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ABSTRACT

Third-, fifth-, and eighth-grade pupil achievement test results in the 1970-71 school year are contrasted in terms of types of school plants, with those schools that had been in operation in a recently constructed school plant for at least one year grouped as "Innovative." Differences in ability levels of pupils were taken into account in all the reported analyses. Pupils in innovative plants made their strongest showing at the third-grade level, with boys stronger than girls. White third-grade boys' test results favored conventional schools, black boys, innovative schools. At the fifth-grade level white boys' test scores again favored conventional plants; eighth-year test results generally favored conventional plants for all sex/race groups except black boys. Correlation is drawn between the test results and the length of time the fifth-year pupils had attended school in the county school system. Causal interpretations of the findings are dependent upon further analysis of the data and on future longitudinal studies to reduce the speculative elements involved in accepting data-based hypotheses about the programs' effectiveness. (Author/LH)

EVALUATION OF INNOVATIVE SCHOOLS :

STUDENT ACHIEVEMENT

1970—71

Submitted to Harry F. McComb
Associate Superintendent for
Curriculum and Teaching

The School Board of Broward County, Florida
Benjamin C. Willis, Superintendent of Schools

Research Department
Report No. 55
April 1972

ABSTRACT

This report contrasts 1970-71 third-, fifth-, and eighth-grade pupil achievement test results in terms of types of school plants. Schools grouped as "Innovative" were those that had been in operation in a recently constructed school plant for at least one year. Differences in ability levels of pupils were taken into account in all the reported analyses.

Pupils in innovative plants made their strongest showing at the third-grade level. At this grade trends involving boys were stronger than those involving girls. White third-grade boys' test results favored conventional schools, black boys' innovative schools.

At the fifth-year level white boys' test scores again favored conventional plants. Except for white girls' scores on the Math Computation test, no other particularly salient trends were evident. White fifth-year pupils of both sexes in conventional plants showed a strong tendency to score higher on the Math Computation test.

Eighth-year test results generally favored conventional plants for all sex/race groups except black boys. The Math Concepts test was the largest single contributor to this difference for whites of both sexes. The Language Mechanics test was the best discriminator between school types for black girls.

An interesting finding regarding the length of time fifth-year pupils have attended schools in Broward County is briefly mentioned in this report. White fifth-year pupils of both sexes who had been in local public schools one or two years scored about the same in both types of schools on the Math Computation test. Those with three or more years in Broward scored higher on this test in conventional schools. The Math Computation test is important because it was the most important source of differences between school types for white fifth-year pupils.

It would at present be very speculative to attribute the findings of this report to such factors as overcrowding or to problems inherent in the new physical plants. Many factors influence test results. It is always difficult to be confident about causal interpretations of findings in educational research. Future analyses of these data, and longitudinal studies will be required in order to reduce the speculative elements involved in accepting data-based hypotheses about the effectiveness of local innovative programs.

INTRODUCTION

This report is concerned with pupil achievement in open-space school plants during the 1970-71 school year. Reports of this type are based upon two sources of information:

1. Countywide test results: The tests used were the California Test of Basic Skills (CTBS) and the California Test of Mental Maturity (CTMM). These tests were administered to local third-, fifth-, and eighth-grade pupils in May, 1971.

2. Research Questionnaires: These questionnaires were constructed cooperatively with instructional personnel. All teachers in innovative schools were given an opportunity to participate in developing the instruments. The questionnaires were designed to provide information about instructional programs and the attitudes of pupils and teachers. These instruments were administered to a sample of fifth-year teachers and pupils in May, 1971. A shorter battery of questionnaires was also administered to a sample of eighth-year pupils and teachers.

PURPOSE

This report's primary purpose is to contrast achievement, after allowing for differences in ability, in open-space and conventional school plants. All pupils who took the tests are included in the primary analyses. The sampling studies and research questionnaire information is only briefly alluded to in this report.

This report is important because it provides a basic summary of achievement data by types of school plants. Any subsequent reports must seek to clarify or explain this basic information. At the end of this report an example of such a "clarification" or "explanation" is briefly cited.

PROCEDURES

At the eighth-year level the following schools were classified as "Innovative": Apollo, Lauderdale Lakes, Lauderhill, Plantation, Rickards, and Nova.

At the third- and fifth-year level the following schools were classified as "Innovative": Palmview, Coconut Creek, Cypress, Floranada, Castle Hill, Sabal Palm, Village, Mirror Lake, Hollywood Park, Hollywood Central, Annabel C. Perry, Fairway, and the two Novas.

This division was primarily based upon type of school plant. Schools were only included if they had been operating in open-space plants during most of the 1970-71 school year.

Preliminary analyses of the data indicated sex and race differences within grades which introduced great complexities in attempting to explicate relationships between IQ scores, sex, race, and type of school. For

the sake of simplicity, each grade, sex, and race group was then analyzed separately in terms of ability differences and type of school. The latter analyses form the primary basis for the present report.

Technical procedures are further amplified and some documentation of the results is provided in the appendix to this report.

RESULTS

The following tables use a simplified format to convey significant differences in a non-numeric form. Results are presented for each of ten subtests. Subtests are used because they provide the maximum amount of diagnostic information.

Results are coded as follows:

1. Type of School: C = Conventional
   I = Innovative

2. Ability Level: H = High (IQ over 116)
   A = Average (IQs between about 84-116)
   L = Low (IQ below 84)

If a box is coded "C" or "I" it means that students at all levels of ability in that particular type of school tended to score significantly higher on that subtest. If an "L/," "A/," or "H/" precedes the code, it means that differences mainly favored the designated ability group(s) for that type of school. For example, "L/C" would mean low-ability pupils scored higher in conventional schools. Average and high-ability pupils did not differ to any noteworthy extent.

Differences marked with an "*" represent cases where differences are quite salient. Such variables represent the most important sources of differences between the types of schools. Empty boxes signify the absence of significant differences.

In interpreting the tables the reader is advised that the starred differences are most worthy of confidence. Less confidence should be placed in the single letters which bear no stars. In general, the least confidence should be placed in the differences preceded by ability-level prefixes.

Third Year:

Inspection of Table I indicates that the Math Computation test served to best distinguish achievement for third-year white boys, favoring conventional plants. Other significant differences, with the exception of high-ability pupils on the Math Concepts subtest, also tended to favor conventional schools.

White girls did not differ significantly on any of the subtests. It should be noted, however, that white girls did differ significantly when all variables were tested simultaneously (multivariate test of significance). The main sources of this multivariate pattern were the Math Computation test (in favor of conventional schools) and the Language

Table I

Third-Year Results

Tests	White Boys	White Girls	Black Boys	Black Girls
Reading Vocabulary	L/C			
Reading Comprehension	C			
Language Mechanics			I*	
Language Expression			I	
Language Spelling	L/C			
Math Computation	C*		I*	I
Math Concepts	L/C, H/I		I	
Math Application			L/I	I
Study Skills Total			I	

Mechanics and Spelling tests (in favor of innovative schools). However, as mentioned previously, no single test by itself differentiated significantly and the overall (multivariate) pattern was not at a highly significant level ($P \leq .047$). It is, therefore, inappropriate to discuss the direction of an overall difference since the subtests point in different directions. The majority of the tests, however, favored innovative schools, even though these differences failed to attain statistical significance.

Significant differences among black boys for the most part favored innovative schools. The Language Mechanics and Math Computation tests were highly significant sources of differences.

The two significant differences among black girls also favored innovative schools. In this case, however, no single variable was highly significant.

Overall trends tended in the direction of favoring innovative schools for blacks and conventional schools for whites at the third year. In general, these trends tend to exist largely for boys of both races and are not particularly evident among girls.

Fifth Year:

Results for white fifth-grade boys were relatively unambiguous. Only the Math Computation test is starred, but differences in Language Mechanics, Spelling, and Math Concepts were also fairly large. The reason that the latter two subtests are not starred is that the Math Computation test clearly stood out as the largest single contributor to the "factor" which these tests have in common and in terms of which the two types of schools differed the most. In brief, the aforementioned tests were somewhat redundant contributors to the "factor" which maximally discriminated between the two types of schools. All of the subtests contributed in the same direction to this "factor" (all favored conventional schools).

Results for white girls were not as clear cut. The Math Computation test was again, by far, the largest single contributor to differences among white girls in the two types of plants and was consistent with results for white boys. It may be confidently concluded that this subtest did a

Table II

Fifth-Year Results

Tests	White Boys	White Girls	Black Boys	Black Girls
Reading Vocabulary				
Reading Comprehension				
Language Mechanics	C			
Language Expression		L/C, H/I		C
Language Spelling	C			
Math Computation	C*	C*		
Math Concepts	C	C	L/I	
Math Applications	C			
Study Skills Reference	C		C	
Study Skills Graphics				

good job of detecting differences among white fifth-year pupils of both sexes in terms of the two types of schools. Unlike the results for white boys, however, not all tests favored the conventional schools. The two reading tests in particular showed a counter trend. Since the only significant differences favored conventional schools, the reading test results should not be emphasized. They are noted because they serve to indicate a sex difference between overall trends for white fifth-year pupils.

Other than for the differences noted in the table, no clear-cut trends seemed apparent from the analyses involving black boys. The Language Expression test, while not significant, was the second largest contributor to differences for black boys among the types of schools. This is noted because this test was significant in the same direction (favoring conventional schools) for black girls.

Black girls did not differ significantly on the Study Skills Reference test. This test was, however, a relatively strong secondary contributor to the "factor" which best differentiated the performance of black girls in the two types of schools. The black girls' study skills scores were similar to the black boys' results on this test. Blacks of both sexes, therefore, tended to score higher in conventional schools on the Language Expression and Study Skills Reference tests.

Overall trends favoring conventional schools were stronger for whites than blacks at the fifth-year level. The group which clearly differed the most at the fifth-year level was the white boys.

Eighth Year:

All significant differences involving eighth-year white boys favored conventional schools. Scores on the Reading Vocabulary, Language Mechanics, and Math Computation tests, while not significant, tended to be similar to the findings for other race/sex groups. In other words, they made a moderate secondary contribution (in favor of conventional schools) to differentiating between the types of schools. These tests are mentioned because significant differences were obtained on them for one or more of the other race/sex groups.

Table III

Eighth-Year Results

Tests	White Boys	White Girls	Black Boys	Black Girls
Reading Vocabulary		C		
Reading Comprehension		L/C, A/I		C
Language Mechanics		L/C	C	C*
Language Expression	C		H/I	
Language Spelling	C	C		
Math Computation		C		
Math Concepts	C*	C*		
Math Applications	C	C	A/C	H/C
Study Skills Reference				
Study Skills Graphics		L/I, A/I		

The general direction of white girls' scores, with the exceptions of the Study Skills and Reading Comprehension tests, also favored conventional schools. Language Expression was the only test which did not show a fairly strong direction one way or another. The Math Concepts test was the best single differentiator of school types for both white boys and girls.

Black boys differed as noted on the chart for individual tests. The overall difference, considering all tests simultaneously (multivariate test), however, did not reach statistical significance at the .05 level (obtained $P \leq .076$). On this basis, it may be concluded that the pattern of achievement did not differ by very much in terms of the two types of school plants.

Black girls in the two types of schools differed considerably on the Language Mechanics test. Most test scores for this group (except Reading Vocabulary and Study Skills Reference) also show at least a moderately strong trend in a direction favorable to conventional schools. It can be concluded that eighth-grade test results generally favored conventional plants for all sex/race groups with the exception of black boys.

DISCUSSION AND CONCLUSIONS

These results can be best interpreted by instructional personnel. Only a few comments will be made about the findings in this section. It would appear that the innovative schools make their strongest showing at the third-year level, especially among black pupils. It is at this grade level that pupils have had less experience with conventional plants and programs. Personnel in innovative schools may be somewhat encouraged by these results.

At the elementary level important differences on subtests tended to be most pronounced on skill subjects which seem to lend themselves to drill and rote procedures. This may reflect a difference in program emphasis, but it may also be that these are the only tests in the battery which are very sensitive to any differences at all in school programs.

These results cannot be taken as providing definitive evidence about the superiority of one type of program to another.. It is a big jump to go from test results to conclusions about schools or programs. Many factors other than the quality of an instructional program can influence test results.

Factors which are apparently connected with the quality of an instructional program, such as staffing and overcrowding, are often cited as problems by personnel in innovative schools. For this reason, they may feel that evaluations such as this one present an unfair picture. Questionnaire results indicate that a majority of the teachers in the new school plants take a favorable position toward the innovative ideas which are being tested in their schools. It would appear that they are somewhat unhappy with the implementation of innovative ideas, but not with the ideas themselves. They do not want to see these ideas threatened by unfavorable evaluative results.

It seems premature to this writer to jump to the conclusion that results contained in this report are largely due to differences in school programs or plants. Causality is a difficult issue in educational research. However, instructional personnel may be correct in thinking that innovative programs have been hurt by overcrowding and understaffing. It is as reasonable to attribute unfavorable results to these factors as it is to attribute them to individualized instruction or open-space plants.

No conclusions will be drawn in this report. The next section, however, will allude to current and projected investigations which may contribute to a further understanding of these results.

ONGOING STUDIES INVOLVING STUDENT ACHIEVEMENT

Research data collection during the 1970-71 school year was designed to provide source material for testing a variety of exploratory hypotheses concerning not only innovative schools, but the overall instructional program of the county.

From a methodological standpoint, some of the results of these exploratory studies cannot be viewed with a great deal of confidence until they can be validated in subsequent studies. Many analyses of the data collected in 1970-71 have already been carried out. Some of the more salient findings have been, or will be, communicated informally to instructional personnel.

The most potentially useful research currently under way or projected, will examine complex relationships involving teacher and program variables, perceptions and attitudes, achievement and ability. It is likely that some of the findings of such studies will not hold up over time. Sometimes it will be because the findings have no real basis in fact and only reflect a chance permutation of variables. In other cases, the finding may have been valid but the circumstances could have altered in the interim between evaluations.

A finding, which may be of some interest but which must be regarded as highly tentative, will be briefly outlined in this section. This

finding concerns fifth-year pupils because it was at this level that most of the supplemental research data were collected.

The finding involved white fifth-year pupils of both sexes. The number of years such pupils had attended school in Broward County seemed to "explain" differences between types of schools on the Math Computation test. It will be recalled that this test was the one on which white fifth-year pupils in innovative and conventional schools differed the most. White pupils who had attended public schools in Broward County for three or more years scored higher on this test in conventional schools. Pupils who had attended local public schools one or two years scored about the same in both types of schools.

One could be more confident about the above finding had it held for more than one test. Analyses designed to uncover the above types of trends are continuing. If enough material that can be regarded with confidence emerges, it will be documented and formally reported.

An important set of analyses will commence in the near future. These analyses will center upon instructional programs and teacher variables. For example, only about half of the fifth-year teachers in the county during the 1970-71 school year indicated that they taught in a "self-contained" situation. It would appear that contrasting "self-contained" classes with innovative classes is superior to making contrasts in terms of types of school plants. Another example of an exploratory hypothesis to be tested concerns examining whether the colleges teachers attended had any effect upon student performance. Other teacher variables to be examined on their own and for their possible effects upon differences between innovative and conventional programs include sex, years of experience, and types and number of degrees.

The list of planned and potential long- and short-range evaluative efforts made possible through research data collection and improved data processing operations is long. It is highly relevant to the interpretation of this report, however, to keep in mind that:

1. evaluative efforts are only entering their initial stages.

2. the best and most reliable evaluative information can often only be confidently established through more than one study.

3. programs and schools change over time. It required several years for the Nova schools to overcome "growing pains" and establish a program which, for the most part, tends to yield favorable evaluative results. Good longitudinal research may help speed up this process for local schools in the future.

APPENDIX

APPENDIX

This report will be read by persons of widely varying degrees of statistical competence. Copies of printouts giving very simple summary information about numbers of cases, means, and standard deviations are provided in this section. We have also reproduced copies of the most pertinent pages of the statistical output associated with this study. These pages contain the tests of significance, contrasts, standard errors, etc. These copies will be made available upon request to anyone interested in obtaining them.

The remainder of this section will be devoted to briefly outlining the technical procedures followed in summarizing the data. All data analyses were carried out upon raw scores on the achievement subtests. Obtained IQ scores were used as covariates. Subtests were used, rather than total scores, to permit the application of multivariate procedures. However, total scores were also processed in each analysis.

The analyses which were most fundamental to this report utilized Eliot Cramer's version of MANOVA* (multivariate analysis of variance). The printouts which have been copied for dissemination to readers interested in examining technical data all derive from this source. Tests were also made for curvilinear relationships involving the IQ covariate. The program used to do this was a modified version of the multiple regression program provided by IBM through its scientific subroutine package. This program was modified by the Research Department to yield regression analysis output similar to that popularized by Ward.** This program was also used to predict scores at selected IQ levels so that trends could be examined in cases where tests for equality of regression were significant. Inspection of these trends formed the basis for prefixing ability-level differences in reporting results for comparisons involving significantly different regression coefficients.

It should be noted that all variables were analyzed in MANOVA with and without a squared covariate. Copies of results for both models have been reproduced. In most cases, inclusion of a squared term did not materially influence results. Differences favoring third-grade black girls in innovative schools were, however, considerably reduced by introducing a curvilinear model.

The .05 level of significance was used as a basis for making entries in the non-numeric summary tables. Where differences existed between the

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* Cramer, Eliot and Sherin, Richard J. MANOVA, Multivariate Analysis of Variance. A program distributed by Clyde Computing Service, Box 166, Coconut Grove Station, Miami, Florida.

** Ward, J. H., Jr., "Multiple Linear Regression Models," in H. Borko, ed., Computer Applications in the Behavioral Sciences, Englewood Cliffs, N.J.: Prentice-Hall, 1962.

linear and curvilinear models, the latter were given priority. Interactions between school types and IQ scores may in some instances be more accurately portrayed by allowing for one inflection in regression lines.

The discussions in the report skip about somewhat between univariate and multivariate interpretations. Since the number of cases in each comparison was rather large, it may well be that only the univariate differences which were starred in the report are really of much practical importance. These differences usually represented over twenty percent of the standard error for a variable, were significant at or beyond the .001 level, and loaded at least in the fifties in terms of their correlation with the multivariate discriminant function score. Discussions based upon the multivariate results were motivated by the need to indicate those instances in which most subtests showed no particularly strong tendency to favor one school type.

In preparing the data for analysis, a missing data multiple regression program was used to estimate missing scores for a small proportion of students. This was done to permit multivariate analyses of the data. Scores were estimated separately by sex, grade, and race groups. Scores were only estimated for pupils who were missing less than half of a possible eleven subtests and IQ variables. The proportion of students with one or more estimated score did not exceed five percent for any sex/race/grade group. Results for all students who took each test were compared with results for the groups used in this report. Differences were found to be trivial.

MEANS AND STANDARD DEVIATIONS

THIRD GRADE WHITE BOYS

FACTOR			VARIABLE						
T			RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	Conventional 2757 OBS								
		M	22.215	26.536	15.171	17.821	16.818	41.680	18.264
		SD	9.200	10.398	5.204	6.693	7.041	13.105	6.430
1	Innovative 853 OBS								
		M	23.308	27.244	15.532	18.385	17.250	41.970	19.018
		SD	9.558	10.063	5.328	6.761	7.241	13.150	6.577

FACTOR			VARIABLE						
T			MATH APPL	I.Q.	RD TOTAL	LANG TOT	MATH TOT	SS TOTAL	TOT BATT
9	Conventional 2757 OBS								
		M	11.633	104.984	48.752	49.809	71.577	17.597	187.735
		SD	5.208	14.994	18.844	17.097	22.655	6.408	60.123
1	Innovative 853 OBS								
		M	12.279	107.447	50.552	51.166	73.266	18.329	193.314
		SD	5.206	14.641	18.891	17.649	22.886	6.544	61.313

FACTOR			VARIABLE
T			IQ SQUARED
9	Conventional 2757 OBS		
		M	11244.793
		SD	3100.803
1	Innovative 853 OBS		
		M	11758.926
		SD	3080.071

SPECIAL ORDER OF EFFECTS

T.

MEANS AND STANDARD DEVIATIONS

THIRD GRADE WHITE GIRLS

FACTOR			VARIABLE						
T	Conventional		RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	2618 OBS								
		M	24.214	30.102	17.107	20.776	20.012	43.990	18.818
	Innovative	SD	8.619	9.257	4.960	6.282	6.396	12.494	5.944
1	739 OBS								
		M	25.736	31.415	18.027	21.633	21.124	45.145	19.922
		SD	8.741	8.736	4.799	6.056	6.043	12.571	6.067

FACTOR			VARIABLE						
T	Conventional		MATH APPL	I.Q.	RD TOTAL	LANG TOT	MATH TOT	SS TOTAL	TOT BATT
9	2618 OBS								
		M	12.333	107.696	54.316	57.895	75.141	19.228	206.579
	Innovative	SD	4.733	13.896	17.088	15.899	21.253	5.876	55.594
1	739 OBS								
		M	13.180	110.760	57.152	60.785	78.246	20.047	216.230
		SD	4.681	13.630	16.699	15.314	21.528	6.013	55.141

FACTOR			VARIABLE
T	Conventional		IQ SQUARED
9	2618 OBS		
		M	11789.754
	Innovative	SD	2919.342
1	739 OBS		
		M	12453.418
		SD	2917.805

SPECIAL ORDER OF EFFECTS
T.

MEANS AND STANDARD DEVIATIONS

THIRD GRADE NON-WHITE BOYS

FACTOR T			VARIABLE RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	Conventional 994 OBS	M	12.440	14.707	8.287	9.663	9.575	25.021	9.646
		SD	6.431	7.097	4.418	4.764	6.085	11.942	4.936
1	Innovative 87 OBS	M	12.805	15.931	9.862	10.724	10.103	29.161	10.621
		SD	6.893	7.866	5.104	5.395	6.565	11.823	5.331

FACTOR T			VARIABLE MATH APPL	I.Q.	RD TOTAL	LANG TOT	MATH TOT	SS TOTAL	TOT BATT
9	Conventional 994 OBS	M	6.248	86.284	27.147	27.525	40.915	10.100	105.687
		SD	3.440	12.729	12.651	13.258	17.901	4.465	43.413
1	Innovative 87 OBS	M	6.839	85.885	28.736	30.690	46.621	11.092	117.138
		SD	3.396	15.164	13.694	15.293	18.082	4.790	47.235

FACTOR T			VARIABLE IQ SQUARED
9	Conventional 994 OBS	M	7606.754
		SD	2287.964
1	Innovative 87 OBS	M	7603.539
		SD	2707.583

SPECIAL ORDER OF EFFECTS

T.

MEANS AND STANDARD DEVIATIONS

THIRD GRADE NON-WHITE GIRLS

FACTOR T			VARIABLE RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	Conventional 1054 OBS								
		M	13.682	17.309	9.783	11.331	12.562	26.221	10.361
	Innovative	SD	7.045	8.164	4.995	5.484	7.430	12.092	4.834
1	86 OBS								
		M	13.663	18.512	10.512	12.570	12.407	29.407	11.419
		SD	7.786	9.510	5.962	6.451	7.641	13.659	5.738

FACTOR T			VARIABLE MATH APPL	I.Q.	RD TOTAL	LANG TOT	MATH TOT	SS TOTAL	TOT BATT
9	Conventional 1054 OBS								
		M	6.868	88.451	30.991	33.676	43.450	11.238	119.355
	Innovative	SD	3.605	12.587	14.282	16.093	18.371	4.810	49.048
1	86 OBS								
		M	7.860	87.407	32.174	35.488	48.686	12.244	128.593
		SD	4.287	17.520	16.490	18.329	22.216	5.887	59.070

FACTOR T			VARIABLE IQ SQUARED
9	Conventional 1054 OBS		
		M	7981.820
	Innovative	SD	2282.018
1	86 OBS		
		M	7943.359
		SD	3145.709

SPECIAL ORDER OF EFFECTS

T.

MEANS AND STANDARD DEVIATIONS

FIFTH GRADE WHITE BOYS

FACTOR			VARIABLE						
T			RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	Conventional 3031 OBS								
		M	26.879	27.569	16.228	18.103	19.384	33.628	20.628
		SD	8.325	9.852	5.912	6.023	6.527	9.472	6.342
1	Innovative 868 OBS								
		M	26.858	27.575	15.728	17.990	18.829	32.154	20.128
		SD	8.374	9.604	5.897	6.141	6.723	9.637	6.476

FACTOR			VARIABLE						
T			MATH APPL	SS REF	SS GRAPH	I.Q.	RD TOTAL	LANG TOT	MATH TOT
9	Conventional 3031 OBS								
		M	12.240	12.007	19.796	103.349	54.448	53.715	66.496
		SD	5.046	4.574	6.373	16.394	17.384	16.678	19.414
1	Innovative 868 OBS								
		M	12.100	11.783	19.880	103.843	54.433	52.547	64.382
		SD	5.047	4.667	6.487	16.634	17.279	17.057	19.620

FACTOR			VARIABLE		
T			SS TOTAL	TOT BATT	IQ SQUARED
9	Conventional 3031 OBS				
		M	31.803	206.462	10948.047
		SD	10.295	59.260	3286.103
1	Innovative 868 OBS				
		M	31.664	203.026	11059.816
		SD	10.392	60.046	3363.260

SPECIAL ORDER OF EFFECTS

T.

FACTOR			VARIABLE						
T			RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	Conventional 2906 085								
		M	28.587	30.208	18.753	20.134	22.284	36.333	21.445
	Innovative	SD	7.233	8.127	4.912	5.211	5.251	7.978	5.307
1	818 085								
		M	29.341	30.980	18.884	20.592	22.654	35.380	21.462
		SD	6.960	7.857	4.863	5.280	5.341	8.007	5.196

FACTOR			VARIABLE						
T			MATH APPL	SS REF	SS GRAPH	I.Q.	RD TOTAL	LANG TOT	MATH TOT
9	Conventional 2906 085								
		M	12.567	13.477	20.574	106.280	58.795	61.171	70.346
	Innovative	SD	4.439	4.111	5.504	14.571	14.516	13.578	16.082
1	818 085								
		M	12.795	13.770	21.017	107.549	60.322	62.130	69.637
		SD	4.512	4.093	5.208	14.249	14.107	13.736	16.175

FACTOR			VARIABLE		
T			SS TOTAL	TOT BATT	IQ SQUARED
9	Conventional 2906 085				
		M	34.052	224.363	11506.012
	Innovative	SD	8.932	48.672	2997.947
1	818 085				
		M	34.787	226.875	11769.578
		SD	8.629	48.516	2946.235

SPECIAL ORDER OF EFFECTS

T.

MEANS AND STANDARD DEVIATIONS

FIFTH GRADE NON-WHITE BOYS

FACTOR T			VARIABLE RD VOC	RD COMP	LANG MECH	LANG EXP.	LANG SPELL	MATH COMP	MATH CONCP
9	Conventional 1054 OBS	M	15.921	16.737	9.898	11.140	12.687	23.198	12.3[illegible]
		SD	7.731	7.702	5.552	4.629	6.835	9.353	5.740
1	Innovative 103 OBS	M	16.320	17.573	9.767	10.893	13.136	23.369	13.146
		SD	8.353	7.883	5.454	4.951	6.568	9.705	5.955

FACTOR T			VARIABLE MATH APPL	SS REF	SS GRAPH	I.Q.	RD TOTAL	LANG TOT	MATH TOT
9	Conventional 1054 OBS	M	6.800	7.531	11.842	79.931	32.658	33.726	42.400
		SD	3.713	3.639	5.350	15.383	14.468	15.202	16.920
1	Innovative 103 OBS	M	7.146	7.087	12.544	81.155	33.893	33.796	43.660
		SD	3.792	3.490	5.717	15.834	15.428	15.693	17.888

FACTOR T			VARIABLE SS TOTAL	TOT BATT	IQ SQUARED
9	Conventional 1054 OBS	M	19.373	128.157	6625.352
		SD	8.216	50.268	2575.906
1	Innovative 103 OBS	M	19.631	130.981	6834.473
		SD	8.467	54.289	2777.352

SPECIAL ORDER OF EFFECTS

T.

MEANS AND STANDARD DEVIATIONS

FIFTH GRADE NON-WHITE GIRLS

FACTOR T			VARIABLE RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	Conventional 1126 OBS	M	17.341	18.816	11.666	12.237	16.060	25.493	12.994
		SD	7.672	7.935	5.839	4.813	7.188	9.521	5.644
1	Innovative 88 OBS	M	17.386	19.682	12.091	11.659	15.898	24.409	13.318
		SD	7.080	7.657	5.949	4.880	7.154	10.262	5.595

FACTOR T			VARIABLE MATH APPL	SS REF	SS GRAPH	I.Q.	RD TOTAL	LANG TOT	MATH TOT
9	Conventional 1126 OBS	M	6.417	8.725	12.362	82.279	36.157	39.964	45.403
		SD	3.622	3.978	5.162	14.738	14.591	16.160	17.001
1	Innovative 88 OBS	M	7.375	8.398	12.875	82.875	37.068	39.648	45.102
		SD	3.696	4.036	5.799	16.900	13.861	16.594	17.833

FACTOR T			VARIABLE SS TOTAL	TOT BATT	IQ SQUARED
9	Conventional 1126 OBS	M	21.087	142.611	6986.840
		SD	8.335	51.523	2499.338
1	Innovative 88 OBS	M	21.273	143.091	7150.645
		SD	9.024	53.910	2940.229

SPECIAL ORDER OF EFFECTS

T.

MEANS AND STANDARD DEVIATIONS
EIGHTH GRADE WHITE BOYS

FACTOR			VARIABLE						
T	Conventional		RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	2644 OBS	M	28.133	29.965	16.241	17.320	17.944	32.410	21.246
		SD	8.477	8.701	4.993	5.339	6.458	10.996	6.328
	Innovative								
1	1027 OBS	M	28.625	31.002	16.451	17.497	18.013	32.890	21.278
		SD	7.916	8.471	4.891	5.133	6.429	10.541	6.138

FACTOR			VARIABLE						
T	Conventional		MATH APPL	SS REF	SS GRAPH	I.Q.	RD TOTAL	LANG TOT	MATH TOT
9	2644 OBS	M	13.222	13.274	19.568	104.104	58.098	51.504	66.877
		SD	4.297	4.464	6.479	15.742	16.377	14.638	20.194
	Innovative								
1	1027 OBS	M	13.315	13.798	20.180	106.103	59.627	51.960	67.483
		SD	4.326	4.241	6.299	14.283	15.451	14.312	19.526

FACTOR			VARIABLE		
T	Conventional		SS TOTAL	TOT BATT	IQ SQUARED
9	2644 OBS	M	32.842	209.322	11083.984
		SD	10.326	56.056	3162.225
	Innovative				
1	1027 OBS	M	33.979	213.049	11461.707
		SD	9.965	53.504	2922.565

SPECIAL ORDER OF EFFECTS
T.

MEANS AND STANDARD DEVIATIONS

EIGHTH GRADE WHITE GIRLS

FACTOR			VARIABLE						
			RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
T	Conventional								
9	2578 OBS	M	29.130	31.951	18.928	19.702	21.449	35.668	21.694
		SD	7.686	7.318	3.746	5.034	5.526	9.821	5.713
	Innovative								
1	1057 OBS	M	29.494	32.806	18.926	19.995	21.413	35.841	21.478
		SD	7.340	7.162	3.825	4.820	5.372	9.516	5.544

FACTOR			VARIABLE						
			MATH APPL	SS REF	SS GRAPH	I.Q.	RD TOTAL	LANG TOT	MATH TOT
T	Conventional								
9	2578 OBS	M	13.261	14.860	20.139	103.787	61.081	60.079	70.622
		SD	4.115	3.590	5.974	15.305	14.285	12.368	18.362
	Innovative								
1	1057 OBS	M	13.309	15.320	20.979	105.572	62.300	60.335	70.628
		SD	4.090	3.470	5.625	14.217	13.727	11.923	17.886

FACTOR			VARIABLE		
			SS TOTAL	TOT BATT	IQ SQUARED
T	Conventional				
9	2578 OBS	M	34.999	226.781	11004.375
		SD	8.952	49.197	3060.635
	Innovative				
1	1057 OBS	M	36.299	229.562	11347.477
		SD	8.485	46.765	2882.644

SPECIAL ORDER OF EFFECTS

T.

MEANS AND STANDARD DEVIATIONS

EIGHTH GRADE NON-WHITE BOYS

FACTOR			VARIABLE						
T	Conventional		RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	659 OBS								
		M	14.551	17.266	10.598	10.194	12.117	20.637	12.876
	Innovative	SD	7.279	7.353	4.919	4.233	6.438	8.636	5.536
1	218 OBS								
		M	15.050	17.784	10.491	10.683	12.202	21.243	13.055
		SD	7.374	7.621	4.988	4.638	6.073	8.545	5.649

FACTOR			VARIABLE						
T	Conventional		MATH APPL	SS REF	SS GRAPH	I.O.	RD TOTAL	LANG TOT	MATH TOT
9	659 OBS								
		M	7.577	8.199	10.945	76.602	31.816	32.909	41.090
	Innovative	SD	3.739	3.984	4.680	15.177	13.776	13.361	16.142
1	218 OBS								
		M	7.729	9.046	11.408	79.289	32.835	33.376	42.028
		SD	3.694	4.303	4.961	15.788	14.060	13.631	16.317

FACTOR			VARIABLE		
T	Conventional		SS TOTAL	TOT BATT	IQ SQUARED
9	659 OBS				
		M	19.144	124.959	6097.941
	Innovative	SD	7.774	45.268	2449.160
1	218 OBS				
		M	20.454	128.693	6534.855
		SD	8.283	46.884	2547.725

SPECIAL ORDER OF EFFECTS

T.

MEANS AND STANDARD DEVIATIONS

EIGHTH GRADE NON-WHITE GIRLS

FACTOR T			VARIABLE RD VOC	RD COMP	LANG MECH	LANG EXP	LANG SPELL	MATH COMP	MATH CONCP
9	Conventional 708 OBS								
		M	15.657	19.970	13.987	12.054	15.936	23.459	13.593
	Innovative	SD	7.090	7.198	4.802	4.571	6.314	9.409	5.525
1	249 OBS								
		M	15.410	18.723	12.843	11.610	15.193	22.450	12.924
		SD	6.799	7.202	5.038	4.404	6.148	8.795	5.227

FACTOR T			VARIABLE MATH APPL	SS REF	SS GRAPH	I.Q.	RD TOTAL	LANG TOT	MATH TOT
9	Conventional 708 OBS								
		M	7.682	10.403	12.494	77.936	35.627	41.977	44.734
	Innovative	SD	3.690	3.794	4.648	14.727	13.486	13.619	17.050
1	249 OBS								
		M	7.305	10.161	11.843	76.928	34.133	39.647	42.679
		SD	3.269	4.118	4.291	14.826	13.133	13.230	15.835

FACTOR T			VARIABLE SS TOTAL	TOT BATT	IQ SQUARED
9	Conventional 708 OBS				
		M	22.897	145.236	6290.910
	Innovative	SD	7.577	46.643	2425.235
1	249 OBS				
		M	22.004	138.462	6136.797
		SD	7.586	44.605	2403.734

SPECIAL ORDER OF EFFECTS

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