Investigation of Standard Accommodation Usage on the Spring 2010 Administration of Arizona's Instrument to Measure Standards: Science Results

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In the early 1990's, Arizona started developing standards and associated assessments to measure student achievement in mathematics, reading, and writing. In response to federal requirements put forth within the reauthorization of the Elementary and Secondary School Act referred to as the No Child Left Behind Act of 2001, Arizona expanded their assessment system to include science for Grades 4, 8, and high school in 2008. Across the nation, concerns have been expressed about the inclusion of both disabled and limited English proficient students within assessment systems and the validity of the use of various accommodations with these populations. This study was designed to explore some of the issues around the use of accommodations thought to allow students to demonstrate what they know and can do without changing the constructs being assessed.

Introduction

There is a growing body of research surrounding the use, effectiveness, and validity of various accommodations used on assessments, particularly those used for state and federal accountability systems. Much of this research has been focused on reading and mathematics assessments while few researchers have explored the effect of accommodation usage within science tests. Additionally, many of the studies that have looked at specific accommodations investigated accommodations such as extended time and change of setting which are now considered to be standard conditions rather than accommodations within Arizona's assessment system.

Arizona has two classifications of accommodations: universal test administration conditions and standard accommodations. Universal test administration conditions are specific test situations or conditions that are available for any student to provide a comfortable and distraction free test environment (Arizona Department of Education (ADE), 2010). While these "accommodations," such as one-on-one testing, specific seating within the testing room or the wearing of noise buffers may be listed as required accommodations within a student's individual education plan (IEP) or 504 plan, for Arizona state testing purposes they are not considered testing accommodations and are available to all students regardless of their ability status (ADE, 2010).

Standard accommodations, which are the focus of this study, are defined by Arizona as "provisions made in how a student accesses and demonstrates learning that do not substantially change the instructional level, the content, or the performance criteria" (ADE, p. 52, 2010). These accommodations are intended for three classifications of students: 1) students with an identified disability who have an established IEP or 504 plan, 2) students who have a temporary injury that restricts their ability to access or respond to the assessment, and 3) students who are English language learners (ELL) or fluently English proficient within their two year monitoring stage. The intent of these accommodations is to reduce or eliminate the effects of a student's disability, injury, or below grade-level English proficiency so that the student is able to demonstrate their content knowledge. It is believed that these accommodations do not change the constructs that are being measured.

Researchers have generally assigned the various accommodations used throughout the nation into four or more classifications. Some of the categories located were: Equipment/Materials, Linguistic, Presentation, Response, Setting, Technological Aid,

Timing/Scheduling, and Other (Cormier, Altman, Shyyan, & Thurlow, 2010; Johnstone, Altman, Thurlow, & Thompson, 2006; Rivera, Collum, Schafer Willner, & Sia, 2006; and Thurlow, Thompson, & Lazarus, 2006). These classifications generally lie solely within either a special education or an ELL framework. Since the current study's focus is on accommodations across these student categories, a similar but modified categorization was created as described below.

While a growing body of research has been accumulated on the accommodations Arizona has defined as "standard" within mathematics and English language arts assessments, there is limited research on these accommodations used within science assessments. That which was found will be briefly described in the next section.

Prior Research

In all, five research studies plus one literature review were found that addressed the accommodations of interest within science assessment. While the search was not limited to K-12, all of these studies did indeed focus on that range and all but the literature review involved only students from grades 3 through 8. Young, et al (2008) explored the use of translated directions and glossaries for grade 5 and grade 8 ELL and non-ELL students and determined that the assessment was essentially unidimensional for all groups assessed. Elliot, Kratochwill, and McKevitt (2001) experimented with 100 grade 4 students, 41 of whom were identified as students with disabilities, and determined that grouped accommodations helped most of the students with disabilities (75%) but also helped students without disabilities (55%). The remaining three studies focused in whole or in part on oral administration accommodations and reported mixed findings for the science assessment used.

Brown (2007) compared grade 5 non-accommodated students with those who received either an oral administration accommodation or an oral administration paired with response

options that were either graphics or pictures. He found that the least able readers (as identified by their teachers) were helped more by the oral administration accommodation than students who were at or above grade level in reading. However, when oral administration was paired with visual response options, all students were helped except for those at the very highest of the range. This is at odds with the two Kim, Schneider, and Siskind (2009a, 2009b) studies which spanned grades 3 through 8 and found that the factorial structure, loadings, and error variances for non-accommodated general education students and disabled students, with and without oral accommodations, were invariant across groups implying that there was no significant difference made by the use of this accommodation. Sireci, Scarpati, and Li's (2005) literature review, which included the Elliot study, concurred with the Kim, et al studies, concluding that while oral accommodations were sometimes found to help students on mathematics assessments (about ½ of the time), that their use within science and social studies assessment led to either no gain for students with disabilities or gains similar to those found for students without disabilities.

What has not been studied is the relationship of specific accommodations to the pass rates of students identified with specific needs or disabilities leading to the purpose of this study.

Purpose of the study

The purpose of the study was multileveled:

- To investigate patterns of standard accommodation usage among students within identified needs.
- To investigate patterns of standard accommodation usage among students across identified needs.

- To investigate whether the students within needs and need types who used specific standard accommodations performed differently than those who did not use standard accommodations.

Data

The data used for this study was the 2010 Arizona's Instrument to Measure Standards (AIMS) Science. While mathematics and reading assessments are given to Grades 3 through 8 and in high school, the science assessment is only given to Grades 4, 8, and in high school. The 2010 AIMS was the first administration in which specific information about both the accommodations used by each student had been gathered and the specific needs, as defined within the state student accountability system and listed in Table 1, for each public school student in the state was available for analysis. The results reported within relate only to the science assessment portion of the analyses; the mathematics and reading portions will follow.

In an attempt to reduce confounding due to the use of multiple accommodations by students, all students using more than one standard accommodation were removed from the analysis. Students with more than one of the 46 state identified needs were maintained and each studied need, as described below, was analyzed separately so that students with more than one need were included in more than one analysis. Student need within this document does not connote any specific condition. Rather, as used within the State's system, it is a designator for multiple student codes ranging from "Quantitative Giftedness" (code number 19), "No Need" (code number 37) and "Limited English Proficiency (LEPS)" (code number 21) to "Severe Mental Retardation" (code number 16) and "NCLB Indicator 1 (Eligible for Free Lunch)" (code number 23).

The original assessment files for each subject contained all students who took the test. This included students from regular and special district schools, charter schools, private schools, and Bureau of Indian Education (BIE) schools. The science assessment file included 227,662 students after those who used more than one standard accommodation (approximately 4.2%) were excluded. The assessment files containing these students were merged with the state-maintained student need file by a state unique student identifier number. Since private and BIE schools are not under control of the state, students within these schools do not have these unique student identifier numbers and were eliminated in the matching process. Over 97 percent of the students were matched to the needs file in this process. The majority of the students not matched did not have a state student identifier in the assessment file (2.1%), and less than .5 percent of students had erroneous state student identifiers. Of the 222,417 students within the science study, 47 percent had no identified need, 42 percent had one identified studied need, and 11 percent had more than one studied need.

Method

Selection of need groups

Of the 46 different needs within the needs file, 19 were chosen to be investigated. Sixteen of these needs related to health or learning issues such as Speech or Language Impairment, Specific Learning Disability, or Orthopedic Impairment. These were chosen to be consistent with the State's designation for special education students within their Annual Yearly Progress (AYP) accountability system. The other three studied needs, Limited English Proficiency (LEP), and the two indicators of low social economic status (SES), i.e., whether a student was eligible for either the Free or the Reduced Lunch Program, are also used within the State's AYP system. Since students could be associated with both of these SES indicators, an alternative variable, Free or

Reduced Lunch (FRL), was created for the students associated with either one to uniquely identify them as low SES. (See Table 1 for the complete list of needs and those selected for this study.) The main criterion for inclusion of a need within the study was the possible use of standard accommodations thought to be useful for that population need. The FRL variable was included because research has shown that this subgroup is typically among the lowest performing. In addition to each of the studied needs, an aggregate of special education and/or health need types were formed. The students identified with any of the sixteen needs related to health or learning issues, except LEP, were aggregated as the SPED/Health group.

Accommodations

During the Spring 2010 AIMS administration, information was gathered on the use of 22 different standard accommodations. (The list of standard accommodations with descriptions and the subgroup they were intended for is provided within Table 2.) Teachers of students with individual educational plans (IEP) or 504 plans that identified regularly used classroom accommodations on the list of standard accommodations were told to allow students to use those accommodations during the assessment and to bubble the test appropriately. Similarly, students who had injuries, such as a broken arm, that would have prevented them from displaying what they knew, were allowed standard accommodations. Additionally, specific standard accommodations were available for students who were identified as LEP. Seven of the 22 available standard accommodations were applicable for more than need type (IEP/504, Injured, or LEP), leaving a total of 15 unique standard accommodations. These unique standard accommodations were also grouped by type as explained below.

In many of the need groupings, there were very sparse numbers of students and even fewer that used the available accommodations. The purpose of the grouping of accommodations

was to improve the power of the analyses to identify differences between the groups. Each of the standard accommodations was grouped within one of four accommodation types: Physical Assistance, Timing, Language, and Tool. Students who have been injured, are blind, or have orthopedic impairments might need a Physical Assistance accommodation such as the use of a Braille writer, the transfer of answers from the test book to the answer document, or dictation of their multiple choice responses to a scribe. Extra or altered Timing can be of assistance to students for whom simply accessing the information within the assessment is difficult. The Language accommodations included simplified language for the scripted directions in English, word-for-word translation dictionaries, and test items being read aloud in English. Additionally, some Tools such as a personal white board, an abacus, or a place marker were available for students to use. Examples of the accommodations included within the Language type were "Word-for-word translation dictionary used" and "Test items read aloud in English as needed upon student request (not available for reading)." Examples of the accommodations included in Physical Assistance included "Answers transferred from test book into answer document" and "Multiple choice responses recorded or dictated to a scribe (not available for writing)." Timing included "More breaks and/or several shorter sessions" and "Tested at a different time of day." The accommodation type of Tool included "Place marker used" and for mathematics only "Abacus used, for blind students only" and "Use of a personal whiteboard as directed."

On some of the accommodations, however, there were restrictions beyond a student being injured, designated as LEP, or having an IEP or 504 plan. For instance, an abacus was only available for blind students and then only for the mathematics test; having test items read aloud in English was not available for the reading test, and dictating to a scribe was only available for the writing assessment. See Table 2 for the complete list of accommodation descriptions, student

populations they were intended for, their assigned accommodation need-type, and the restrictions on their use.

Analysis

The number of students in each need category at each of Arizona's four achievement categories was tabulated by grade. For Arizona, these achievement categories consist of Exceeds the Standard, Meets the Standard (both considered passing), Approaches the Standard, and Falls Far Below the Standard (both considered failing). The achievement classification for students who had used a standard accommodation was disaggregated by accommodation across grades for each of the studied need categories.

While students were only included within the study if they used fewer than two standard accommodations, they were allowed to be associated with multiple needs. This required that they be non-uniquely included within multiple analyses. Table 3 presents across-tab of the number of students, by need, included in the study.

The tabulation of accommodation usage within and across need categories was inspected for trends. The number of students within the SPED/Health and FRL need combinations as well as the LEP need category are presented in Table 4.

Chi-square analyses were performed within studied needs to compare the pass/fail rates across grades for students who used standard accommodations to those who did not. If there were at least 5 students in each of the four cells of the two-by-two matrix (pass/fail by accommodated/non-accommodated), regular chi-square analyses were performed. If there was at least one student in every cell but at least one cell that contained less than 5 students, Yates' chi-square test, which corrects for continuity, was performed. For two-by-two matrices that contain a cell with no examinees, chi-square tests are not recommended (Yates, 1934); therefore,

in these cases, no analysis was performed. Since this study was intended to be preliminary to additional analyses, a *p*-value of .10 was adopted as the criterion for significance.

The analyses were performed first by need, aggregating all students who used any standard accommodation, then by individual standard accommodation, and finally by accommodation groupings. Various similar or exact accommodations were coded to be used by students with different needs. For example, the standard accommodation of "Simplified language for the scripted directions in English" was coded as SA 5 for LEP students but SA 12 for students with either an IEP or a 504 plan. Since students were not excluded from the study due to their association with multiple needs but only if they were associated with multiple accommodations, all students, if they used standard accommodations, were uniquely associated with that accommodation. This allowed similarly or exactly worded standard accommodations designed for different needs to be combined for the analysis within each need.

Similarly, each accommodation was grouped into one of four accommodation types: Language, Physical Assistance, Timing, and Tool as described above. The results of the trend and the chi-square analyses will be discussed in the next section.

Results

Within this section the results of the inspection of accommodation trends within and across the needs and need combinations will first be presented, followed by the results of the chi-square analysis. Arizona's science assessments are administered in Grades 4 and 8 and after students have taken high school life science (usually biology). Due to the low numbers of students who used standard accommodations, the inspection for trends was performed, aggregating students from the three assessed grades together. Similarly, chi-square analyses were performed within each studied need to compare the pass/fail rates across grades for students who

used standard accommodations to those who did not. It should be noted that the students within the three grades used in this study have very different characteristics and trends noted might not hold with different aggregations.

Trend analysis results

As presented in Table 4, there are a small number of students who accessed a single accommodation, especially compared to the number of students within each need or need-combination. The largest percentage observed was for LEP students of which 20.4 percent (2788 of 13477 students) used an accommodation. A slightly lower percentage of students in the SPED/Health combination used one accommodation (16.1%, 3071 of 19,037 students); while of those within the FRL combination, only 4.2 percent (4452 of 107,135 students) accessed one accommodation.

Of those students who used one standard accommodation, across needs and need combinations, the highest percentage of accommodation grouping was that of Language (82.5%, 60.9%, and 74.7%) followed by Timing (17.0%, 34.2%, and 22.8%) for LEP, SPED/Health, and FRL, respectively. Less than 3 percent of students who used one standard accommodation within any need or need combination used either a Tool or a Physical Assistance accommodation.

Within the Language accommodation grouping, the accommodation used most across needs was that of “Test items read aloud in English as needed, upon student request” (48.9%, 40.0% and 45.0%, for LEP, SPED/Health, and FRL respectively). For LEP and FRL students, this was followed by the use of “Word-for-word translation dictionary,” 24.5% and 17.6% respectively, while for SPED/Health students, the use of this accommodation was extremely low, 0.08%. For the SPED/Health combination, the two other Language accommodations “Read

aloud or sign the directions that students read on their own" and "Simplified language for the scripted directions in English" were used more often, 11.1% and 9.0% respectively.

By far the most used accommodation across needs within the Timing accommodation group was that of "More breaks and/or several shorter sessions." For this accommodation, 16.8%, 33.3%, and 22.5% of students within LEP, SPED/Health, and FRL respectively, accessed this as their sole accommodation. Less than 1 percent of students within any need or need-combination were "Tested at a different time of day."

Chi-square analysis results

The results of the chi-square analyses for the science assessment are presented in Table 5. When all students who used any standard accommodation were aggregated together within needs, fifteen need groups showed no significant difference in performance for the two accommodation classifications. However, the accommodations groups within Speech/Language Impairment (S/L, $N = 6{,}294$, $X^2 = 211.90$, $p < .001$) and Limited English Proficiency (LEP, $N = 13{,}477$, $X^2 = 13.39$, $p < .001$) performed significantly different. Additionally, when students were aggregated by need category (SPED/Health and FRL) across all accommodations, both accommodation comparisons were found to have significantly different performance, ($N = 19{,}037$, $X^2 = 123.87$, $p < .001$; and $N = 107{,}135$, $X^2 = 1281.39$, $p < .001$, respectively). In all four of these cases, the non-accommodated students had a higher pass rate than the students using a standard accommodation.

Of the 374 need/accommodation code combinations (17 accommodation-associated needs x 22 accommodation codes), 62 had at least one student in each of the four cells required to assess pass/fail rates via chi-square analysis with or without the Yates' continuity correction. Of these 62 analyses, 18 indicated that the accommodated group and the non-accommodated

group had significantly different pass rates. All of the significant findings were for one of five need groups: Autistic, Emotional Disability – Private Placement, Other Health Issues, S/L, and LEP. All but two of the significant findings indicated that the non-accommodated students had a higher pass rate than the accommodated students. The exceptions were for students associated with the need of Other Health Issues who took more breaks or had shorter testing sessions (N = 164, $X^2 = 2.79$, $p < .10$) and LEP students who had their test items read aloud to them (N = 1,161, $X^2 = 17.53$, $p < .001$). For each of these two need/accommodation code combinations, the accommodated students performed significantly better than those within the need who did not use an accommodation.

Because students were uniquely associated with an accommodation but non-uniquely associated with needs, student achievement within similar/exact accommodations was aggregated. (See Table 2 for a complete listing of the accommodations and those that were aggregated together both by type and by similar/exact wording.) This aggregation resulted in 187 need/accommodation combinations (17 accommodation-associated needs x 11 accommodations available for science). Additionally, the 11 accommodations available for science were assigned to one of four accommodation types (Language, Physical Assistance, Timing, or Tool) adding another 68 need/accommodation combinations.

Of the 255 aggregate need/ accommodation combinations, 93 had at least one student in every cell of the matrix, and of the 93 analyses, 24 results indicated that the accommodated students' performance was significantly different from the non-accommodated students. These results were very similar to those within the need/accommodation code analysis in that the same five need categories remained the only ones for which significant results were found and all but the same two need/accommodation combinations showed that students who used

accommodations performed significantly worse than those who did not use accommodations. While several other grade/need/accommodation combinations showed a higher pass rate for the accommodated students, none of them indicated a significant difference between the achievement of the accommodated and non-accommodated groups within the needs. Follow-up analyses for the two exceptions were performed, disaggregating the data to grade level.

Among the five need groups with significant findings (Autistic, Emotional Disability – Private Placement, Other Health Impairment, S/L, and LEP) most of the significant findings were for S/L and LEP. Of the seven need/accommodation aggregations with enough students in each cell for analyses in the LEP need, all seven showed a significantly lower performance for students who used accommodations as compared to those who did not. Similarly, of the 13 need/accommodation aggregations available for analysis in the S/L need, 12 showed that students using the accommodation performed significantly poorer than those who used no standard accommodation. The other three need categories had a maximum of two accommodations where there was a significant difference between the two accommodation classifications, all of which were significant only at the .10 level.

The aggregation increased the number of full chi-square matrices (those that contained no empty cells) allowing for many more need/accommodation combinations to be analyzed. This also led to increased numbers of significant findings among those combinations. However, in multiple cases, the strength of the test was reduced when the accommodations were aggregated within needs, in one case to the point of failing to reach significance at the .10 level. Specifically, when accommodation SA14 “Test items read aloud in English as needed upon student request” was analyzed for students identified with Other Health Impairment, the results were determined to be significant ($N = 102$, $X^2 = 2.81$, $p < .10$). However, when the one student coded with SA 6,

which has the exact same description and passed the test was added to the analysis, the results failed to indicate that there was a significant difference between the achievement of the accommodated and non-accommodated groups for this need/ accommodation combination (N = 103, X^2 = 2.25).

Interestingly, there were multiple need/accommodation combinations (28 in the aggregated analyses) where the accommodated students had a higher pass rate than the non-accommodated students but failed to reach significance, perhaps due to the low number of accommodated students. Two examples of these cases are students identified with Specific Learning Disabilities who used a place marker and had a 19 percent pass rate compared to that of non-accommodated students with a13 percent pass rate (N= 53 accommodated), and students with Other Health Impairments who used simplified language for scripted directions in English and had a pass rate of 30 percent, while those who did not use an accommodation had a pass rate of 25 percent (N = 37 accommodated).

The chi-square tests for seven of the need groups (Emotional Disability, Hearing Impairment, Multiple Disabilities, Orthopedic Impairment, Specific Learning Disabilities, Traumatic Brain Injury, and Visual Impairment) showed no significant difference between the pass rates for students who used any of the accommodations, regardless of whether the accommodations were analyzed separately or grouped by description or type. The remaining five need categories (Multiple Disabilities – Severe Sensory Impairment, Mild Mental Retardation, Moderate Mental Retardation, Severe Mental Retardation, and Developmental Delay) failed to have sufficient numbers of students who used only one accommodation to allow for even one analysis.

All of the aggregated analyses were also performed on the need combinations of SPED/Health and FRL. For the SPED/Health combination, all of the Language accommodations, the Timing, the "More breaks" accommodations, but none of the Physical Assistance or Tool accommodations were significant. For the FRL combination, all except for three Physical Assistance accommodations (scribed multiple choice responses, large print test, and Braille writer) were significant. In each of the significant results, the students who did not use a standard accommodation performed better than those who used one.

A discussion of possible reasons behind and implications of these findings follows.

Discussion and Conclusions

This section first highlights the findings of the trend analyses and then the chi-square analyses and places these results within the context of the current research in the field. This is followed by a discussion of recommended future investigations.

The documentation showed that a relatively small number of students accessed standard accommodations and even fewer accessed only one. For science, of the 237,628 scores in the original assessment file, 9966 students (4.2%) were removed prior to matching to need because they used more than one standard accommodation. This left a majority of students, 216,249 (91.0%), who had no documentation of using standard accommodations and 6168 (2.6%) who were documented as using one. While it would be ideal (or at least desired) that every test monitor in the state appropriately marked every student who used a standard accommodation, the high numbers of students without such documentation (91.0%) would seem to indicate that perhaps at least some monitors failed to document student usage appropriately. Future studies looking at the congruence between actual accommodation use, IEP/ 504 plan, and test documentation may be in order.

Given that the documentation is the best that is available across the studied needs and need groupings, the most prevalently used accommodation type was Language, followed by Timing. Within these accommodation types, having the test items read aloud and having more breaks and/or shorter test sessions were accessed the most. For those students who are still learning the English language, the accommodation of the use of a "word-for-word translation dictionary" also was used by a relatively high percentage of students (24.5% of those who accessed one accommodation). Concern that the non-unique classification of students into needs might lead to confounding of trends led to additional exploration into the number of students who were in both the LEP and SPED/Health groupings. Of the 19,037 students identified with SPED/Health and the 12,477 who were identified with LEP, only 1,799 were identified with both, and of that number about 1/4th (470) accessed an accommodation with exactly 100 of them accessing the Read-Aloud accommodation and 104 of them having shorter sessions or more breaks. These students account for 3.7% of the 2738 students in the dataset that accessed the Read-Aloud accommodation and 6.6% of the 1578 who had shorter sessions or more breaks. These small percentages allayed the researcher's fears of impactful confounding of the trends.

These trends seem to be somewhat consistent with those found by Kim, Schneider, and Siskind (2009) in their study of South Carolina's 2005 science assessments. The percentage of students found to be using accommodations was approximately the same as that found in Arizona. For South Carolina, 7.2% of the students used accommodations. This percentage is based on the 10,666 students reported in the study as compared to the 148,463 students who took the test in grades 3, 4, and 5 as reported by South Carolina's Department of Education (2005). This is approximately comparable to Arizona's 7.9% of students in the original assessment file who used at least one standard accommodation.

Because of small numbers of students within each grade that used specific accommodations, Kim, et al. (2009) chose only to look at three different categories of accommodations: all accommodations together, oral administration of the test, and all accommodations except that of setting. They chose to explore oral administration because 75.1% of the students used this accommodation. This percentage is very similar to that found in Arizona in 2010 for Language (76.3%) based on accommodation usage for students within a combined SPED/Health/LEP grouping. This would seem to support the reliability of the documentation by the testing monitors.

Across the needs, generally the significant chi-square analyses showed that the non-accommodated group performed better than the accommodated group as evidenced by pass rate. The two exceptions were for LEP students who were read the test items and for students associated with Other Health Issues who took more breaks or had shorter testing sessions. However, when the students were disaggregated to grade level, these two exceptions failed to reach significance for any of the grades. These findings seem to indicate that those responsible for selecting standard accommodations, the IEP or 504 plan teams, teachers, and the students themselves, are choosing to use standard accommodations for the lowest performing students while not choosing them for, or at least not recommending them to, those who are more proficient. Additionally, within these preliminary analyses, the lack of evidence that the accommodated groups have a differential boost in achievement as compared to others within their need or need grouping implies that their scores can, and should, be aggregated with the rest of the scores when exploring state, district, or school achievement as well as within applicable accountability evaluations until counter evidence is found.

The findings in this study seem to be consistent with Kim, et al. (2009a, 2009b) and Young, et al (2008) rather than Brown (2007) or Elliot, et al (2001). There was some evidence that some accommodations did help some students demonstrate what they were able to do and what they knew but that, for science, there seems to be little evidence that the use of the studies' accommodation introduces construct-irrelevant variance into the measurement of the ability of the students involved.

As noted previously, there is some question about the completeness of the documentation of accommodations by students. Additionally, while possible confounding of results due to the non-unique nature of student needs seemed to be minimal, it could have impacted analyses and results within this report. Future investigations are planned that will include differential item and test functioning analyses within the item response theory framework, and an investigation of factor invariance between accommodated and non-accommodated groups. Of particular interest are the differences between these two accommodation groups for students within the lowest performance levels. These levels are where most of the students who used standard accommodations scored and, potentially, where the effect of accommodations might be found. Additionally, experimental quantitative and qualitative studies exploring timing accommodations for students identified with Other Health Issues and the read-aloud accommodation for LEP students are being considered since these accommodations showed the accommodated students had a significantly higher pass rate than students of the same need who did not access these accommodations.

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Table 1. Student needs entered into the student accountability system by schools, maintained by the state.

Chosen for Study	Not Chosen for Study
Autism	Chronic Illness/Condition
Developmental Delay	Delinquent
Emotional Disability	Evacuee
Emotional Disability (separate facility or private school	Health, Dental and Eye Care
Hearing Impairment	Home Bound
Multiple Disabilities	Homeless
Multiple Disabilities - Severe Sensory Impairment	Homeless - Unaccompanied Youth
Mild Mental Retardation	Immigrant
Moderate Mental Retardation	Independent
Other Health Impairment	Language Arts (reading and/or writing)
Orthopedic Impairment	Language Arts (Verbal) Giftedness
Specific Learning Disability	Math
Speech/Language Impairment (S/L)	Migrant
Severe Mental Retardation	Neglected
Traumatic Brain Injury	No Need
Visual Impairment	Non-Verbal Reasoning Giftedness
Limited English Proficiency (LEP)	Other Academic Services
NCLB Indicator 1 (Eligible for Free Lunch)	Other Support Services
NCLB Indicator 2 (Eligible for Reduced Lunch)	Preschool - Moderate Delay
	Preschool - Severe Delay
	Preschool - Speech/Language Delay
	Quantitative (Math) Giftedness
	Refugee
	Science
	Social Studies
	Supporting Guidance/ Advocacy
	Vocational/Career

Table 2. Standard accommodations available for students on AIMS, 2009 - 2010 school-year.

Code	Need Type	Accom. Type	Description	Note
SA 1	Injured	Physical Assistance	Answers transferred from test book into answer document.	Same as SA19
SA 2	Injured	Physical Assistance	Multiple choice responses recorded or dictated to a scribe (not available for writing.	Same as SA20
SA 3	Injured	Physical Assistance	Assistive technology used with spell check, grammar check, and predict ahead functions turned off (not available for reading, mathematics, or science).	Same as SA21
SA 4	ELL	Timing	More breaks and/or several shorter sessions.	Same as SA10
SA 5	ELL	Language	Simplified language for the scripted directions in English.	Same as SA12
SA 6	ELL	Language	Test items read aloud in English as needed upon student request (not available for reading).	Same as SA14
SA 7	ELL	Language	Word-for-word translation dictionary used.	
SA 8	ELL	Language	Exact oral translation of the directions as needed upon student request.	Same as SA13
SA 9	IEP/504	Tool	Place marker used.	
SA 10	IEP/504	Timing	More breaks and/or several shorter sessions.	Same as SA 4
SA 11	IEP/504	Timing	Tested at a different time of day.	
SA 12	IEP/504	Language	Simplified language for the scripted directions in English.	Same as SA 5
SA 13	IEP/504	Language	Read aloud or sign the directions that students read on their own.	Same as SA 8
SA 14	IEP/504	Language	Test items read aloud in English as needed upon student request (not available for reading).	Same as SA 6
SA 15	IEP/504	Physical Assistance	Large print edition of test.	
SA 16	IEP/504	Tool	Abacus used, for blind students only (not available for writing, reading, or science).	
SA 17	IEP/504	Physical Assistance	Electronic dictionary and/or thesaurus used, for blind students only (not available for reading, mathematics, or science).	
SA 18	IEP/504	Physical Assistance	Braille writer used, for blind students only.	
SA 19	IEP/504	Physical Assistance	Answers transferred from test book into answer document.	Same as SA 1
SA 20	IEP/504	Physical Assistance	Multiple choice responses recorded or dictated to a scribe (not available for writing).	Same as SA 2
SA 21	IEP/504	Physical Assistance	Assistive technology used with spell check, grammar check, and predict ahead functions turned off (not available for reading, mathematics, or science).	Same as SA 3
SA 22	IEP/504	Tool	Use of a personal whiteboard as directed (not available for reading, writing, or science).	

Table 3. Need cross-tab for students who accessed one or no standard accommodations.

Need	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Autism	677																		
2. Emotional Disability	16	1753																	
3. Emotional Disability (separate facility or private school	2	151	406																
4. Hearing Impairment	3	9	1	381															
5. Multiple Disabilities	0	7	0	51	86														
6. Multiple Disabilities - Severe Sensory Impairment	2	0	0	8	0	9													
7. Mild Mental Retardation	6	7	7	6	7	1	272												
8. Moderate Mental Retardation	0	1	0	1	2	0	4	10											
9. Other Health Impairment	30	127	25	16	8	1	18	1	1900										
10. Orthopedic Impairment	0	2	0	3	22	3	5	0	11	140									
11. Specific Learning Disability	50	381	79	74	69	2	44	0	399	37	11633								
12. Speech/Language Impairment	412	192	49	103	27	2	127	6	323	30	2166	6294							
13. Severe Mental Retardation	0	0	0	0	0	0	0	0	0	0	0	0	0						
14. Traumatic Brain Injury	0	2	0	1	0	0	0	0	9	2	9	22	0	61					
15. Visual Impairment	1	3	0	7	14	5	0	0	3	2	18	11	0	0	78				
16. Limited English Proficiency (LEP)	20	56	13	23	10	0	31	1	62	9	1373	703	0	8	10	13477			
17. NCLB Indicator 1 (Eligible for Reduced Lunch)	52	165	30	27	5	0	23	0	168	13	1105	565	0	2	8	680	17287		
18. NCLB Indicator 2 (Eligible for Free Lunch)	175	894	196	185	43	7	167	8	682	61	6029	2794	0	30	31	10481	2200	89848	
19. Developmental Delay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2

Table 4. Number of students within selected need categories, who used only one accommodation by type.

	Need	Need Combinations	
	Limited English Proficient	Special Education/ Health	Free and/or Reduced Lunch
Number of Students	13,477	19,037	107,135
Number of Accommodated Students	2,748 (20.4)	3,071 (16.1)	4,452 (4.2)
Accommodation			
All Accommodations	2,748	3,071	4,452
Language	2,267 (82.5)	1,871 (60.9)	3,326 (74.7)
Simplified language for the scripted directions in English	157 (5.7)	276 (9.0)	283 (6.4)
Test items read aloud in English as needed upon student request	1,345 (48.9)	1,228 (40.0)	2,002 (45.0)
Read aloud or sign the directions that students read on their own	92 (3.3)	342 (11.1)	257 (5.8)
Word-for-word translation dictionary used	673 (24.5)	25 (0.8)	784 (17.6)
Physical Assistance	10 (0.4)	75 (2.4)	53 (1.2)
Answers transferred from test book into answer document	8 (0.3)	61 (2.0)	39 (0.9)
Multiple choice responses recorded or dictated to a scribe	0 (0.0)	1 (0.0)	5 (0.1)
Large print edition of test	2 (0.1)	13 (0.4)	9 (0.2)
Braille writer used, for blind students only	0 (0.0)	0 (0.0)	0 (0.0)
Timing	467 (17.0)	1,049 (34.2)	1,014 (22.8)
More breaks and/or several shorter sessions	461 (16.8)	1,024 (33.3)	1,000 (22.5)
Tested at a different time of day	6 (0.2)	25 (0.8)	14 (0.3)
Tool	4 (0.1)	76 (2.5)	59 (1.3)
Place marker used	4 (0.1)	76 (2.5)	59 (1.3)

Note: The values cannot be summed across need categories but can be summed within need categories since the students involved are not uniquely identified with need categories but are uniquely identified with accommodations. The values within parentheses, in all but the second row, indicate the percentage of accommodated students within the need who used that type of accommodation.

Table 5. Chi-square results for pass rates by accommodation and need.

	Need					Need Combinations	
	Autism	Emotional Disabled - Private Placement	Other Health Issues	Speech/ Language Impairment	Limited English Proficient	Special Education/ Health	Free and/ or Reduced Lunch
Number of Students	677	406	1,900	6,294	13,477	19,037	107,135
Number of Accommodated Students	139	72	349	902	2,748	3,071	4,452
Accommodation							
All Accommodations				211.90***	13.39***	123.89***	1281.39***
Language	3.21^{+}			160.82***	6.42*	108.24***	952.16***
Simplified language for the directions				27.75***	5.09*	12.87***	107.29***
Test items read aloud in English	3.22^{+}	*3.16*$^{+}$	SA 14 2.81^{+}	108.47***	**7.94****	70.22***	435.08***
Read aloud or sign the directions				27.17***	*4.67**	25.65***	117.22***
Word-for-word translation dictionary				*3.53**	53.24***	*5.12**	335.57***
Physical Assistance				*13.60****			11.29***
Answers transferred from test book				*8.91***			12.66***
Scribed multiple choice responses							
Large print test							
Braille writer							
Timing			**2.88**$^{+}$	44.74***	11.59***	25.74***	324.25***
More breaks - shorter sessions			**2.79**$^{+}$	45.61***	11.04***	23.98***	317.16***
Time of day							6.17*
Tool				*4.58**			13.02***
Place marker				*4.58**			13.02***

Note: Results are for accommodations grouped by description rather than the accommodation code. The one exception, SA14 within Other Health Issues, was non-significant when grouped by description. $^{+}$ means $p < .10$, * means $p < .05$, ** means $p < .01$, and *** means $p < .001$. Bolding indicates that the students within the need who used the accommodation had a significantly higher pass rate than those who did not use the accommodation. Italicized means Yates' correction applied. See either Table 2 for complete listing of accommodations and type groupings.