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ABSTRACT

The scores which students get on tests are the result of many factors, only one of which is the school program of instruction. The unique traits of the individual develop as they interact with the environment. Family life style, the way parents and siblings use language, and the presence of reading materials and television in the home all have an impact on children. The community exerts an increasing influence as children grow. By the time students enter school, their friends and neighborhood have shaped their lives and learning patterns in important ways. The family and the community continue to be important learning environments during the school years. As a result, not all a student learns is learned in school; and what is learned there builds on a foundation provided by home and community. The strategy adopted in the Performance Indicators program is to use these kinds of influences to make an estimate of what learning can be expected. The influence of the school is purposely omitted. Thus, a score is obtained which shows what learning could be expected for students with certain characteristics under certain community and family conditions. This manual is designed to describe the Program. The system is designed to aid districts in reducing the element of chance in educational decisionmaking, describing district performance by taking into account noncontrollable variables, identifying areas in mathematics and reading in need of more detailed evaluation, determining needs, and facilitating the calculation of the cost-effectiveness of alternative instructional programs. (Author/DN)

SPRING 1974 PERFORMANCE INDICATORS IN EDUCATION

Manual for Interpreting Local District Results for the School Years 1971-72 and 1972-73

The University of the State of New York/THE STATE EDUCATION DEPARTMENT
Bureau of School Programs Evaluation/Albany, New York 12224

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FOREWORD

The Performance Indicators in Education program was initiated by the State Education Department with the purpose of developing a new way of studying the performance of school districts. It followed more than ten years of experience in school district assessment provided by the Quality Measurement Project. Beginning in 1968--aided by an ESEA Title V grant--methodologies, mathematical models and computer programs were developed for generating performance data. The major thrust has been toward reporting school district performance while taking into account characteristics of the district and its students.

The first preliminary reports shown to samples of districts in 1971 were followed by modifications in the program. The first extensive report[1] was delivered to school administrators in 628 districts in September, 1972. A workbook[2] was developed to enable those districts not receiving a report to compute their own performance scores. Efforts to improve the next set of reports have included meetings with school personnel, a telephone survey of chief school administrators,[3] a study of research findings,[4] application of more sophisticated statistical procedures,[5] and a comparison of statewide and regional analyses.[6]

The preparation of the current set of reports is a result of the cooperative efforts of the staff of the Bureau of School Programs Evaluation and a group of local school personnel from Nassau and Westchester Counties. Their efforts, which may help make these reports more relevant to local needs, are acknowledged with appreciation. Participants in the project are listed on the next page. Requests for additional information should be addressed to David J. Irvine, Chief of the Bureau of School Programs Evaluation.

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SECTION I

MEASURING DISTRICT PERFORMANCE

This manual is designed to describe the Performance Indicators in Education program. It is intended primarily for local school personnel to assist them in using the individual reports prepared for their districts. It may provide other interested readers a general picture of the approach used in the program in order to promote better understanding of some of the problems encountered in evaluating education. The ideas contained here and the dialogue we hope this manual stimulates among evaluators, administrators, teachers, and other educators may help increase the usefulness of evaluation in improving the quality of education.

The scores which students get on tests are the result of many factors, only one of which is the school program of instruction The unique traits of the individual develop as they interact with the environment. Family life style, the way parents and siblings use language, and the presence of reading materials and television in the home all have an impact on children. The community exerts an increasing influence as children grow. By the time students enter school, their friends and neighborhood have shaped their lives and learning patterns in important ways. The family and the community continue to be important learning environments during the school years. As a result, not all a student learns is learned in school; and what is learned there builds on a foundation provided by home and community

Separating the effects of these influences, in order to determine the impact of the school, is obviously a difficult task. Since the late 1950's, numerous studies have been attempted to determine the effects of various influences upon educational attainment. Many of these studies have been summarized in an extensive review.[7]

In order to understand the relationships among a number of influences on the educational attainment of the individual, we might visualize a person before he enters school and again as he leaves school. The home and the community are continuing influences on him. He will learn throughout his lifetime from formal experiences such as school and from informal experiences such as reading, conversation, and work.

To estimate the impact of the school on a person's learning, we first need to obtain a measure of what he knows on a particular subject as he enters school or when he enters a certain phase of his schooling. We also need a measure of what he knows on that subject when he leaves school or leaves that phase of his schooling. Finally, we need to be able to estimate the impact of other factors outside the control of the school.

These influences are illustrated in Figure 1. The figure suggests that measures taken as a student leaves school would reflect the influence of four kinds of factors:

(1) what the student brings to the learning situation
(2) family characteristics
(3) community conditions
(4) the school itself.

The strategy adopted in the Performance Indicators program is to use the first three kinds of influences to make an estimate of what learning can be expected. The influence of the school is purposely omitted. Thus, a score is obtained which shows what learning could be expected for students with certain characteristics under certain community and family conditions. By comparing this expected score with the actual score, we can estimate the impact of the school. If the actual score is above the expected score, the students appear to be achieving more than would be expected. We may tentatively conclude that a portion of this positive achievement is due to the influence of the school. If the actual score is lower than the expected score, on the other hand, we may tentatively conclude that the school has had less effect on achievement than would be expected.

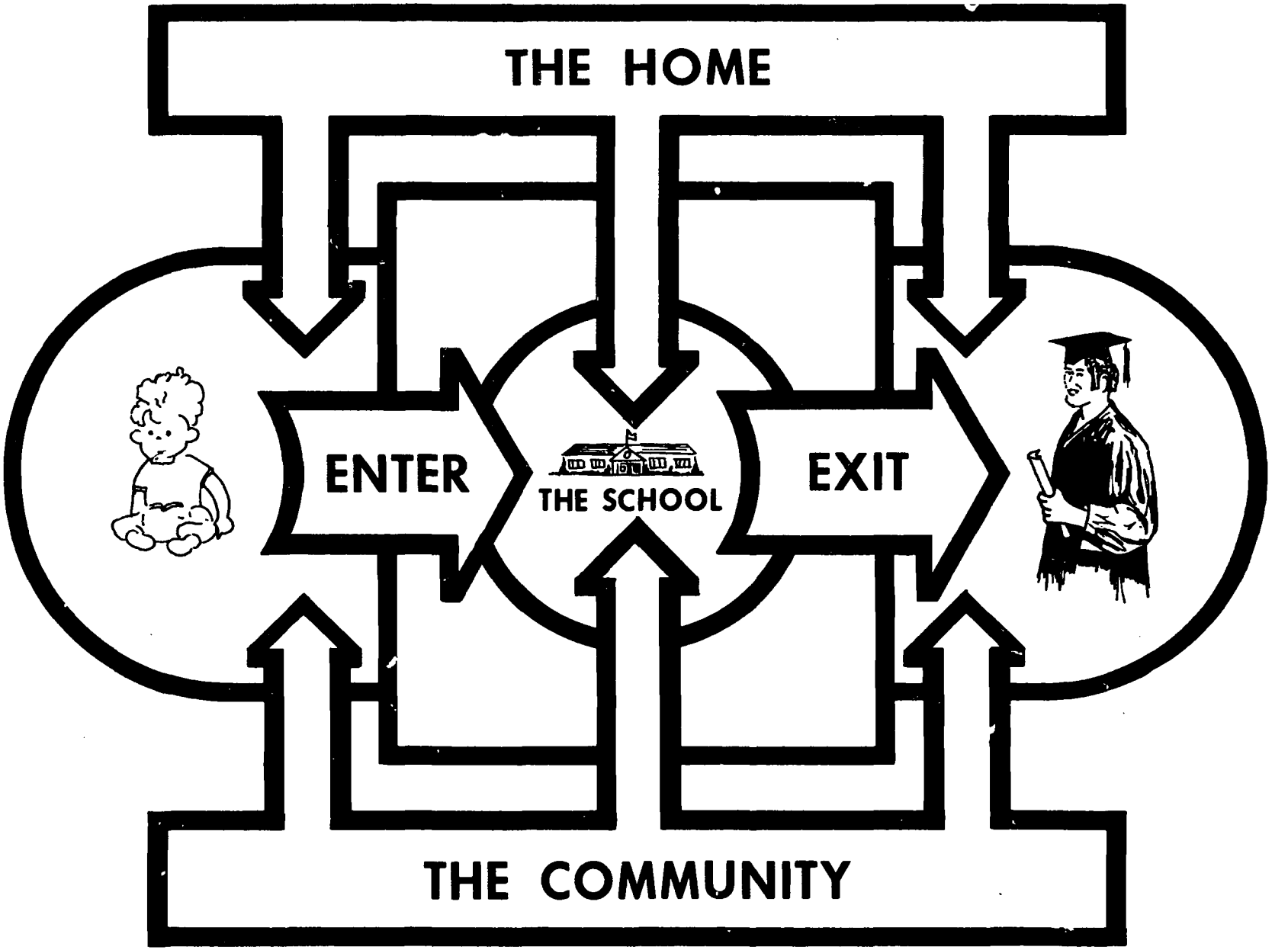
Applying the Strategy

The strategy is being used to estimate the performance of school districts. Data collected from various sources by the New York State Education Department are assembled to describe student and community characteristics in each school district of the State. The data are then analyzed by a statistical method called "regression analysis." Simply stated, regression analysis finds the strength of each of a number of variables in relation to all others. An equation is formed which includes only those influences which have been shown to be the strongest.

The performance of a district on a given criterion is computed by, first, solving the appropriate equation using that district's own data to obtain an expected score and, second, comparing the expected score with the district's actual score on that variable.

In the reports described here, performance is computed for each school district's average scores in reading and arithmetic for grades 3 and 6. Both total scores and part scores are used. The scores are obtained from the Pupil Evaluation Program tests which were administered in the fall of 1971 and 1972.

FIGURE 1



INFLUENCES ON STUDENT LEARNING

The report for each district contains that district's values on each of the variables describing achievement and community characteristics.

Interpreting the Data

As indicated above, variables under control of the schools are not used to compute the expected scores. Therefore, the difference between an expected score and actual score can be attributed in part to the impact of the school. Part of the difference, however, may be due to inadequate data, to equations in which relationships between variables are misstated, or to errors of measurement. Caution is thus advised in interpreting the difference. To deal with error of measurement, confidence limits were computed for each expected score. They are indicated in Figure 2 as the "upper limit" and "lower limit."

If a district's actual score falls outside the confidence limits, there is a two-thirds probability that the difference between the actual and expected scores is real and not due to chance. If the actual score is higher than the upper confidence limit, we may tentatively conclude that the district is doing well in the program under consideration. That is, conditions under the control of school personnel appear to have caused the students to achieve better than expected, once the community conditions and student characteristics of that district are accounted for. The opposite conclusion may be drawn if the actual score falls below the lower confidence limit. Should the actual score fall between the two confidence limits, the school district seems to be doing about what conditions and students characteristics would cause you to expect.

If all data are available, a district will receive four tables:

Table 1	Third Grade Reading	1971 and 1972
Table 2	Third Grade Arithmetic	1971 and 1972
Table 3	Sixth Grade Reading	1971 and 1972
Table 4	Sixth Grade Arithmetic	1971 and 1972

Several types of information can be derived from these tables. The following is an explanation of the symbols and abbreviations appearing on each table. (See Figure 2.)

STATE MEAN - the average of all districts in the analysis
STATE S.D. - the standard deviation for the district scores. This is an indication of the spread or variability of the scores in a distribution.

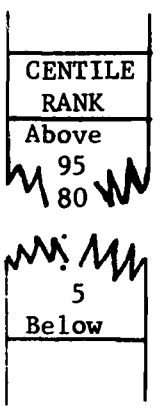
DIST. MEAN - the district average score.

PRED. VAL. - the expected (predicted) score (value) estimated by one of the equations.

UPPER LIM. and LOWER LIM. - Upper and Lower Confidence Limits. The values forming a range or band around an expected score as described above.

<= - The computer-printed arrow indicates the actual score on that variable for the district. The numerical actual scores are found at the bottom of the table across from DIST. MEAN.

--- - The three dash lines represent the upper and lower limits for the expected range or confidence limits computed for each expected score. The predicted score falls midway between these lines. The specific district values are found at the bottom of each column. Note that, when the actual score falls on one of the confidence limits, a combination of symbols (-<=) appears.



- These are percentile rank scales. This allows each district to compare its score on a variable with the rest of the state. For example, if a district's arrow (<=) falls across from the 80 on the CENTILE RANK column, that district has an actual score equal to or higher than 80 per cent of the districts in the state.

The variables used in each equation and definitions of variables may be found in the supplementary information starting on page 12.

FIGURE 2

THIRD GRADE ARITHMETIC

DISTRICT: INDICATUR CODE: 990501

CENTILE RANK	COMPUTATION DISTRICT MEAN		PROBLEM SOLVING DISTRICT MEAN		CONCEPTS DISTRICT MEAN		TOTAL ARITHMETIC DISTRICT MEAN		TOTAL ARITHMETIC STANDARD DEVIATION	
	1971	1972	1971	1972	1971	1972	1971	1972	1971	1972
ABOVE										
95	9.520	9.580	12.990	13.250	16.740	16.620	38.850	39.210	13.690	13.620
90	9.020	9.170	12.580	12.730	16.210	16.220	37.690	38.060	13.160	13.160
85	8.800	8.850	12.400	12.470	15.860	15.980	36.960	37.400	12.840	12.840
80	8.570	8.580	12.150	12.270	15.590	15.700	36.160	36.540	12.559	12.600
75	8.390	8.410	11.920	12.000	15.280	15.400	[illegible]	35.600	12.360	12.440
70	8.170	8.230	11.[illegible]	11.830	15.110	[illegible]	[illegible]	35.040	12.210	12.260
65	8.000	8.110	11.[illegible]	[illegible]	14.940	[illegible]	[illegible]	34.600	12.090	12.100
60	7.840	7.970	11.[illegible]	[illegible]	14.720	14.800	[illegible]	34.160	11.960	12.010
55	7.740	7.810	11.[illegible]	11.330	14.530	14.560	33.580	33.740	11.830	11.870
50	7.610	7.680	11.140	11.180	14.300	14.350	33.070	33.280	11.690	11.740
45	7.480	7.550	10.990	11.000	14.170	14.150	32.530	32.450	11.540	11.580
40	7.340	7.310	10.790	10.810	13.950	13.930	32.070	32.020	11.450	11.410
35	7.180	7.200	10.600	10.60[illegible]	[illegible]710	13.680	31.530	31.440	[illegible]	[illegible]260
30	7.030	7.040	10.390	10.38[illegible]	[illegible]480	13.480	[illegible]0.970	30.940	1[illegible]	[illegible]090
25	6.790	6.[illegible]	[illegible].190	10.170	[illegible].220	13.2[illegible]	[illegible]70	30.420	11.020	10.950
20	6.630	6.[illegible]	[illegible]940	9.950	12.910	[illegible]	[illegible]3	29.770	10.87[illegible]	[illegible]800
15	6.410	6.[illegible]	[illegible].630	[illegible].530	12.470	[illegible]	28.610	28.740	[illegible]	[illegible]50
10	6.150	6[illegible]	[illegible].260	9.260	12.000	[illegible]	[illegible]570	27.530	10.[illegible]00	10.460
5	5.420	5.[illegible]	8.490	8.67[illegible]	11.210	11.[illegible]	[illegible]50	25.650	1[illegible]	9.960
BELOW										
STATE MEAN	7.565		10.984	[illegible]	14.188	14.216	32.742	32.899	11.[illegible]	[illegible].717
STATE S.D.	1.247		1.442		1.755	1.742	4.269	4.290	1.1[illegible]	1.193
DIST. MEAN	6.570		9.450		12.410	12.590	28.520	28.680	13.120	13.300
PRED. VAL.	6.500	5.720	8.230	10.[illegible]40	13.780	12.810	28.550	28.010		
UPPER LIM	7.430	6.690	9.240	11.530	15.060	14.120	31.540	31.110		
LOWER LIM	5.570	4.750	7.220	[illegible].500	12.500	11.500	25.560	24.910		

Three examples using the sample profile (Figure 3) for INDICATUR, the fictitious school district, may help in understanding the reports.

Example 1: Third Grade Arithmetic — Computation: District Mean - 1972

Note that the arrow (<=) has been placed between 6.690 and 6.500 to indicate the approximate value for that district on that sub-test. The upper and lower confidence limits (---) are placed at 6.690 and below 5.340. The precise values for these may be found at the bottom of the column. The district's percentile rank among the districts in the state can also be noted by looking at the Centile Distribution on the left. Indicatur's score on Computation in 1972 places it at about the seventeenth percentile. Since the arrow falls within the limits, one might assume that the district is doing about what could be expected, given its characteristics.

Example 2: Third Grade Arithmetic — Problem Solving: District Mean - 1971

Here the arrow falls above the upper confidence limit. This suggests that the district is doing an exceptional job; that is, better than might be expected.

Example 3: Third Grade Arithmetic — Total Arithmetic: Standard Deviation - 1972

This column reports the district's standard deviation. This is an indication of the spread of student scores in a district. A prediction is not made. Therefore, confidence limits are not calculated. The arrow represents the district's value. Indicatur's Total Arithmetic Standard Deviation in 1972 was one of the largest among the districts in the state, falling at approximately the ninety-second percentile.

FIGURE 3

THIRD GRADE ARITHMETIC

DISTRICT: INDICATUR CODE: 990501

CENTILE RANK	COMPUTATION DISTRICT MEAN		PROBLEM SOLVING DISTRICT MEAN		CONCEPTS DISTRICT MEAN		TOTAL ARITHMETIC DISTRICT MEAN		TOTAL ARITHMETIC STANDARD DEVIATION	
	1971	1972	1971	1972	1971	1972	1971	1972	1971	1972
ABOVE										
95	9.520	9.580	12.990	13.250	16.740	16.620	38.850	39.210	13.690	13.620
90	9.020	9.170	12.580	12.790	16.210	16.220	37.690	38.060	13.160	13.160
85	8.800	8.950	12.400	12.470	15.860	15.980	36.960	37.400	12.840	12.840
80	8.570	8.580	12.150	12.270	15.590	15.700	36.160	36.540	12.550	12.600
75	8.390	8.410	11.920	12.000	15.280	15.400	35.500	35.600	12.360	12.440
70	8.170	8.230	11.750	11.830	15.110	15.190	34.920	35.040	12.210	12.260
65	8.000	8.110	11.580	11.640	14.940	14.990	34.500	34.600	12.090	12.100
60	7.880	7.970	11.420	11.470	14.720	14.800	34.060	34.160	11.960	12.010
55	7.740	7.810	11.270	11.330	14.530	14.560	33.580	33.740	11.830	11.870
50	7.610	7.680	11.140	11.180	14.300	14.350	33.070	33.280	11.690	11.740
45	7.480	7.550	10.980	11.000	14.170	14.150	32.530	32.450	11.540	11.580
40	7.340	7.310	10.790	10.810	13.950	13.930	32.070	32.020	11.450	11.410
35	7.180	7.200	10.600	10.600	13.710	13.680	31.530	31.440	11.320	11.260
30	7.030	7.040	10.390	10.380	13.480	13.480	30.970	30.940	11.170	11.090
25	6.790	6.900	10.190	10.170	13.220	13.240	30.530	30.420	11.020	10.950
20	6.630	6.690	9.940	9.950	12.910	12.890	29.540	29.770	10.870	10.800
15	6.410	6.500	9.610	9.630	12.470	12.590	28.610	28.740	10.710	10.660
10	6.150	6.190	9.240	9.260	12.000	11.990	27.570	27.530	10.500	10.460
5	5.420	5.340	8.490	8.670	11.210	11.120	25.360	25.650	10.090	9.960
BELOW										
STATE MEAN	7.565	7.625	10.984	11.058	14.188	14.216	32.742	32.899	11.742	11.717
STATE S.D.	1.247	1.258	1.442	1.446	1.755	1.742	4.269	4.290	1.117	1.193
DIST. MEAN	6.570	6.630	9.450	9.500	12.410	12.590	28.520	28.680	13.120	13.300
PRED. VAL.	6.500	5.720	8.230	10.540	13.780	12.810	28.550	28.010		
UPPER LIM	7.430	6.690	9.240	11.580	15.060	14.120	31.540	31.110		
LOWER LIM	5.570	4.750	7.220	9.500	12.500	11.500	25.560	24.910		

Using Performance Indicators Reports

The Performance Indicators reports provide local education agencies, as well as the State Education Department, with both descriptive and comparative data about a district which may allow assessment of the effectiveness of certain programs. At both the State and local levels, objective information about the performance of educational systems can be used in identifying educational needs, determining the most appropriate means of meeting the needs, and evaluating the results obtained.

The data presented in the reports can be analyzed in several ways. Values or scores on all reported variables are presented to show each district's standing in relation to the districts in the state in terms of percentile rank.

Data reported in the profiles can also be used when studying programs within a district without comparing it directly with other districts.

Some examples of comparisons which might be made are:

1) Between-year comparisons - Comparing reading at the third grade level may reveal trends in the achievement characteristics of the student body over a period of time.
2) Between-grade comparisons - Comparing the same group (more or less) of students at different grade levels may show how well a district is able to move students through school (e.g., from grade 3 in 1968 to grade 6 in 1971).
3) Between-subject comparisons - Comparing achievement in reading to achievement in arithmetic may suggest district strengths and weaknesses and indicate areas of additional effort.

It must be emphasized that these comparisons should be made with caution. What might appear to be program strengths or weaknesses may in fact be due to such factors as shifting school population, unique conditions in the community, or invalid or unreliable measurements.

Summary

The PIE system is designed to aid districts in:

- -- reducing the element of chance in educational decision making
- -- describing district performance by taking into account non-controllable variables
- -- identifying areas in math and reading in need of more detailed evaluation
- -- determining needs
- -- facilitating the calculation of the cost-effectiveness of alternative instructional programs.

As better data and more precise analyses become available, calculations will become more accurate. Criteria of school district performance may include non-test data as well as results of other types of measurement instruments, such as criterion-referenced tests or tests in the affective domain. School process variables will be added to the data file and studied to determine their effects on achievement. The ultimate goal is to develop models which make it possible to predict the consequences of a management decision before implementing the policy.

A technical manual is being prepared to supplement this report. It will include more detailed information on the data analyses and a description of procedures. A study of interaction and curvilinear relationships in the data will be conducted to determine whether certain variables affect achievement in different ways under different conditions. Fourth Count Census Data will be available for future analyses.

SECTION II

SUPPLEMENTARY INFORMATION

SUPPLEMENT Ia.

MATRIX OF INDEPENDENT-DEPENDENT VARIABLE COMBINATIONS
USED IN THE FINAL PREDICTION EQUATIONS FOR
3RD GRADE READING

Independent (Predictor) Variables	Dependent (Criteria) Variables					
	Total Reading		Word Knowledge		Comprehension	
	1971	1972	1971	1972	1971	1972
Census						
- % of Population Living in Units With 1.01 Persons or More Per Room	x	x	x	x	x	x
- % of Children Under 18 Living in Family	x	x	x	x	x	x
- % of Population Living in Housing Units Lacking One or More Plumbing Facilities	x		x		x	
- % Rural Population				x		
- % of Housing Units That are Owner Occupied	x	x		x		
Size						
- Population	x	x	x	x	x	x
District Wealth						
- State Aid Ratio	x	x		x	x	x
Prior Achievement						
- 3rd Grade Reading 1968						
- 3rd Grade Arithmetic 1968						
- 3rd Grade Reading 1969						
- 3rd Grade Arithmetic 1969						

SUPPLEMENT Ib.

MATRIX OF INDEPENDENT-DEPENDENT VARIABLE COMBINATIONS
USED IN THE FINAL PREDICTION EQUATIONS FOR
6TH GRADE READING

Independent (Predictor) Variables	Dependent (Criteria) Variables					
	Total Reading		Word Knowledge		Comprehension	
	1971	1972	1971	1972	1971	1972
Census						
- % of Population Living in Units With 1.01 Persons or More Per Room	x	x	x	x	x	x
- % of Children Under 18 Living in Family	x	x	x	x	x	x
- % of Population Living in Housing Units Lacking One or More Plumbing Facilities						
- % Rural Population	x		x	x		
- % of Housing Units That are Owner Occupied		x	x		x	
Size						
- Population	x		x	x	x	x
District Wealth						
- State Aid Ratio		x	x		x	
Prior Achievement						
- 3rd Grade Reading 1968	x		x		x	
- 3rd Grade Arithmetic 1968						
- 3rd Grade Reading 1969		x		x		x
- 3rd Grade Arithmetic 1969						

SUPPLEMENT Ic.

MATRIX OF INDEPENDENT-DEPENDENT VARIABLE COMBINATIONS
USED IN THE FINAL PREDICTION EQUATIONS FOR
3RD GRADE ARITHMETIC

Independent (Predictor) Variables	Dependent (Criteria) Variables							
	Total Arithmetic		Concepts		Computation		Problem Solving	
	1971	1972	1971	1972	1971	1972	1971	1972
Census								
- % of Population Living in Units With 1.01 Persons or More Per Room	x	x	x	x	x	x	x	x
- % of Children Under 18 Living in Family	x	x	x	x	x	x	x	x
- % of Population Living in Housing Units Lacking One or More Plumbing Facilities	x		x		x		x	
- % Rural Population		x		x		x		x
- % of Housing Units That are Owner Occupied		x		x				x
Size								
- Population	x	x	x	x	x	x	x	x
District Wealth								
- State Aid Ratio		x		x		x		x
Prior Achievement								
- 3rd Grade Reading 1968								
- 3rd Grade Arithmetic 1968								
- 3rd Grade Reading 1969								
- 3rd Grade Arithmetic 1969								

SUPPLEMENT Id.

MATRIX OF INDEPENDENT-DEPENDENT VARIABLE COMBINATIONS
USED IN THE FINAL PREDICTION EQUATIONS FOR
6TH GRADE ARITHMETIC

Independent (Predictor) Variables	Dependent (Criteria) Variables							
	Total Arithmetic		Concepts		Computation		Problem Solving	
	1971	1972	1971	1972	1971	1972	1971	1972
Census								
- % of Population Living in Units With 1.01 Persons or More Per Room	x	x	x	x			x	x
- % of Children Under 18 Living in Family		x			x	x		x
- % of Population Living in Housing Units Lacking One or More Plumbing Facilities								
- % Rural Population								
- % of Housing Units That are Owner Occupied	x	x	x	x	x	x	x	
Size								
- Population								
District Wealth								
- State Aid Ratio	x	x	x	x	x	x		
Prior Achievement								
- 3rd Grade Reading 1968								
- 3rd Grade Arithmetic 1968	x		x		x		x	
- 3rd Grade Reading 1969								
- 3rd Grade Arithmetic 1969		x		x		x		x

SUPPLEMENT II

DEFINITION OF VARIABLES

DEPENDENT (CRITERIA) VARIABLES - These reflect the distribution of achievement test district mean scores in reading and arithmetic as measured by the statewide Pupil Evaluation Program. The mean scores for each district are based on the raw means of the individual pupil scores for the district. (See Supplementary Information: I - Matrix of Independent Variable Combinations Used In Final Prediction Equations for actual achievement scores used.)

INDEPENDENT (PREDICTOR) VARIABLES -

- % OF POPULATION LIVING IN HOUSING UNITS WITH 1.01 OR MORE PERSONS PER ROOM
  This variable was created by dividing the number of persons in the district living in housing units under crowded conditions (1.01/room). . .by the total district population. Both values were obtained from the First Count Summary of 1970 Census Data by School District (8).

- % OF CHILDREN UNDER 18 LIVING IN FAMILY
  This variable was constructed by dividing the number of children under 18 years of age living in a family with both parents present by the total number of people under 18 in the district. This is another indicator of SES. The original variables are also from the First Count Summary (8).

- % OF POPULATION LIVING IN HOUSING UNITS LACKING ONE OR MORE PLUMBING FACILITIES
  The First Count Census (8) report of the number of people in each district living in homes lacking some plumbing was divided by district population. This would seem to be a good indicator of socio-economic status.

- % RURAL POPULATION
  The Census (8) count of the number of people living in a rural environment was divided by total population.

- % OF HOUSING UNITS THAT ARE OWNER OCCUPIED
  Census (8) figures for the number of owner occupied housing units for each district were divided by the total number of units in each district. This should reflect the degree of home ownership in each district.

- POPULATION
  The Census (8) count of the total number of people living in each district.

- STATE AID RATIO
  The State Aid Ratio for each district is computed on the basis of a formula which gives consideration to the district's Full Tax Value and its Weighted Average Daily Attendance. It is an indicator of the district's ability to pay for the education of their students.

- PRIOR ACHIEVEMENT
  Achievement test scores by relatively the same group of students when they were in third grade have been used again as an estimate of later sixth grade performance in the same skills area. For example, a district's mean score in third grade reading in 1968 has been used to estimate that district's reading in 1971 on the sixth grade test. (See Supplementary Information: I for actual test scores used.)

STANDARD DEVIATION - These variables were neither used as dependent (criteria) or independent (predictor) variables. They have been included to reflect the amount of variability in the pupil scores within a district (the higher the number, the greater the variation in scores obtained; i.e., the greater the spread from low to high scores).

SUPPLEMENT III

OTHER VARIABLES EXAMINED

Other variables were included in the analysis to examine their relationship to the various criteria. They were not included in the final equations because of their co-linearity (high correlation) with other variables and/or their lack of relationship to any of the criteria. These variables are as follows:

Prior Achievement Part Scores (e.g., 1969 Third Grade Reading: Word Knowledge)
Number of Housing Units
Total Rural Population
Total Urban Population
Total Number of Persons Under 18
Number of Children Under 18 Living In Husband-Wife Family
Number of Owner Occupied Housing Units
Owner Occupied Housing Units Per Population
Total Population Living in Housing Units With 1.51 or More Persons Per Room
Number of People Living in Housing Lacking All or Some Plumbing Facilities
Area in Square Miles
Average Daily Attendance K-6, 1971
Enrollment (Grades 3, 6, K-6, and K-PG; For 1971 and 1972)
% Urban Population
Density (Population per Square Mile)
% of Population Living in Housing Units With 1.51 or More Persons Per Room
Number of Housing Units Per Square Mile
% of Population Under 18
Total Population Living in Housing Units With 1.01 or More Persons Per Room

REFERENCES

1. Bureau of School Programs Evaluation. Performance Indicators in Education, Local District Results--1972. Albany: New York State Education Department. September 1972.

2. _____. Performance Indicators in Education Workbook. Albany: New York State Education Department. March 1973.

3. _____. Performance Indicators in Education Telephone Survey. Albany: New York State Education Department. January 1973

4. _____. Variables Related to Student Performance and Resource Allocation Decisions at the School District Level. Albany: New York State Education Department. June 1973.

5. _____. Using Interaction and Curvilinear Terms to Improve New York State Performance Indicators Models. Albany: New York State Education Department. April 1973

6. _____. Comparison of District PIE Ratings: Statewide Equations Versus Regional Equations. Albany: New York State Education Department. April 1973.

7. _____. What Research Says About Improving Student Performance. Albany: New York State Education Department. March 1973.

8. Information Center on Education. First Count Summary of 1970 Census Data by School District. Albany: New York State Education Department. 1973.