Low-performing	20%	13%	13%	16%	36%
Grade 8	High-performing	72%	14%	7%	4%	1%
	Medium-performing	40%	23%	16%	8%	11%
	Low-performing	24%	12%	12%	15%	33%

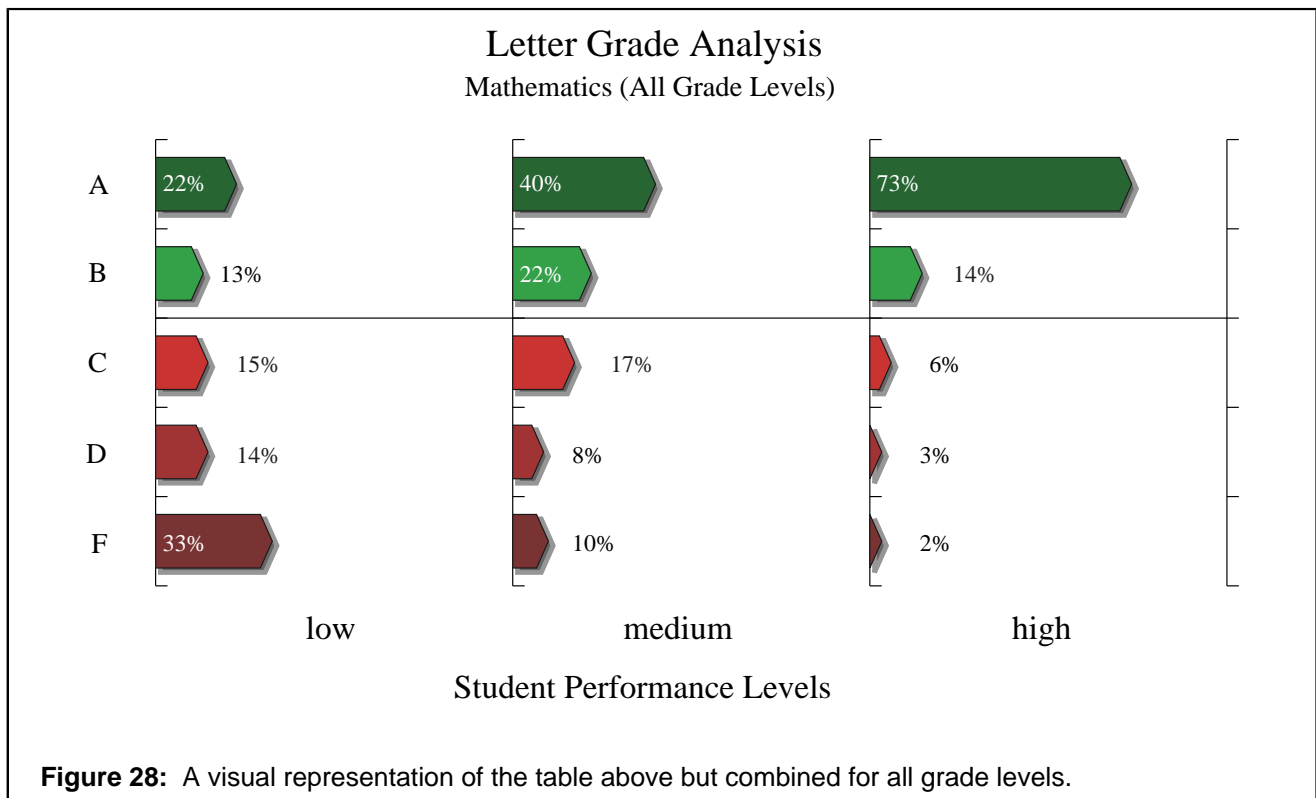
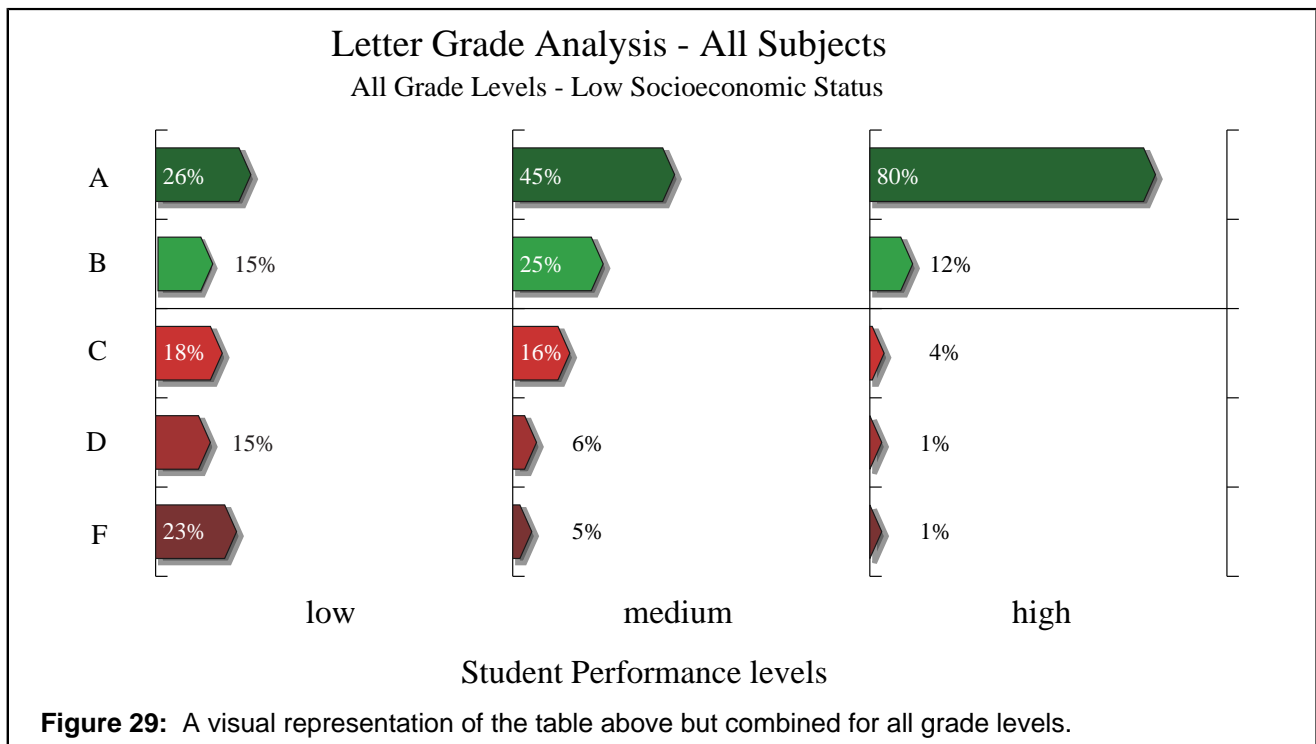


Figure 28: A visual representation of the table above but combined for all grade levels.

3.24 Letter-grade analysis - combined subjects (low socioeconomic status)

Table 19: Letter grades received by students on assignments (both English language arts and mathematics) in schools residing in relatively poor communities. Composite results for all grade levels are displayed visually in the figure below.

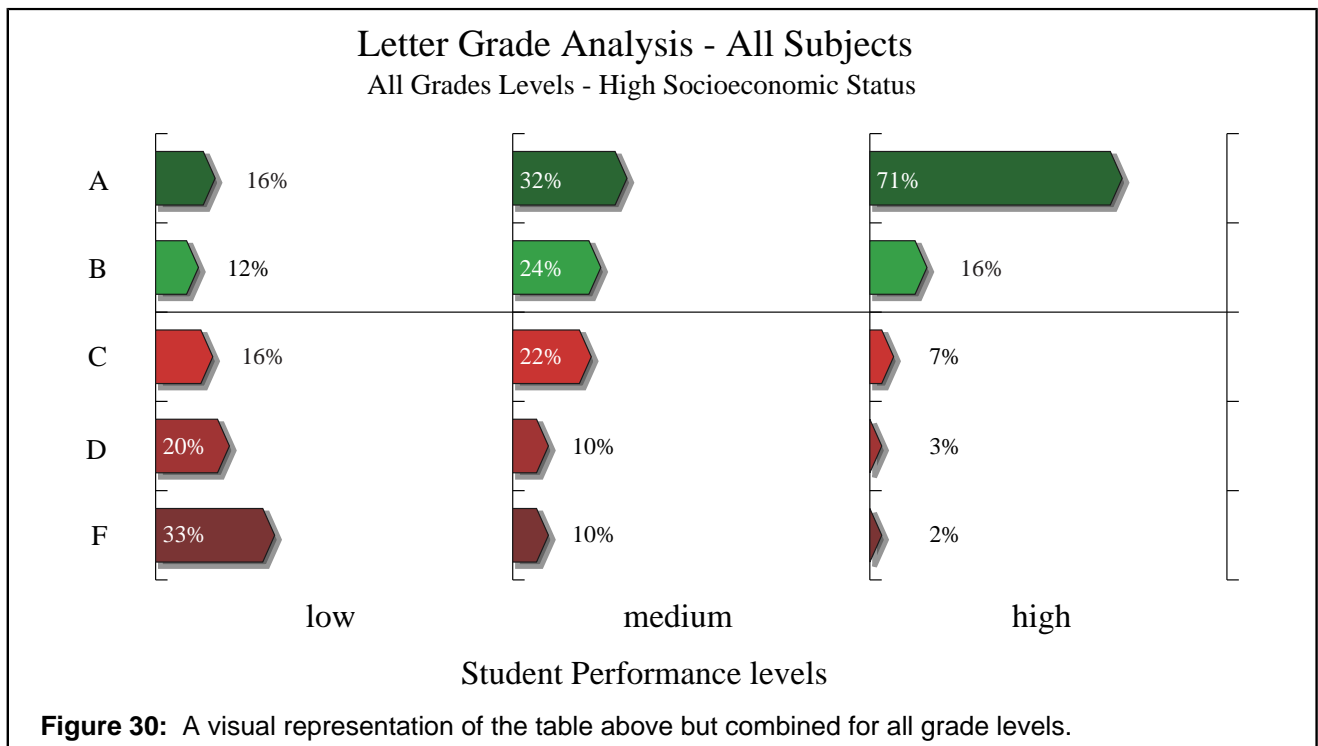
Subject		Letter grade analysis Low SES (all subjects)				
		A	B	C	D	F
Grade 3	High-performing	81%	12%	4%	1%	1%
	Medium-performing	49%	25%	13%	6%	5%
	Low-performing	27%	18%	15%	13%	24%
Grade 4	High-performing	84%	10%	3%	1%	0%
	Medium-performing	44%	25%	18%	8%	3%
	Low-performing	25%	18%	24%	13%	18%
Grade 5	High-performing	80%	14%	4%	0%	0%
	Medium-performing	48%	22%	16%	5%	6%
	Low-performing	22%	15%	21%	18%	22%
Grade 6	High-performing	78%	14%	3%	1%	2%
	Medium-performing	41%	28%	15%	7%	7%
	Low-performing	24%	16%	18%	13%	27%
Grade 7	High-performing	78%	12%	4%	2%	2%
	Medium-performing	45%	25%	16%	6%	7%
	Low-performing	30%	13%	18%	14%	22%
Grade 8	High-performing	80%	11%	3%	2%	1%
	Medium-performing	43%	25%	16%	6%	6%
	Low-performing	28%	12%	16%	19%	22%



3.25 Letter-grade analysis - combined subjects (high socioeconomic status)

Table 20: Letter grades received by students on assignments (both English language arts and mathematics) in schools residing in relatively affluent communities. Composite results for all grade levels are displayed visually in the figure below.

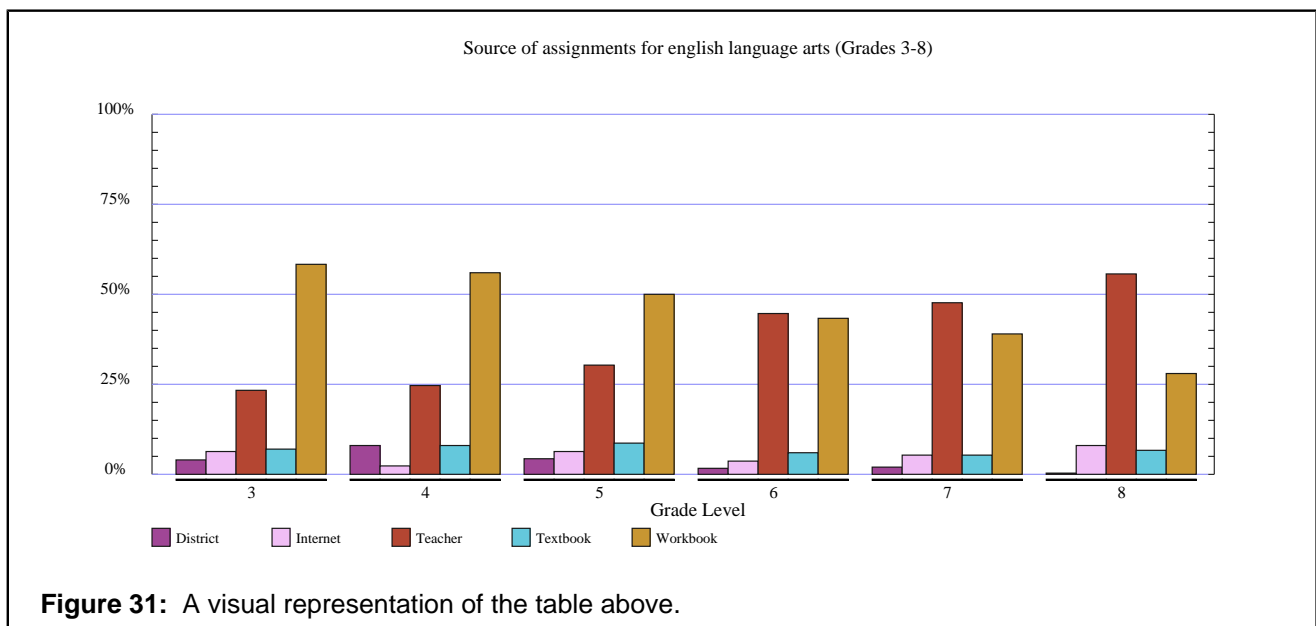
Subject		Letter grade analysis High SES (all subjects)				
		A	B	C	D	F
Grade 3	High-performing	71%	15%	8%	3%	1%
	Medium-performing	48%	18%	11%	14%	6%
	Low-performing	25%	11%	12%	15%	34%
Grade 4	High-performing	65%	15%	12%	2%	4%
	Medium-performing	46%	15%	16%	8%	13%
	Low-performing	21%	16%	11%	20%	29%
Grade 5	High-performing	75%	18%	3%	0%	1%
	Medium-performing	25%	25%	24%	10%	14%
	Low-performing	14%	17%	17%	12%	38%
Grade 6	High-performing	74%	14%	6%	2%	2%
	Medium-performing	27%	32%	21%	10%	8%
	Low-performing	14%	11%	20%	25%	28%
Grade 7	High-performing	70%	17%	5%	3%	2%
	Medium-performing	29%	24%	29%	8%	8%
	Low-performing	14%	11%	17%	20%	36%
Grade 8	High-performing	67%	15%	8%	6%	1%
	Medium-performing	29%	24%	22%	10%	11%
	Low-performing	17%	12%	12%	23%	34%



3.26 Source of assignments - English language arts

Table 21: Source of English language arts assignments for all schools participating in the study. Note that the definition of workbooks shown here was not limited to non-adopted commercial publishers but could have corresponded to supplementary materials to state- or district-adopted textbooks. These results are displayed visually in the figure below.

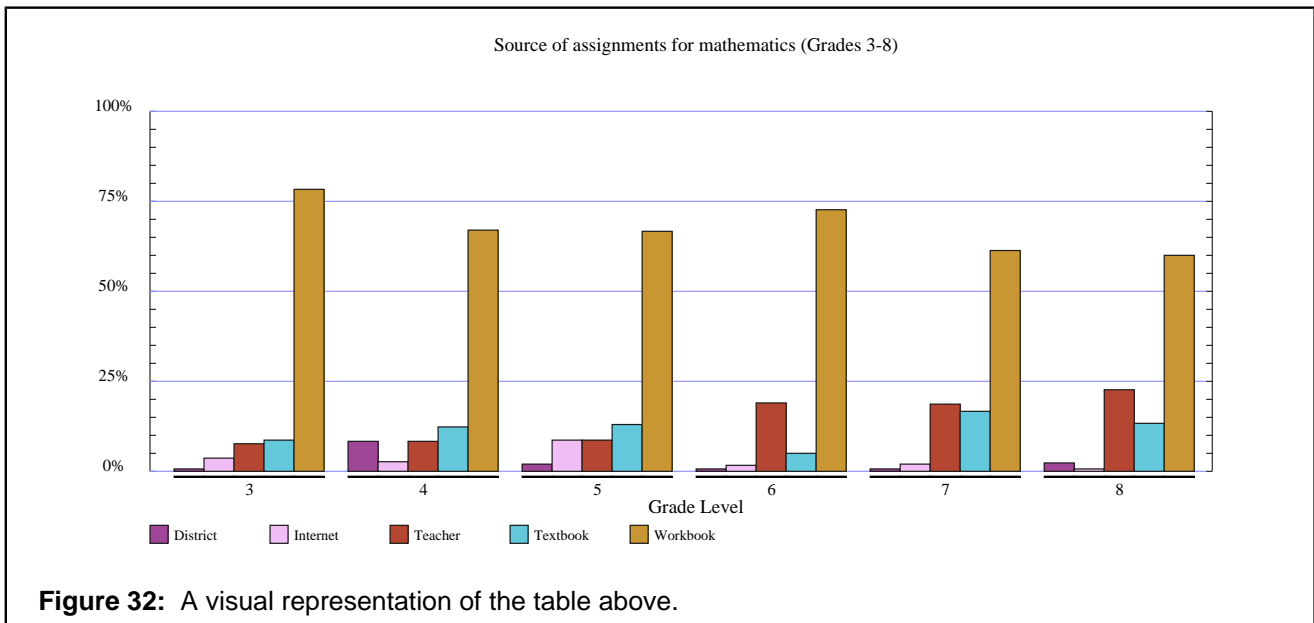
Source of assignments for english language arts					
Grade	district	internet	teacher	textbook	workbook
3	4%	6%	23%	7%	58%
4	8%	2%	24%	8%	56%
5	4%	6%	30%	8%	50%
6	1%	3%	44%	6%	43%
7	2%	5%	47%	5%	39%
8	0%	8%	55%	6%	28%



3.27 Source of assignments - mathematics

Table 22: Source of mathematics assignments for all schools participating in the study. Note that the definition of workbooks shown here was not limited to non-adopted commercial publishers but could have corresponded to supplementary materials to state- or district-adopted textbooks. These results are displayed visually in the figure below.

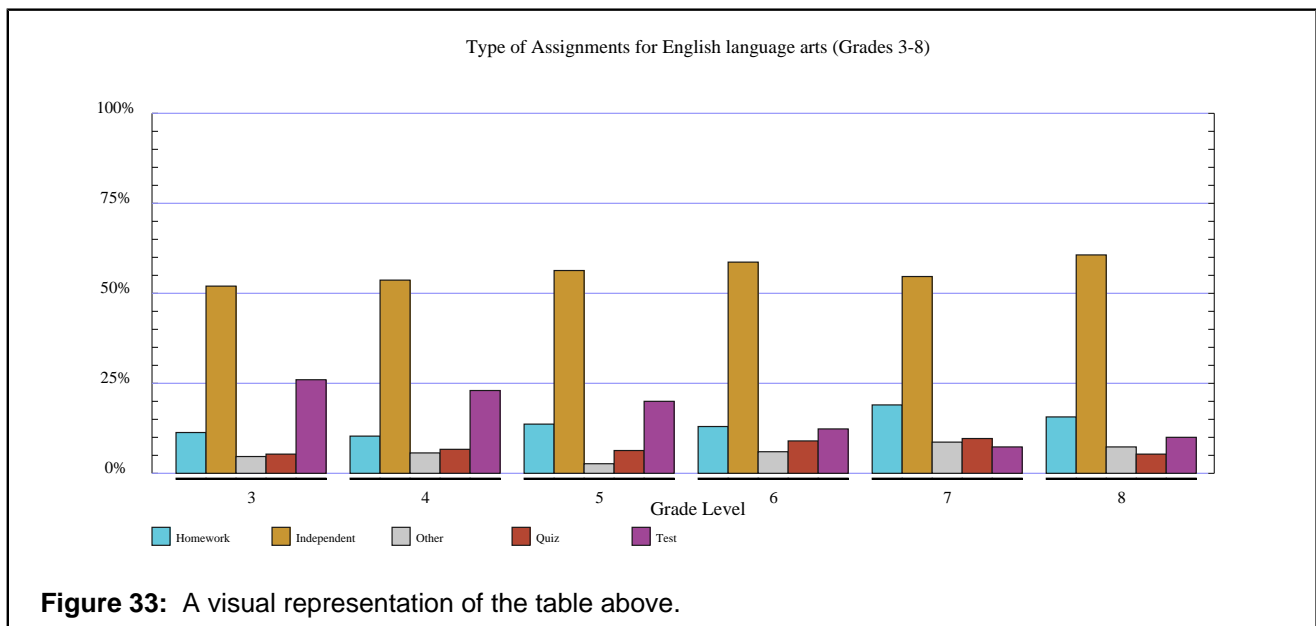
Source of assignments for mathematics					
Grade	district	internet	teacher	textbook	workbook
3	0%	3%	7%	8%	78%
4	8%	2%	8%	12%	67%
5	2%	8%	8%	13%	66%
6	0%	1%	19%	5%	72%
7	0%	2%	18%	16%	61%
8	2%	0%	22%	13%	60%



3.28 Type of assignments - English language arts

Table 23: Type of English language arts assignments submitted for analysis. The term independent refers to work performed in class by students with little or no guidance from the teacher. These results are displayed visually in the figure below.

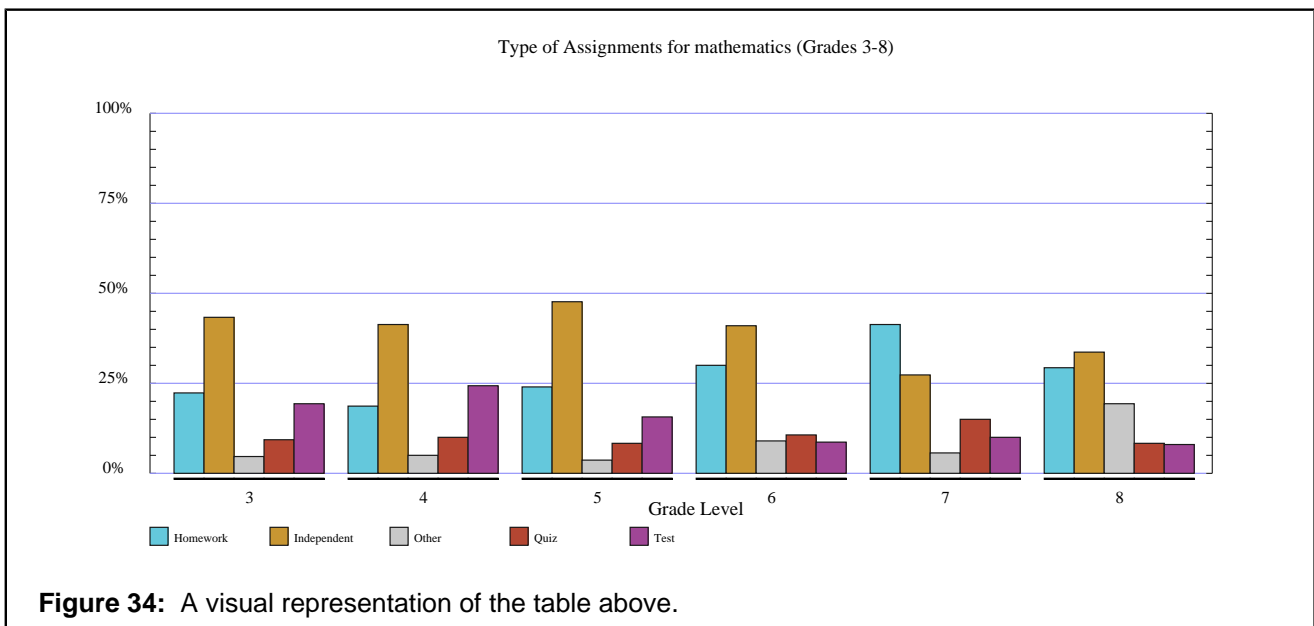
Type of Assignments for English language arts					
Grade	homework	independent	other	quiz	test
3	11%	52%	4%	5%	26%
4	10%	53%	5%	6%	23%
5	13%	56%	2%	6%	20%
6	13%	58%	6%	9%	12%
7	19%	54%	8%	9%	7%
8	15%	60%	7%	5%	10%



3.29 Type of assignments - mathematics

Table 24: Same as the previous table but specifically for mathematics. As stated previously, the term independent refers to work performed in class by students with little or no guidance from the teacher.

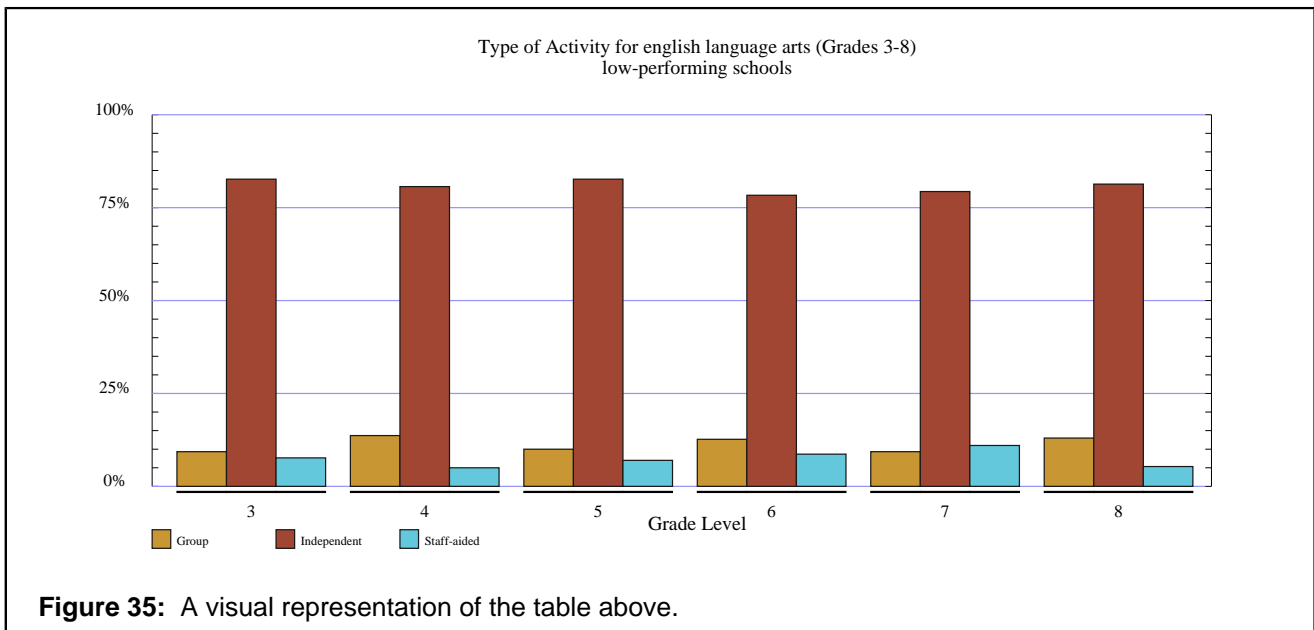
Type of Assignments for mathematics					
Grade	homework	independent	other	quiz	test
3	22%	43%	4%	9%	19%
4	18%	41%	5%	10%	24%
5	24%	47%	3%	8%	15%
6	30%	41%	9%	10%	8%
7	41%	27%	5%	15%	10%
8	29%	33%	19%	8%	8%



3.30 Type of activities - English language arts (low-performing schools)

Table 25: Type of activities associated with English language arts assignments collected from low-performing schools. These results are displayed visually in the figure below.

Type of activity for english language arts (low-performing schools)			
Grade	group activity	individual	teacher-aided
3	9%	82%	7%
4	13%	80%	5%
5	10%	82%	7%
6	12%	78%	8%
7	9%	79%	11%
8	13%	81%	5%



3.31 Type of activities - English language arts (high-performing schools)

Table 26: Type of activities associated with English language arts assignments collected from high-performing schools. These results are displayed visually in the figure below.

Type of activity for english language arts (high-performing schools)			
Grade	group activity	individual	teacher-aided
3	7%	82%	9%
4	10%	84%	5%
5	8%	86%	5%
6	6%	88%	4%
7	8%	84%	7%
8	6%	89%	3%

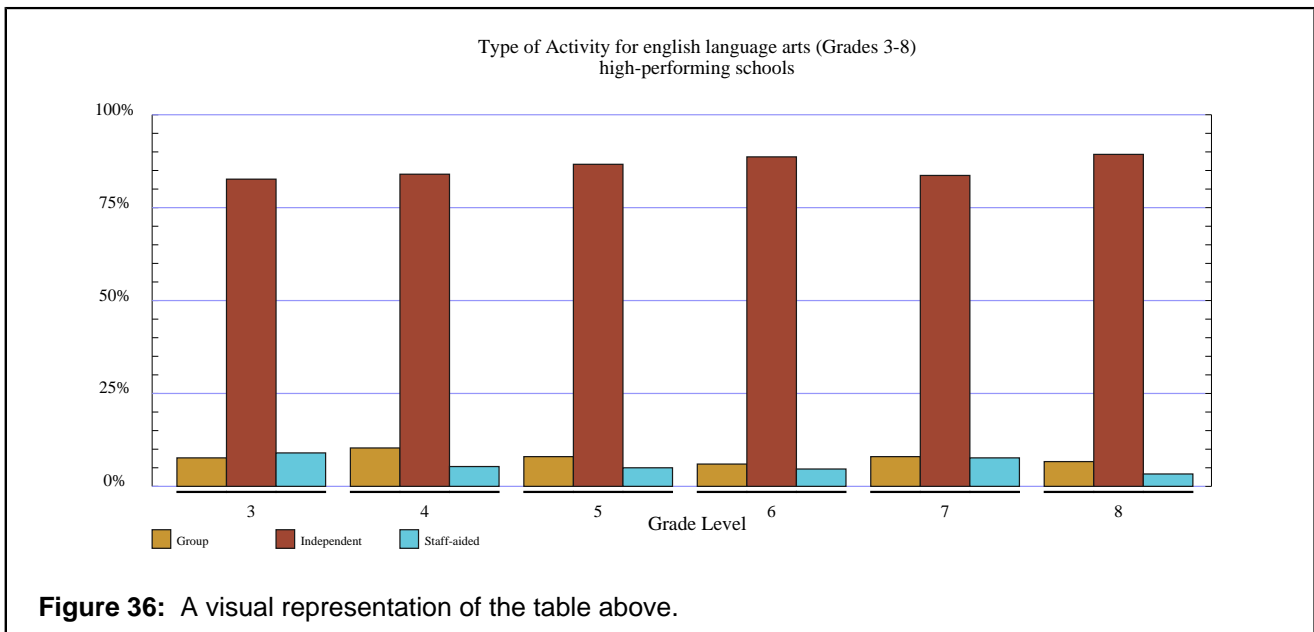
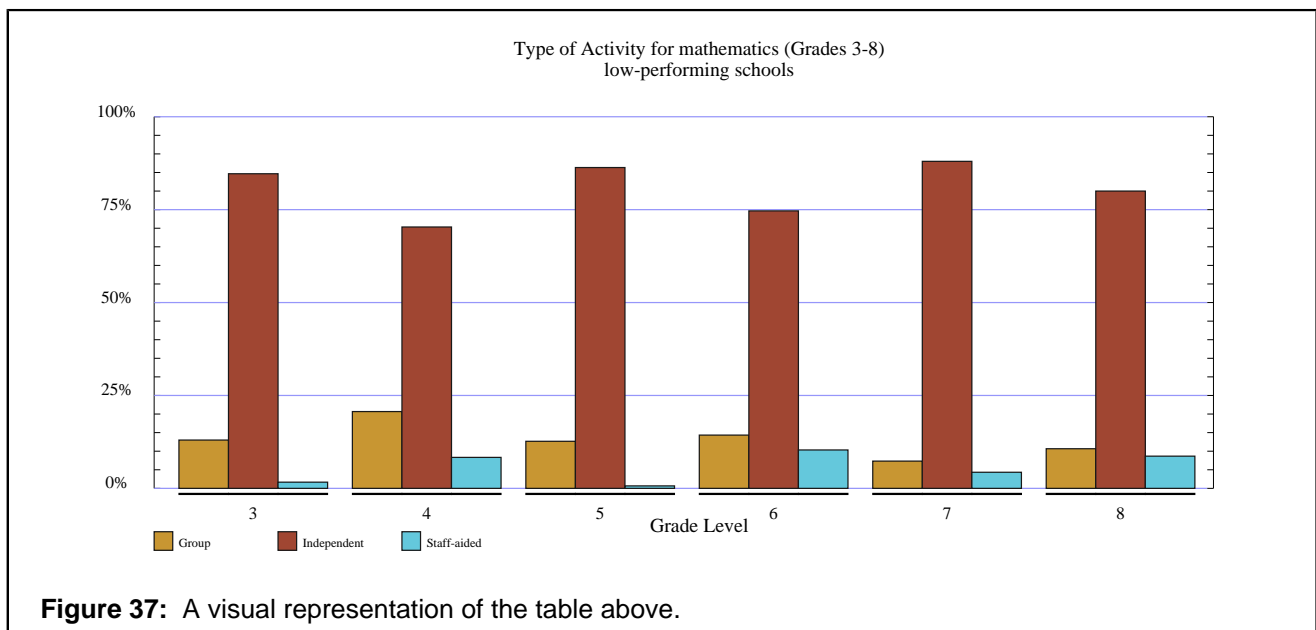


Figure 36: A visual representation of the table above.

3.32 Type of activities - mathematics (low-performing schools)

Table 27: Type of activities associated with mathematics assignments collected from low-performing schools. These results are displayed visually in the figure below.

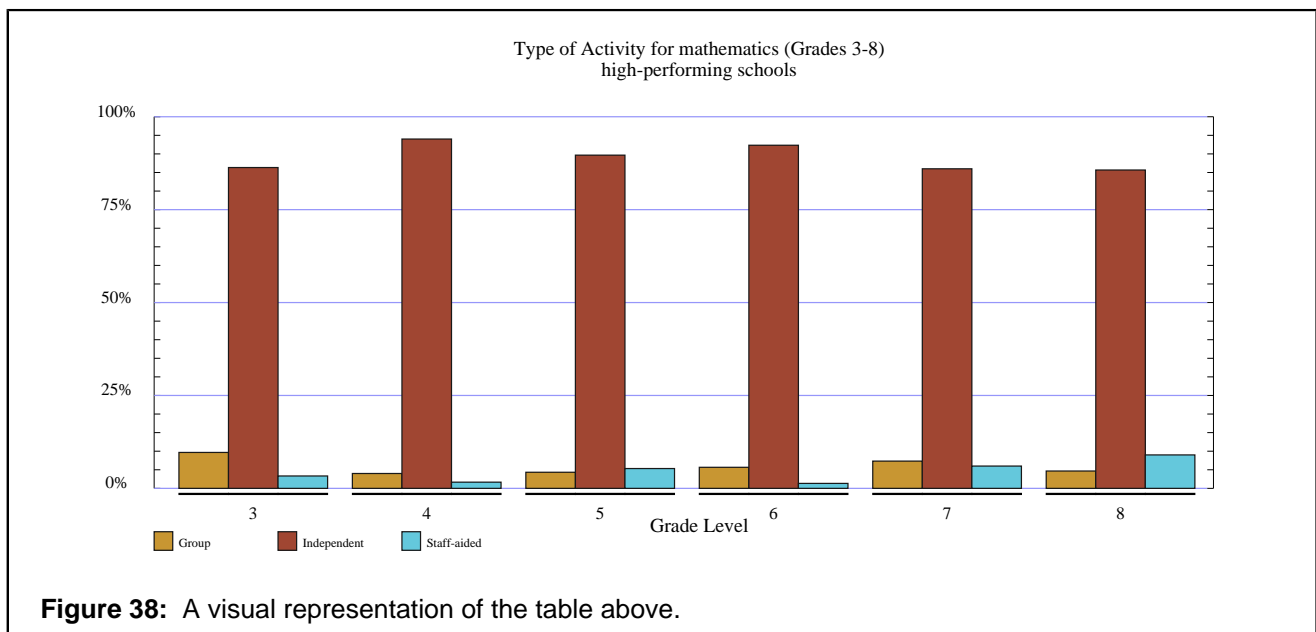
Type of activity for mathematics (low-performing schools)			
Grade	group activity	individual	teacher-aided
3	13%	84%	1%
4	20%	70%	8%
5	12%	86%	0%
6	14%	74%	10%
7	7%	88%	4%
8	10%	80%	8%



3.33 Type of activities - mathematics (high-performing schools)

Table 28: Same as the previous table but specifically for high-performing schools. These results are displayed visually in the figure below.

Type of activity for mathematics (high-performing schools)			
Grade	group activity	individual	teacher-aided
3	9%	86%	3%
4	4%	94%	1%
5	4%	89%	5%
6	5%	92%	1%
7	7%	86%	6%
8	4%	85%	9%



4 Recommendations

1. In English language arts, the appearance of large quantities of fifth-grade content appearing at grade levels 6-8 was the result of repeated teaching of fifth-grade content centered on low-level grammar, English conventions, and mechanical skills. Such an overemphasis could limit growth in writing skills at the paragraph level and beyond. Middle school English language arts teachers should examine fifth grade standards associated with these concepts and skills in light of what they are expected to teach at their own grade levels and adjust their lesson plans accordingly. Professional development for middle school English language arts teachers related to lesson plan development and curriculum could improve future results. Since these results appeared in all categories of schools defined in this study, such professional development should not be limited to a specific category of middle schools.
2. The steady, yet strong, drop in alignment as the grade levels increased indicates that the curriculum in middle schools and high schools could potentially be limiting achievement. High school mathematics assignments were not included in this study but warrant their own thorough examination since the results in this study indicate a potential severe misalignment to standards (studying the enacted curriculum of high school mathematics poses complications since the state of Nevada does not have course-specific standards. For this reason, we have proposed to focus future collections only on high school algebra and geometry)
3. Low Bloom's Taxonomy levels indicate that students are exercising a limited type of thinking when completing activities. Low depth-of-knowledge levels are associated with short, straightforward, and relatively unsophisticated activities in which content items appearing in student work are largely performed in isolation with respect to other items. The results of this study indicate that teachers of mathematics from low-performing schools need additional training in cognitive rigor as associated with assigned activities. The manner in which the concept of cognitive rigor is incorporated in lesson plan development is also an area of potential training.
4. As stated previously, schools located in areas of low socioeconomic conditions submitted student work containing higher letter grades than schools located in more affluent communities. Artificially high letter grades can produce unrealistic expectations about the knowledge and skill levels of students and can mask problem areas in learning. Those teaching in schools located in low socioeconomic communities should revisit what defines a letter grade, discuss the ramifications of grade inflation, and ensure that the letter grades they administer are reasonable.
5. As we stated earlier, the definition of workbooks was not limited to non-adopted commercial publishers; in fact, many of the assignments identified by teachers as workbooks were supplements to state-adopted textbooks. Even so, the preponderance of assignments corresponding to workbooks is especially striking. Excessive use of workbooks can be problematic since students are often provided little or no guidance during the activity. We suggest that teachers be informed of the problems associated with heavy workbook use and modify lesson plan development accordingly.
6. High incidences of independent activity, as opposed to teacher-aided and group-based activities, appeared at every grade level and remained fairly steady as the grade levels progressed. In contrast, it has been the experience of The Standards Company LLC personnel that the lower grade levels traditionally feature more group-based and teacher-aided activity, conducive to the extra assistance young students need to complete tasks. We suggest that school and district administrators discuss the roles that group activities and teacher assistance play in learning, especially in elementary schools. If the results of this study conflict with desired targets, we suggest that teachers receive additional professional development.

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