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Research Brief

Acuity Usage and WESTEST 2 Performance

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INTRODUCTION AND PURPOSE

Acuity is a web-based assessment platform that provides interim and formative assessments designed to inform teaching and improve student learning. Because everything in Acuity is aligned to the West Virginia 21st Century Content Standards and Objectives (CSOs), educators are able to build tests, or use tests built by other educators, which gauge student understanding of the CSOs being covered in the classroom. The reports generated following completion of the assessments provide detailed information regarding individual student comprehension of each CSO tested. Educators can then assign targeted instruction to individual students, either within Acuity or externally, to improve student understanding in any needed areas.

In November 2009, the West Virginia Department of Education Office of Assessment, Accountability and Research (WVDE: OAAR) conducted exploratory analyses of extant data to examine the relationship between Acuity usage and WESTEST 2 performance.

Research Question

RQ: Is there a difference between the average WESTEST 2 reading/language arts and mathematics scores of “high usage” schools and “no usage” schools?

DESIGN AND METHODOLOGY

A quasi-experimental design was utilized to answer the research question. The selection of the treatment group was purposeful, containing a sample of schools that were designated by WVDE as “high usage” schools. These schools had administered more than 1,000 Acuity tests and more than 500 Acuity exercises during the 2008-2009 academic year¹. Using this operational definition, approximately 82 of 730 West Virginia schools (11%) were considered “high usage” schools. Of these 82 schools, researchers selected only those with either a fourth grade or eighth grade class ($n = 65$) to take part in the preliminary study.

A comparison group of “no usage” schools was then drawn from the list of West Virginia schools that had never used Acuity ($n = 106$). Researchers selected 65 of these “no usage” schools to serve as a comparison group. Researchers matched “no usage” schools to “high usage schools” based on the percentage of low socioeconomic status students enrolled². Analyses revealed that the average percentage of low SES students for the treatment and comparison samples was approximately 52%.

¹ ad hoc analyses were conducted to ensure that the operational definition of “high usage” did not systematically exclude smaller schools from the study. It was found that the average enrollment, as measured by number of students tested in 4th and 8th grade, did not vary significantly between “high usage” and “no usage” schools. Furthermore, there was no significant correlation between enrollment and student achievement on WESTEST 2 for either group.

² SES was controlled for due to its historic relationship with academic achievement.

FINDINGS

Comparative statistical analyses (i.e., Independent Samples T-Test) were completed to explore whether a relationship existed between group membership (i.e., high usage or no usage) and WESTEST 2 reading/language arts and mathematics performance. The results were statistically significant for eighth grade, but not for fourth grade. The “high usage” schools performed approximately 10 scale score points higher than “no usage” schools in eighth grade reading/language arts and mathematics. The “high usage” schools also outperformed “no usage” schools in fourth grade reading/language arts and mathematics as well, but these differences were not statistically significant. Tables 1-4 present the results.

Table 1: T-Test Results (Fourth Grade Mathematics)

Group	<i>n</i>	Mean	<i>sd</i>	Mean Δ	<i>t</i>	<i>df</i>	Sig.
High Usage	36	582.93	10.87	+4.42	1.36	70	NO <i>p</i> > .05
No Usage	36	578.51	16.20				

Table 2: T-Test Results (Fourth Grade Reading/Language Arts)

Group	<i>n</i>	Mean	<i>sd</i>	Mean Δ	<i>t</i>	<i>df</i>	Sig.
High Usage	36	439.38	12.86	+5.03	1.44	70	NO <i>p</i> > .05
No Usage	36	434.35	16.63				

Table 3: T-Test Results (Eighth Grade Mathematics)

Group	<i>n</i> ³	Mean	<i>sd</i>	Mean Δ	<i>t</i>	<i>df</i>	Sig.
High Usage	26	626.13	10.07	+9.79	4.11	50	YES <i>p</i> < .001
No Usage	26	616.34	11.35				

Table 4: T-Test Results (Eighth Grade Reading/Language Arts)

Group	<i>n</i> ⁴	Mean	<i>sd</i>	Mean Δ	<i>t</i>	<i>df</i>	Sig.
High Usage	25	471.11	10.03	+10.43	3.70	48	YES <i>p</i> < .001
No Usage	25	460.68	9.88				

³ - 3 Outlier schools were removed from each group to ensure a fair comparison.

⁴ - 4 Outlier schools were removed from each group to ensure a fair comparison.

CONCLUSIONS

This exploratory study provides some promising information for West Virginia and indicates that Acuity usage may be positively associated with student performance in reading/language arts and mathematics. However, this research is descriptive in nature and the study design does not allow researchers to attribute the differences between treatment and comparison schools to the use of Acuity. Some portion of the differences found in this study is likely attributable to other unmeasured variables. To make a causal statement about the impact of Acuity, a controlled study examining student-level data must be conducted. Additionally, researchers did not examine all tested grade levels or the specific nature of the Acuity tests and exercises administered at “high usage” schools. Future research should include an examination of Acuity’s standardized state-developed benchmarks, and perhaps also teacher-developed Acuity benchmarks.

RECOMMENDATIONS

Researchers recommend the continued use of Acuity given the results of this exploratory study. However, additional student-level research utilizing a controlled design should be conducted to isolate the impact of Acuity on student achievement.

APPENDIX A

AD HOC ANALYSES

School Size in the Preliminary Acuity Study

Purpose

Analyses were conducted to address the concern that the selection criteria used to code schools as “High Acuity Usage” schools was biased in favor of large schools.

Procedure

The number of 4th and 8th grade students who participated in WESTEST 2 at each of the “No Acuity Usage” and “High Acuity Usage” schools was used as a proxy measure of school size. Descriptive statistics were calculated to discover whether large schools were overrepresented in the “High Acuity Usage” sample. Next, a series of bivariate Pearson correlations were calculated to determine whether or not there was a statistically significant relationship between school size and student performance on WESTEST 2.

Findings

No Usage Schools

- The number of 4th grade students tested at the “No Acuity Usage” schools selected for this study ranged between 17 and 129. **The average number of 4th grade students tested was 58.83** (SD =28.77).
- The number of 8th grade students tested at the “No Acuity Usage” schools selected for this study ranged between 12 and 262. **The average number of 8th grade students tested was 137** (SD =65.66).
- The correlation between number of students tested and mathematics scale scores **was NOT statistically significant** for 4th or 8th graders.
- The correlation between number of students tested and reading/language arts scale scores **was NOT statistically significant** for 4th or 8th graders.

High Usage Schools

- The number of 4th grade students tested at the “High Acuity Usage” schools selected for this study ranged between 22 and 165. **The averaged number of 4th grade students tested was 69.69** (SD = 29.68).
- The number of 8th grade students tested at the “High Acuity Usage” schools selected for this study ranged between 32 and 312. **The average number of 8th grade students tested was 133** (SD =60.12).
- The correlation between number of students tested and mathematics scale scores **was NOT statistically significant** for 4th or 8th graders.
- The correlation between number of students tested and reading/language arts scale scores **was NOT statistically significant** for 4th or 8th graders.

Conclusions

- School sizes (as measured by the number of 4th and 8th grade students tested) ranged from small to large in the “High Acuity Usage” schools. **This provides compelling evidence that the selection criteria did not bias the sample to include only large schools.**
- The average school size was comparable for the “No Acuity Usage” and “High Acuity Usage” schools. **This provides evidence that comparisons between both groups are most likely not influenced by variations in school size.**
- There was no correlation between school size and student performance in RLA or Mathematics for any of the schools in the sample. **This provides compelling evidence that school size is not a confounding factor in interpreting the results of the preliminary Acuity study.**