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ABSTRACT
                This is the fifth in a series of reports of a
longitudinal study of the effects of the operation of a curriculum
engineering system in a school district. Specific objectives were to
observe the effects of leadership and curriculum engineering on
teacher attitudes and teacher performance in a curriculum system and
on student achievement. A causal model and path analysis were used to
demonstrate the effects of the research variables upon each other and
upon student achievement. Where appropriate, the most recent data
were compared with data from previous years and discussed in light of
the longitudinal design of the study. (Author)

LONGITUDINAL STUDY IN CURRICULUM ENGINEERING - V

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This is the fifth in a series of reports of the study of certain effects of the installation and operation of a system of curriculum engineering in a school district. The curriculum system was designed with two purposes in mind. One was to insure that the curriculum of the school district would be adequately implemented throughout the district, and the other was to bring the curriculum under constant surveillance for potential revision. A curriculum system thus consists of three major functions: planning, implementing, and evaluating. Measured effects included teacher attitude, teacher performance, and student achievement. One objective of the study was to observe effects of the curriculum system upon teachers. A second was to investigate the relationships among leadership, teacher, and student variables within assumed causal relationships.

The basic theoretical posture supporting the study is that there are causal relationships among various factors and processes in schooling and one of the results of schooling in the form of student achievement. Among the factors and processes of particular interest in the study are leadership, curriculum functions and processes, and personal characteristics of teachers. The theory is that the use of a causal model will aid in the observance of the effect of specific variables upon student achievement. Of particular interest in this study are variables associated with a curriculum system.

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Definition of Terms

Certain terms need to be defined. Some of these are important for the theory content presented in this paper, and others are used in explaining the model developed to illustrate demonstrated relationships among the variables.

A curriculum is a written product; it contains the plan for the total educational opportunities for students in the school where it is to be implemented.

Curriculum engineering refers to the curriculum system and its internal dynamics. It consists of all the processes necessary to make a curriculum system functional in schools: curriculum planning, implementation, evaluation, and revision.

Curriculum system refers to the organization for both decision making and action with respect to curriculum functions regarded as a part of the total operations of schooling.

Participation in curriculum planning is active membership in formally organized committees designed to plan a curriculum.

Principal leadership effectiveness refers to the extent to which the principal carries out successfully the leadership process in the areas of representation, demand reconciliation, tolerance of freedom, role assumption, consideration, production emphasis, predictive accuracy, integration, and superior orientation.[1]

Productivity refers to the outcomes associated with teacher behavior as measured by growth in student achievement.

Student achievement is the extent to which measurable growth in learning has taken place.

Causal relation is an assymetrical relation between two variables.

Effect coefficient, in exact use, refers to causal determinism; a

weak causal order is assumed for purposes here, and the effect coefficient refers to the measure of expected difference between two groups which are different by one unit.[2]

Endogenous variables refer to those variables determined by forces operating within the scope of a particular model of reality while exogenous variables refer to those variables determined by forces operating outside.[3]

Exogenous variables are considered to be predetermined for the study of a particular system.

Model is used in this report to refer to the mathematical system of equations that represents an abstract and simplified picture of a realistic process.[4]

Parameters are exogenous variables outside the system that present a plausible rival hypothesis concerning relationships among variables in the system.

Path coefficients are standardized regression coefficients, or beta values.

Data Source

The data source was a suburban Kindergarten to grade eight school district in Cook County, Illinois. There are approximately four thousand students enrolled in the school district, and they are housed in ten school buildings. One of the buildings is a junior high school for grades seven and eight, one is an intermediate school, three are primary units containing Kindergarten through grade three, and five are K-6 units. There are five principals; four of them have more than one building under their jurisdictions. There are approximately 132 classroom teachers in the ten schools. They are supported by approximately thirty specialist supervisors. All classroom teachers and principals participated in the study, and a 25% random sample

of students stratified by grade level was used. The longitudinal character
of the study is evidenced by the fact that some of the data have been collected
recurrently since 1970; some in 1973 and 1974.

DESIGN

The present study was designed with two purposes in mind. The first
purpose was to study the longitudinal effects of the curriculum engineering
system upon teacher attitudes and teacher performance. The second purpose
was to demonstrate causal linkages among such variables as principal
leadership, teacher motivation, teacher per.ormance in a curriculum system,
and student achievement through the use of a causal model and path analysis.
The first is a continuation of the design of the first three reports in
this series of studies; the second is to continue the type of data analysis
presented in the fourth report.

Three instruments were administered in the spring of 1974 to collect
data on teacher attitudes and teacher performance. One was the Curriculum
Attitude Inventory (CAI)[5], intended to measure the attitude of teachers
toward being involved in a curriculum system. A second was the Teacher
Self-Analysis Inventory (TSAI)[6], which is designed to measure teachers'
perceptions of their performance within a curriculum system. The third
was the Principal's Version of the Teacher Self-Analysis Inventory (PTSAI)[7],
intended to be used by principals to evaluate teacher performance. The
PTSAI is a new measure in the series of studies. It is composed of twelve
items selected from the TSAI and reworded so that principals would be doing
the rating rather than teachers rating themselves. In addition, personal
characteristic data on teachers indicating their sex, their marital status,
the grade level taught, the amount of teaching experience, and the amount
of professional preparation for teaching were acquired.

One-way analysis of variance was used to determine whether scores on the CAI, the TSAI, and the PTSAI were significantly affected by school assignment, by sex, by marital status, by grade level assignment, by teaching experience, and by professional preparation. The t-test was used to determine whether growth in the CAI and the TSAI were significantly different from previous years.

Principal performance was assessed by the administration of the Leader Behavior Description Questionnaire (LBDQ).[8] These ratings of principals were made by teachers in the respective buildings.

Student achievement scores were assessed by the administration of the Stanford Achievement Test, 1973 edition, and student IQ scores were assessed by means of the Kuhlmann-Anderson Intelligence Test, 7th edition. Both sets of data were analyzed by one-way analysis of variance of those scores by school for each of the six grades in the elementary schools.

Since previous reports had established non-zero order correlations among the measures utilized in the study, it was not necessary to repeat that procedure in this one. We were concerned, however, with the correlation between the TSAI and the PTSAI for obvious reasons. Therefore, correlation analysis of that data was made.

Correlation and regression analyses were used to demonstrate the magnitude of relationships among the various factors and variables. A causal model was used to demonstrate the effects of the research variables upon each other and upon student achievement, as was done in the fourth report in this series. The model utilized in this study is shown in Figure 1.

The causal model contains two types of variables: endogenous and exogenous. Endogenous variables are those variables assumed to be determined by variables within the system, or the model, plus residual or random
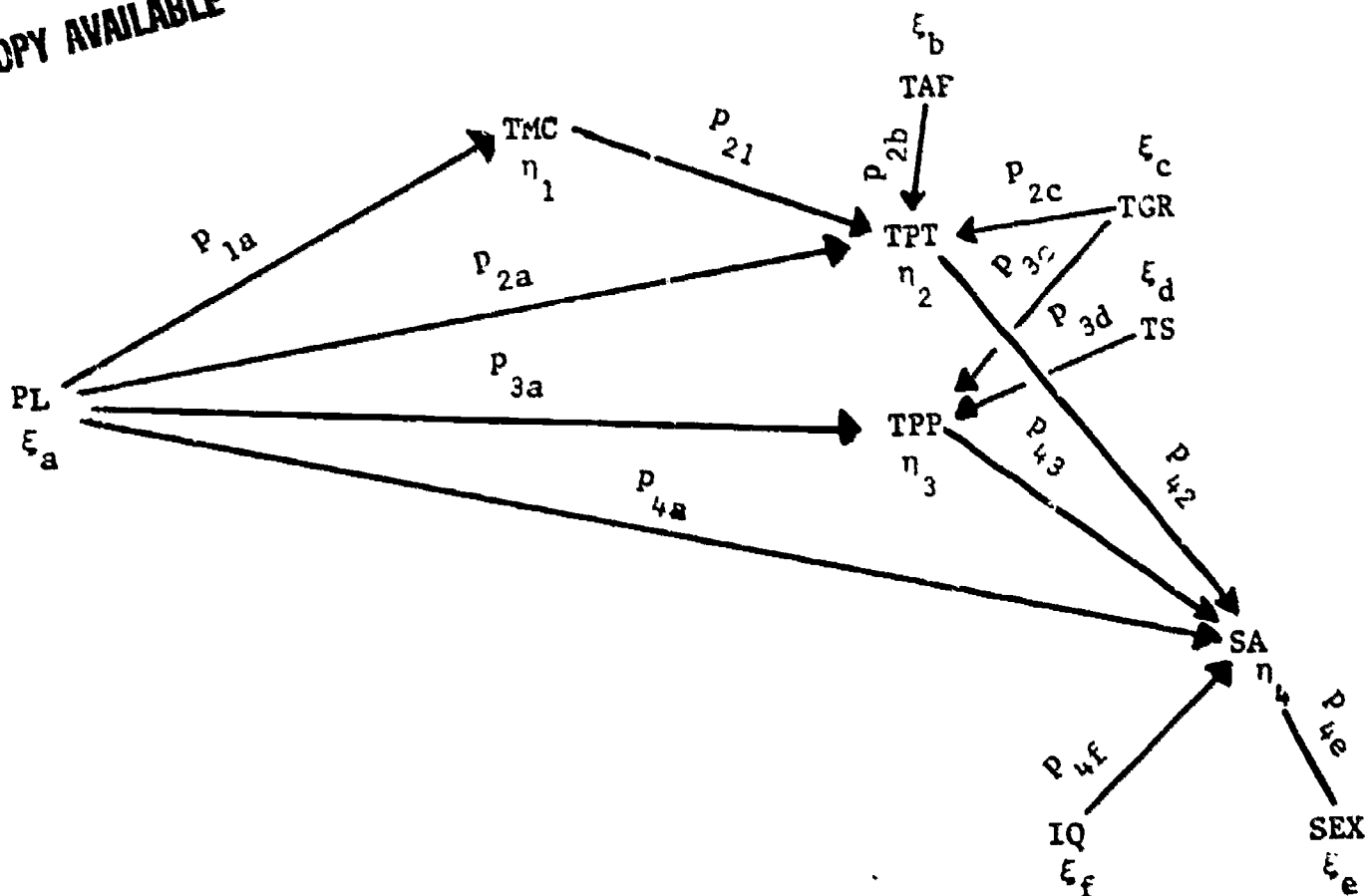
$$P_{1a} \quad P_{21} \quad P_{2b} \quad P_{2c} \quad P_{2a} \quad P_{3c} \quad P_{3d} \quad P_{3a} \quad P_{43} \quad P_{42} \quad P_{4a} \quad P_{4f} \quad P_{4e}$$

TMC η_1 — TAF ξ_b — TGR ξ_c — TPT η_2 — TS ξ_d — TPP η_3 — PL ξ_a — SA η_4 — IQ ξ_f — SEX ξ_e

where:

    PL = Principal Leadership
    TMC = Teacher Motivation (Attitudes toward Curriculum)
    TPT = Teacher Performance as Self-perceived
    TAP = Teacher Ability according to the Extent of Formal Education
    TGR = Grade Level Taught
    TPP = Teacher Performance as Rated by Principals
    TS = Teacher Sex
    SA = Student Achievement
    SEX = Student Sex
    IQ = Student IQ

Figure 1. The Causal Model.

disturbances. Exogenous variables are those that are assumed to be outside

of the system, that is, they are determined by variables outside the system

under examination. I list the variables as included in the model below:

Endogenous variables

η_1 = TMC = Teach   motivation or attitude toward curriculum as measu   by the Curriculum Attitude Inventory (CAI)

η_2 = TPT = Teacher performance as self-perceived by the teachers through the Teacher Self-Analysis Inventory (TSAI)

η_3 = TPP = Teacher performance as rated by principals by means of the Principals' Version of the TSAI (PTSAI)

η_4 = SA = Student achievement as measured by the Stanford Achievement Test

Exogenous variables

ξ_a = PL = Principal leadership as measured by the administration of the Leader Behavior Description Questionnaire (LBDQ) to teachers in the district

ξ_b = TAP = Teacher ability according to the extent of a teacher's formal preparation for teaching

ξ_c = TGR = Grade level taught by teachers

ξ_d = TS = The sex of teachers

ξ_e = SEX = Sex of a student specified as male or female

ξ_f = IQ = Student IQ

In the model several causal relationships were assumed: (1) teacher

motivation (TMC) is determined by principal leadership (PL) and residual

variables; (2) teacher performance (TPT) is determined by teacher motivation

(TMC), principal leadership (PL), teacher ability (TAP), grade level at which

teachers teach (TGR), and residual variables; teacher performance (TPP) is

determined by principal leadership (PL), grade level taught (TGR), sex of

the teacher (TS), and residual variables; student achievement (SA) is

determined by principal leadership (PL), teacher performance (TPP), teacher

performance (TPT), student IQ (IQ), student sex (SEX), and residual variables.

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These relationships are further described in the following structural equations using the subscriptions in Figure 1:

$$TMC = \eta_1 + p_{1a}\xi_a + R_v$$

$$TPT = \eta_2 + p_{21}\eta_1 + p_{2a}\xi_a + p_{2b}\xi_b + p_{2c}\xi_c + R_w$$

$$TPP = \eta_3 + p_{3a}\xi_a + p_{3c}\xi_c + p_{3d}\xi_d + R_x$$

$$SA = \eta_4 + p_{43}\eta_3 + p_{42}\eta_2 + p_{4a}\xi_a + p_{4e}\xi_e + p_{4f}\xi_f + R_y$$

Solutions to these structural equations were sought through the use of regression analysis. Stepwise multiple regression was used for this purpose.

RESULTS

There were no significant differences on the CAI and the TSAI between 1974 and 1973. A summary of the F-ratios resulting from univariate analysis of variance of teachers' scores on the three teacher measures for the six factors are shown in Table I. From Table I it can be noted that there were differences in teacher scores on the TSAI and the PTSAI attributable to school assignment. There were differences due to sex on the PTSAI. There were differences on the TSAI and the PTSAI because of grade level assignment, and there were differences on the TSAI attributable to the amount of professional preparation. The fact that there were significant differences on the CAI, the TSAI, or the PTSAI attributable to the teacher characteristics (grade level taught, amount of professional preparation, and teacher sex) causes those characteristics to be considered as exogenous variables in the causal model shown in Figure 1.

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TABLE I

SUMMARY OF F-RATIOS RESULTING FROM UNIVARIATE
ANOVAS OF TEACHERS' SCORES ON THREE
CRITERION MEASURES FOR SIX FACTORS
BLUE ISLAND 1974

FACTOR	CRITERION		
	CAI	TSAI	PTSAI
School (df = 4,125)	.75	7.20^{**}	14.20^{**}
Sex (df = 1,128)	.26	2.49	10.98^{**}
Marital Status (df = 2,127)	.04	.80	.27
Grade Level (df = 2,127)	.56	14.06^{**}	11.66^{**}
Experience (df = 2,127)	1.05	1.65	2.11
Preparation (df = 3,126)	.07	4.80^{**}	.38

$^{**} p < .01$

TABLE II

CORRELATION BETWEEN TOTAL SCORES
ON PTSAI AND TSAI BY SCHOOL AND DISTRICT
BLUE ISLAND 1974

School	PTSAI MEAN	TSAI MEAN	Pearson r
04	35.26	146.30	.512*
05	41.33	151.73	.477
11	41.09	129.94	.052
12	39.25	144.75	.299
14	35.15	146.10	-.113
ALL	37.98	142.53	-.012

$^*p < .05$

The PTSAI was used in this year's data analysis for the first time. Since it was composed of items taken directly from the TSAI, we were concerned about the degree to which there was conformity between the principals and teachers in the rating of teachers on the same items. The teachers' scores on the TSAI and the PTSAI were therefore correlated. The results are shown in Table II. From Table II it can be noted that, with one exception, all schools produced zero correlations as did the results for the district as a whole. We therefore were forced to conclude that there was no correlation between the two measures. In the design of our model, we had originally expected to have to show a strong correlation between these two measures. Due to the results of the correlation analysis, however, we had to delete that relationship from the causal model.

Principal performance was assessed by the administration of the Leader Behavior Description Questionnaire (LBDQ). These ratings of principals were made by teachers in the respective buildings. The means, standard deviations, and the results of the analysis of variance of leadership behavior by school is shown in Table III. It can be noted that there were significant differences in leadership behavior among the principals.

TABLE III

MEANS, STANDARD DEVIATIONS, AND RESULTS OF UNIVARIATE ANOVA OF
LEADERSHIP BEHAVIOR BY SCHOOL
BLUE ISLAND 1974

Principal	N	Mean	Standard Deviation
04	23	392.22	46.23
05	14	374.86	28.59
11	35	392.86	34.82
12	21	375.52	31.74
14	39	343.38	44.32
TOTAL	132	373.46	43.71

$F(4,127) = 9.29$, $p < .01$

Within the limits of this paper, it is not feasible to include the results of all of the treatment of student achievement data. Therefore, the results for fifth-grade students will be used here to illustrate the results of the outcome of data treatment.

Table IV shows the means, standard deviations, and results of analysis of variance for fifth-grade student achievement on all subtests of the achievement test battery by school. Significant differences among schools are designated. Variance attributable to school location is not consistent throughout the subtests.

Regression coefficients for the paths to teacher effects are shown in Table V. Multiple R's are significant for the effect η_2 only. For effects

TABLE V

REGRESSION COEFFICIENTS FOR PATHS TO TEACHER EFFECTS - GRADE 5

Effect	Variable	β	R^2	MR
η_1	PL	.43	.19	.43
η_2	PL	.43	.42	.65**
	TAP	.28	.51	.71**
	TMC	.54	.70	.83**
η_3	PL	.30	.14	.38
	TS	-.35	.26	.51

** $p < .01$

η_2 and η_3, ξ_c (grade level taught) was removed from the equation. Regression coefficients for the paths to student achievement for grade five are shown in Table VI. Significant multiple regression coefficients are asterisked. There was considerable variation in size of the coefficients, and the _beta_

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TABLE IV

MEANS, STANDARD DEVIATIONS, AND RESULTS OF UNIVARIATE ANOVA OF STUDENTS' ACHIEVEMENT SCORES BY SCHOOL FOR GRADE 5 – 1974

School	N		VOC**	REC**	W.S*	LIC**	SP	LA**	MCON**	MCOM**
041	24	M	6.8	7.3	7.7	8.1	6.4	7.3	7.1	7.4
		SD	2.0	2.3	2.6	2.5	1.7	2.3	1.9	2.1
051	7	M	5.9	6.2	7.0	4.4	6.1	5.0	5.4	5.5
		SD	1.2	1.4	1.5	1.2	1.7	1.6	1.1	.6
052	2	M	3.8	3.5	3.2	3.4	3.0	3.0	4.0	4.6
		SD	.4	.8	.3	.4	0	0	.7	2.3
121	10	M	4.3	4.7	4.7	5.1	5.4	4.7	5.2	4.9
		SD	1.6	1.5	2.4	2.2	2.3	1.3	1.3	1.4
122	19	M	5.5	5.7	6.0	6.1	5.2	5.9	5.2	6.2
		SD	1.6	2.2	2.8	2.2	2.2	2.5	1.3	1.9
142	40	M	5.7	5.5	6.4	5.6	5.9	6.0	5.6	6.0
		SD	1.4	1.8	2.7	2.0	1.9	2.4	1.7	1.8
TOTAL	102	M	5.8	5.9	6.4	6.1	5.8	6.0	5.8	6.2
		SD	1.7	2.1	2.7	2.4	2.0	2.4	1.8	2.0

School	N		MAPP**	SOCS**	SCI**	TR**	TM**	TA**	TB**
041	24	M	7.0	7.1	7.4	7.5	7.2	7.1	7.1
		SD	2.2	2.1	2.2	2.4	2.0	2.0	2.0
051	7	M	5.2	5.1	4.5	6.6	5.5	5.2	5.4
		SD	1.5	1.2	1.2	1.4	.7	1.0	.8
052	2	M	5.1	4.1	4.3	3.4	4.5	3.8	3.6
		SD	1.4	1.6	1.8	.6	1.8	0	.8
121	10	M	4.2	5.3	4.5	4.6	4.7	4.6	4.6
		SD	1.5	1.9	1.4	1.8	1.2	1.6	1.4
122	19	M	4.8	5.3	5.4	5.8	5.5	5.6	5.5
		SD	1.7	1.7	1.9	2.5	1.8	1.4	1.9
142	40	M	5.5	5.7	5.8	5.9	5.7	5.6	5.7
		SD	2.2	2.0	1.9	2.0	1.9	1.3	1.8
TOTAL	102	M	5.6	5.8	5.8	6.1	5.9	5.8	5.8
		SD	2.2	2.0	2.1	2.3	1.9	1.7	1.9

* p < 0.05

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TABLE VI

REGRESSION COEFFICIENTS FOR THE PATH TO SA (η_4) GRADE 5 IN 1974

	VOC β	VOC R^2	VOC MR	BEC β	BEC R^2	BEC MR	WSS β	WSS R^2	WSS MR	LIC β	LIC R^2	LIC MR
PL	-.76	.07	.27	-.11	.28	.53	-.06	.05	.23	-.38	.25	.50
TPT	2.51	.18	.43	1.45	.38	.62	.52	.11	.33	1.79	.81	.90
TPP	-1.59	.84	.92*	-1.14	.95	.96**	-.95	.88	.94**	-.55	.86	.93**
IQ	-.66	.85	.92*	-.02	.95	.96**	.62	.93	.97**	-.37	.86	.93*
SEX	-.31	.93	.97*	-.07	.95	.98**	-.04	.93	.97*	-.23	.91	.95*

	SP β	SP R^2	SP MR	LA β	LA R^2	LA MR	MCON β	MCON R^2	MCON MR	MCOM β	MCOM R^2	MCOM MR
PL	.44	.03	.18	-.91	.05	.23	-.06	.24	.49	-.37	.17	.41
TPT	-.90	.05	.22	2.51	.57	.75	.98	.60	.77	1.59	.61	.78*
TPP	-.34	.63	.77	-1.02	.74	.86	-.56	.82	.91*	-.66	.76	.87*
IQ	1.33	.73	.85	-.69	.87	.93*	.26	.85	.92*	-.16	.76	.87
SEX	.28	.79	.89	.29	.94	.97*	-.16	.87	.93*	-.06	.76	.7

	MAPP β	MAPP R^2	MAPP MR	SOCS β	SOCS R^2	SOCS MR	SCI β	SCI R^2	SCI MR	TR β	TR R^2	TR MR
PL	-.21	.11	.34	-.77	.18	.42	-.71	.11	.34	-.15	.16	.40
TPT	1.04	.37	.60	2.72	.61	.78*	2.22	.77	.87**	1.25	.23	.48
TPP	-.76	.74	.86*	-1.11	.78	.88*	-.81	.90	.95**	-1.18	.93	.96**
IQ	.26	.81	.90	-.88	.81	.90*	-.47	.92	.96**	.12	.94	.97**
SEX	-.41	.95	.97*	-.35	.91	.95*	-.08	.92	.96*	-.11	.95	.97*

	TM β	TM R^2	TM MR	TA β	TA R^2	TA MR	TB β	TB R^2	TB MR
PL	-.24	.20	.44	-.69	.17	.41	-.39	.16	.41
TPT	1.36	.54	.74	2.55	.50	.70	1.64	.54	.74
TPP	-.79	.86	.93**	-1.25	.82	.90*	-.97	.97	.98**
IQ	.08	.87	.94*	-.71	.83	.91*			
SEX	-.25	.93	.96*	-.33	.92	.96*			

* $p < 0.05$
** $p < 0.01$

coefficients varied both in magnitude and direction.

The following solutions show the fitting of the data to the regression equations for fifth-grade students. The effect coefficient for the residuals equals $\sqrt{1-R^2}$. For the regressions, $\eta = 10$.

$$TMC_5 = \eta_1 + .43\xi_a + .90R_v$$

$$TPT_5 = \eta_2 + .54\eta_1 + .43\xi_a + .28\xi_b + .55R_w$$

$$TPP_5 = \eta_3 + .30\xi_a - .35\xi_d + .86R_x$$

$$SA_{VOC_5} = \eta_4 - 1.59\eta_3 + 2.51\eta_2 - .76\xi_a - .31\xi_e - .66\xi_f + .26R_y$$

$$SA_{REC_5} = \eta_4 - 1.14\eta_3 + 1.45\eta_2 - .11\xi_a - .07\xi_e - .02\xi_f + .21R_y$$

$$SA_{WSS_5} = \eta_4 - .95\eta_3 + .52\eta_2 - .06\xi_a - .04\xi_e + .62\xi_f + .26R_y$$

$$SA_{LIC_5} = \eta_4 - .55\eta_3 + 1.80\eta_2 - .38\xi_a - .23\xi_e - .37\xi_f + .30R_y$$

$$SA_{SP_5} = \eta_4 - .34\eta_3 - .90\eta_2 + .44\xi_a + .28\xi_e + 1.34\xi_f + .46R_y$$

$$SA_{LA_5} = \eta_4 - 1.02\eta_3 + 2.52\eta_2 - .91\xi_a + .29\xi_e - .69\xi_f + .24R_y$$

$$SA_{MCON_5} = \eta_4 - .56\eta_3 + .98\eta_2 - .06\xi_a - .16\xi_e + .26\xi_f + .36R_y$$

$$SA_{MCOM_5} = \eta_4 - .66\eta_3 + 1.59\eta_2 - .37\xi_a - .06\xi_e - .16\xi_f + .49R_y$$

$$SA_{MAPP_5} = \eta_4 - .76\eta_3 + 1.05\eta_2 - .21\xi_a - .41\xi_e + .26\xi_f + .22R_y$$

$$SA_{SOCS_5} = \eta_4 - 1.12\eta_3 + 2.72\eta_2 - .77\xi_a - .35\xi_e - .88\xi_f + .30R_y$$

$$SA_{SCI_5} = \eta_4 - .81\eta_3 + 2.22\eta_2 - .71\xi_a - .08\xi_e - .47\xi_f + .28R_y$$

$$SA_{TR_5} = \eta_4 - 1.18\eta_3 + 1.25\eta_2 - .15\xi_a - .11\xi_e + .12\xi_f + .23R_y$$

$$SA_{TM_5} = \eta_4 - .79\eta_3 + 1.36\eta_2 - .24\xi_a - .25\xi_e + .08\xi_f + .27R_y$$

$$SA_{TA_5} = \eta_4 - 1.25\eta_3 + 2.55\eta_2 - .69\xi_a - .33\xi_e - .71\xi_f + .28R_y$$

$$SA_{TB_5} = \eta_4 - .97\eta_3 + 1.64\eta_2 - .39\xi_a \qquad\qquad + .19R_y$$

From the foregoing equations for the fifth grade, several relationships among the effects can be noted. The effect of TPP upon student achievement is high in magnitude and negative in direction; whereas, the reverse is true for TPT. Effect coefficients for PL vary from low to high, and they are, with one exception, negative. Those for student sex are low and mostly negative. The effect coefficients for student IQ are mixed in direction and varied in magnitude. This is an unusual result because in all other grades the effect coefficient for IQ was positive and high in magnitude. The residuals for grade five are low.

To illustrate how these data fit into the causal model, Figure 2 is included. Figure 2 graphically represents the flow of effects upon student achievement for the subtest, Word Study Skills, for grade five. TGR was eliminated for grade five in the regression analysis program; hence, it does not appear in Figure 2. However, the basic causal model generally held in other grades. Of particular interest to us were the persistent counter-productive effects of TPT and TPP upon student achievement. We believe this to be related to communication problems within the curriculum system.
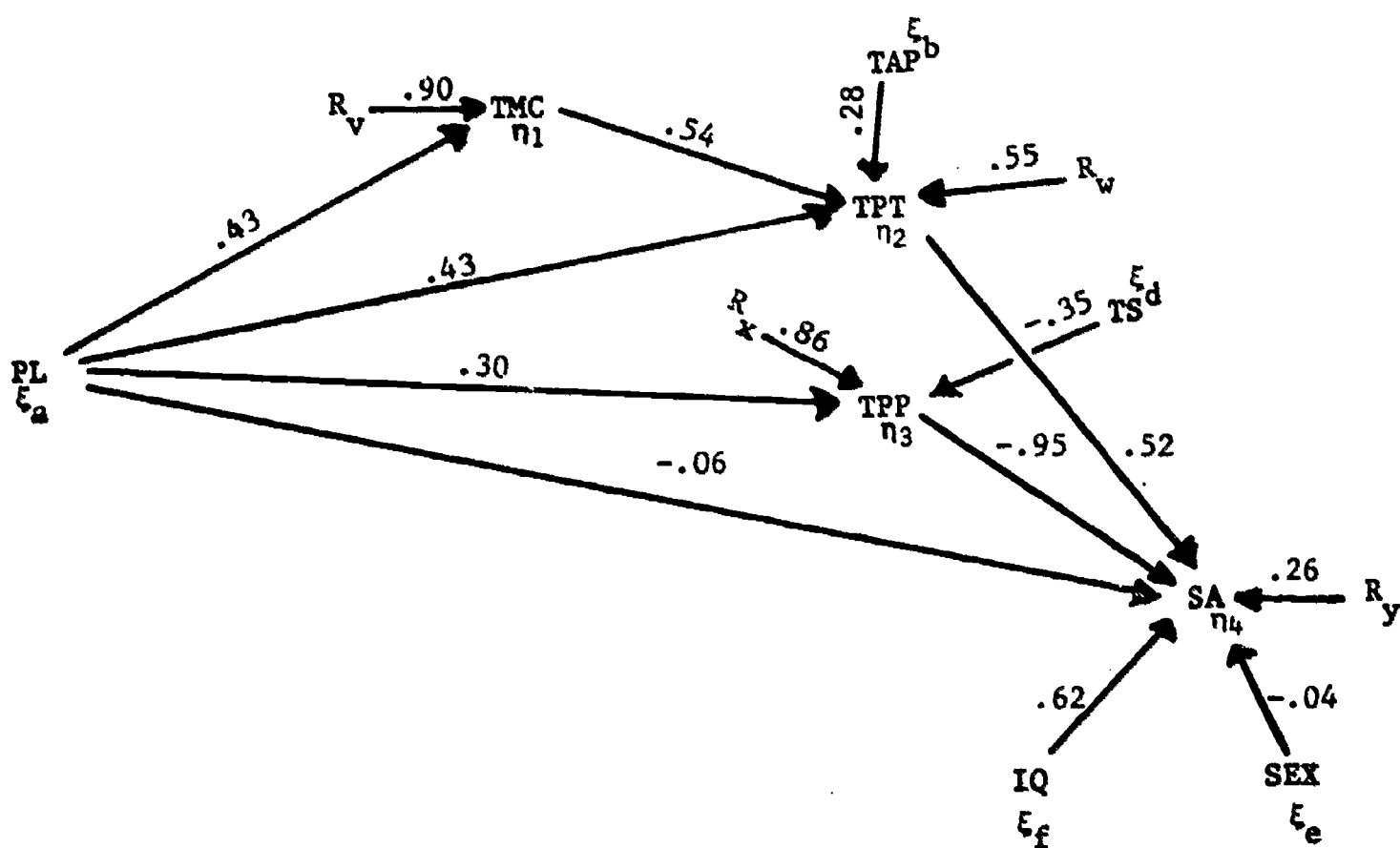
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      TS = Teacher Sex
      SA = Student Achievement
     SEX = Student Sex
      IQ = Student IQ
     R_i = Residuals

Figure 2.   Path diagram for grade 5 in Word Study Skills 1974.

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The results of all measures were tabulated in the form of rankings by school. These results are shown in Table VII. The table is self-explanatory and needs no explication here other than to state that blanks occur for schools that do not contain certain grades. Grade seven was excluded from most analyses because of it being a single school with departmental organization.

We are not satisfied with the degree to which all variances within the study have been accounted for. For next year, we hope to add to the model a measure of organizational climate and a measure of student motivation. These additions may stabilize the consistency of more of the effect coefficients and reduce the amount of residual variance.

Despite our dissatisfaction with certain elements of our design, we are convinced that the theoretical framework in which this design has been cast is a useful one. We hope that the discovery of new variables that significantly affect schooling will guide us in better representing the real world of schooling. From the work thus far, we are encouraged that the presence of a curriculum engineering system can be related to teacher behaviors and student achievement. There seems to be little doubt as to the critical character of principal leadership upon the variates studied. From a very practical point of view, we have created a substantial amount of data that is useful to the source school district for diagnosis and treatment in the form of inservice education of teachers and persons occupying leadership positions.

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TABLE VII

RANKS FOR PRINCIPAL, TEACHER, AND STUDENT MEASURES BY SCHOOL
BLUE ISLAND 1974

GRADE 1

SCHOOL	IQ	VOC	REA	REB	REC	WSS	LIC	MCON	MCOM	TR	TM	TA	TB
041	3	1	2	2	2	4	1	1	6	3	3	1	1
042	1	2	1	1	1	6	–	2	1	6	1	3	2
043	6	6	5	5	6	3	6	5	7	1	6	2	2
051	–	–	–	–	–	–	–	–	–	–	–	–	–
052	7	7	7	7	7	8	7	7	7	7	7	7	7
111	4	4	4	4	4	2	4	4	3	2	2	5	6
121	8	5	5	6	5	5	6	8	4	8	8	8	8
122	6	8	4	8	8	7	8	6	8	5	5	6	–
141	5	4	5	6	5	2	4	4	3	4	4	4	4
142	–	–	–	–	–	–	–	–	–	–	–	–	–

ALL GRADES / GRADE 2

SCHOOL	PL	TMC	TPT	TPP	IQ	VOC	REA	REB	REC	WSS	LIC	SP	LA	MCON	MCOM	MAPP	SOCS	SCI	TR	TM	TA	TB
041	2	5	2	8	4	3	2	6	3	6	6	2		1	1	4	3	2	6	1	5	2
042	2	8	8	6	2	5	3	2	2	2	3	3		3	2	3	5	3	2	2	6	3
043	2	10	9	10	1	1	1	1	1	1	1	1		1	1	1	4	1	1	5	1	1
051	4	1	3	3	7	7	4	4	4	5	5	6		2	5	5	6	6	5	6	7	6
052	4	2	1	1	5	2	1	1	1	1	2	1		2	2	2	7	7	1	5	3	1
111	1	6	10	2	2	3	7	7	7	7	7	7		8	7	7	8	8	7	8	7	7
121	3	4	7	5	1	5	8	8	8	8	8	8		7	8	8	–	–	8	–	8	8
122	3	3	4	4	5	4	5	5	5	4	4	4		5	4	5	6	5	3	4	4	5
141	5	7	6	7	6	6	6	3	5	3	1	5		4	3	1	2	5	8	7	2	8
142	5	9	5	9	–	–	–	–	–	–	–	–		–	–	–	–	–	–	–	–	–

TABLE VII (CONT.)

RANKS FOR PRINCIPAL, TEACHER, AND STUDENT MEASURES BY SCHOOL
BLUE ISLAND 1974

GRADE 3

SCHOOL	IQ	VOC	REA	REB	REC	WSS	LIC	SP	LA	MCON	MCOM	MAPP	SOCS	SCI	TR	TM	TA	TB
041	2	1			1	2	1	2	3	2	4	3	1	1	2	4	1	1
042	5	4			2	4	4	3	2	5	2	1	3	2	3	2	4	3
043	1	3			3	1	2	1	4	1	3	6	4	3	1	1	2	4
051	3	7			4	3	5	5	8	3	1	2	2	4	4	3	5	2
052	8	8			8	7	8	8	8	8	7	7	6	7	7	8	8	8
111																		
121	7	5			7	6	7	7	7	4	8	8	8	8	8	7	7	7
122	6	6			6	8	6	6	6	7	5	5	7	6	6	6	6	6
141	4	2			5	5	3	4	5	6	6	4	5	5	5	5	3	5
142																		

GRADE 4

SCHOOL	IQ	VOC	REA	REB	REC	WSS	LIC	SP	LA	MCON	MCOM	MAPP	SOCS	SCI	TR	TM	TA	TB
041	1	3			3	3	3	3	3	2	1	2	4	3	3	2	3	3
042																		
043																		
051	4	2			1	1	1	1	1	1	2	1	1	2	1	1	1	1
052	5	4			5	5	5	5	5	4	3	3	2	5	5	4	4	5
111																		
121	2	1			2	2	2	2	2	3	4	4	3	1	2	3	2	2
122																		
141	3	5			4	4	4	4	4	5	5	5	5	4	4	5	5	4
142																		

TABLE VII (CONT.)

RANKS FOR PRINCIPAL, TEACHER, AND STUDENT MEASURES BY SCHOOL
BLUE ISLAND 1974

GRADE 5

SCHOOL	IQ	VOC	REA	REB	REC	WSS	LIC	SP	LA	MCON	MCOM	MAPP	SOCS	SCI	TR	TM	TA	TB
041	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1
042	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–
043	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–
051	4	2			2	2	5	2	4	3	4	3	5	4	2	4	4	4
052	3	6			6	6	6	6	6	6	6	4	6	6	6	6	6	6
111	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–
121	6	5			5	5	4	4	5	5	5	6	3	5	5	5	5	5
122	5	4			3	4	2	5	3	4	2	5	4	3	4	3	2	3
141	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–
142	2	3			4	3	3	3	2	2	3	2	2	2	3	2	3	2

GRADE 6

SCHOOL	IQ	VOC	REA	REB	REC	WSS	LIC	SP	LA	MCON	MCOM	MAPP	SOCS	SCI	TR	TM	TA	TB
041	1	1			2	1	1	1	1	1	1	1	1	1	1	1	1	1
042	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–
043	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–
051	4	4			5	6	4	2	4	6	4	5	4	5	5	5	4	5
052	6	2			1	3	2	5	5	2	3	2	2	2	2	2	2	3
111	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–
121	5	6			6	5	6	6	6	5	6	6	6	6	6	6	6	6
122	3	5			4	4	5	4	3	3	5	3	5	4	4	4	5	4
141	–	–			–	–	–	–	–	–	–	–	–	–	–	–	–	–
142	2	3			3	2	3	3	2	4	2	4	3	3	3	3	3	2

FOOTNOTES

[1] Ralph M. Stcgdill, "Manual for the Leader Behavior Description Questionnaire - Form XII: An Experimental Revision," (Columbus, Ohio: Bureau of Business Research, College of Commerce and Administration, The Ohio State University, 1963), p. 3.

[2] The distinction is made by Jae-On Kim and Frank J. Kahout in an unpublished paper, "Special Topics in General Linear Models" (University of Iowa, 1974), pp. 33-34.

[3] Michael J. Brennan, Preface to Econometrics (3d ed.; Cincinnati: South-Western Publishing Co., 1973), p. 212.

[4] Lawrence R. Klein, An Introduction to Econometrics (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962), p. 11.

[5] Michael Langenbach, "The Development of an Instrument to Measure Teachers' Attitudes Toward Curriculum Use and Planning" (unpublished doctoral dissertation, Northwestern University, 1969).

[6] George A. Beauchamp, The Teacher Self-Analysis Inventory, Northwestern University, 1970.

[7] George A. Beauchamp, Principals' Version of the Teacher Self-Analysis Inventory, Northwestern University, 1974.

[8] Leader Behavior Description Questionnaire - Form XII (Columbus: Bureau of Business Research, College of Commerce and Administration, The Ohio State University, 1962).