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In an attempt to provide information about the best strategies for effecting change, data were collected from 65 school board members, 16 superintendents, 16 principals, and 358 teachers in 16 southern California school districts. Two scales to measure the dependent variable, rate of adoption of educational innovations, were developed--one to measure district adoption and the other to measure individual teacher adoption. Other independent variables included cosmopoliteness (the use of outside sources for new educational ideas); opinion leadership on innovation; communication patterns; role responsibilities; and certain organizational variables such as expenditure, size, assessed valuation per ADA, and pupil-teacher ratio. The investigation sought to determine (1) which variables were related to innovation, (2) the number of levels at which a variable was significant, (3) the constellation of variables significant at each level, and (4) how strongly related to innovation were these groups of variables. The major result was that three variables--board conception of community attitude toward innovation, conflict over responsibility for determining educational policy, and expenditure--explain 77 percent of the variation in the rate of district adoption of innovation. (HW)

A SOCIAL SYSTEM ANALYSIS OF INNOVATION IN SIXTEEN SCHOOL DISTRICTS*

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A SOCIAL SYSTEM ANALYSIS OF INNOVATION IN SIXTEEN SCHOOL DISTRICTS

When the public schools are viewed over a long period of time, their outstanding characteristic appears to be stability rather than change. Yet schools do change. Since they are a creation of society, and exist to fulfill its needs, they must conform, ultimately, to public pressure. The current interest of educators in large scale educational reform is in no small measure attributable to this pressure.

To agree that we need to change, to innovate, is a very important first step. Too often, however, only minor adjustments are made in the school program. Frequently, the most popular educational fad is adopted as this conforms to the public's idea of what an innovative school should be doing. Often these fads are adopted because educators have no well planned and defensible program for introducing innovations.

If educators do not make the right decisions in attempting to make their schools more adaptable, it is probably because they lack information about the best strategies for effecting change.

This research was undertaken with the hope that we might provide some of this needed information. We were seeking to answer the question - what combination of variables seem to facilitate the adoption of educational innovations?

We believed that the school-community should be viewed as a social system, therefore data were gathered from sixty-five board members, sixteen superintendents, sixteen principals, and 358 teachers in sixteen southern California school districts.

Two scales to measure the dependent variable, rate of adoption of educational innovations, were developed for this study; the first to measure district adoption, the second to measure individual teacher adoption.

Two concepts, social system norms and reference group orientation (cosmopolitanism) were central to this study. Some of the other independent variables included were, cosmopoliteness (the use of outside sources for new educational ideas), opinion leadership on innovation, communication patterns, role responsibilities, and certain organizational variables, such as expenditure, size, assessed valuation per ADA, and pupil-teacher ratio.

In analyzing the data in this study, we were seeking the answer to several questions -- which variables were related to innovation? At how many levels was a variable significant? What constellation of variables was significant at each level, and finally -- how strongly were these groups of variables related to innovation, that is, how much variation did they explain?

The manner in which the data were analyzed might be more clearly understood by the following example. It was hypothesized that the age of individuals in the school system would be negatively related to innovation. (A separate hypothesis was advanced for each level of the system.) Age was one of the independent variables to be considered with the group of school board member variables, with superintendent variables, with principal variables, and with teacher variables. Therefore, the question was -- is age significantly related to innovation for all these groups, for some of these groups, or for none of them?

To answer these questions it was necessary to examine the results of multiple regression analysis in two ways, first in a horizontal manner, looking across the levels of the school system, considering one variable at each level, and second, in a vertical manner, considering all the variables significant at each level, taking one level at a time.

Because of the limitations of time, the discussion of the findings in this study will deal only with those relationships found to be significant. However, in the tables that have been provided, the hypothesized relationships, and the findings for all variables are shown. The first three tables show the findings as we look across the levels of the school system.

By examination of Table I, it may be seen that perception of innovativeness was significant for both board members and teachers. The other variables in this table were significant at only one level. Cosmopolitanism and cosmopoliteness were significantly related to the adoption rate of teachers, while perception of the norms on innovation and aspiration level were significant for board members.

In Table 2, which refers to modes of behavior or attributes of individuals, none of the variables were significant at more than one level. Those significant for board members are associated with organizational membership, reading habits, and activities as a board member. Specifically, these variables were: total organizational membership, as well as, membership in service organizations, number of non-local newspaper subscriptions, attendance at non-local professional meetings, and hours spent on board duties.

Organizational membership and reading habits were also significant for teachers, in addition to, recency of course work in graduate school, and majoring in education.

The variables listed in Table 3 are concerned with communication. All are significantly related to the adoption rate of innovation. For board members, these variables are frequency of communication with fellow board members, frequency of spirited arguments between board members, and frequency of unexpected items on the agenda. The only teacher variable on this table, opinion leadership, was significantly related to teacher adoption rate.

Let us turn now, from the examination of variables across levels of the system, and look at the relationships at each level. Table 4 shows the correlation of organizational and community variables to either district or mean teacher adoption rates. None of these were significant at the .01 level of confidence. At the board level, eleven variables (shown in Table 5) were significantly related to district innovation. They explained 57% of the variation in district adoption.

It should be noted that four of these, frequency of communication between board members and the superintendent; communication among board members; and board members' perception of community attitude toward innovation are interrelated, and explain twenty-three per cent of the variation in district innovation.

The output from multiple regression for teacher innovativeness may be seen in Table 6. A total of sixteen variables entered the regression within the .05 confidence level, explaining 29% of the variation.

Of the variables in this table, nine are interrelated, yet they have a relationship to innovation that is not common among them. These relationships may be organized under three categories -- awareness - status and information gathering.

In Table 7, the variables are grouped in this manner and from them a profile of the innovative teacher may be drawn.

The results of this study indicate that the innovative teacher seeks information from many sources for new ideas about teaching. However, she relies on outside sources more than local ones. She has an accurate perception of herself as an innovator. It is likely that she is either a cosmopolitan or an opinion leader. She is recognized by her fellow teachers as a person who is knowledgable about teaching, and they look to her for new ideas. Although the innovative teacher does not usually borrow ideas from teachers in her building or district, she does tend to utilize her students in obtaining feedback.

We have now looked across the levels of the school system, and at groups of variables at each level. As the final step in analysis, we combined the variables at two of these levels. This was done to account for the interaction of board member, superintendent, and organizational variables. The results of this combined analysis may be seen in Table 9.

Perception of innovativeness by board members was the strongest predictor of district innovation (multiple R of .72, explaining 52% of the variation). It is important to note that the correlation between board member perception and district innovation was negative. In order to determine which boards had the greatest misperception, further analysis of this variable was made. These data are shown on Table 10. Examination of the data contained in this table clearly shows that boards in the least innovative districts perceived their districts to be <u>above average</u> in innovation!

The second variable to enter the regression equation was conflict between the board and the superintendent over the degree of responsibility for determining educational policy. This variable accounted for 25% of the variation in district adoption rate. Contrary to our expectations, this conflict variable was <u>positively</u> related to district innovation.

The third variable to enter this equation was expenditure. It explained an additional 20% of the variation not explained by the other two variables. In summary, the three variables, board perception of community attitude toward innovation, conflict over responsibility for determining educational policy, and expenditure, explain 77% of the variation in the rate of district adoption of innovation.

This research offers tentative support for the idea that the characteristics of superintendents are weakly related to innovation, that it is the behavior of superintendents that needs to be studied. Specifically, the interpersonal relationships and communication linkages he establishes, both with the school board, and his staff. There are several findings in this study that may be cited in support of this idea.

One of these is conflict on the degree of responsibility for determining educational policy, which was positively related to innovation. The frequency communication between the board and superintendent was also related to innovation. This suggests that as board members exhibit more interest and concern with curriculum matters, they are more likely to converse with, and to be in conflict with, the superintendent. The evidence suggests that this conflict is associated with HIGHER rather than lower rates of adoption.

Further evidence points to the importance of superintendent - board interaction. It may be remembered that school board members in less innovative districts perceived their districts to be above average in innovation. However, more frequent conversations with the superintendent are associated with a correct perception of innovation by board members.

This suggests that the superintendent can build support for innovation by a continuing effort to inform the board of the relative innovativeness of their district. In this study board members generally perceived norms on innovation in the community to be positive and there was a tendency to conform to these norms, or at least to believe that they were conforming.

We have been speaking of the results of weak communication links between the superintendent and the board. There is also evidence in this study that the lines of communication between the district office and the staff may be maintained in an erratic fashion. In this study there was NO CORRELATION between the rate of adoption of innovations at the district level and the rate of adoption of innovations by teachers.

Since this research was not designed as a diffusion study, we can offer no data to help explain this finding. It does seem, however, that in the district with a well planned and coordinated curriculum program there should be a correlation between the adoption of district-wide innovations and classroom innovations.

TABLE 1

THE HYPOTHESIZED AND EMPIRICAL RELATIONSHIP BETWEEN ADOPTION OF INNOVATIONS AND INDIVIDUAL VARIABLES CLASSIFIED AS (ATTITUDES, PERCEPTIONS, AND ORIENTATIONS)

Variables[1]	LEVEL OF MEASUREMENT							
	School Board		Superintendent		Principal		Teacher	
	Hypothesis[2]	Finding[3]	Hypothesis	Finding	Hypothesis	Finding	Hypothesis	Finding
Cosmopolitanism	+	o	+	o	+	o	+	+
Perception of norms on innovation	+	+	+	o	+	o	+	o
Perception of Innovativeness	+	-	+	o	+	o	+	+
ATTITUDE TOWARD INNOVATION								
Innovation important for quality	+	o	+	o	+	o	NT	
Aspiration level	o	-		NT		NT		NT
Important to hire innovators	o	o	o	o	o	o		NT
District rewards for innovators		NT		NT	o	o		NT
USEFULNESS OF DIFFERENT SOURCES OF INFORMATION								
OUTSIDE SOURCES (Cosmopoliteness)								
Graduate courses in education		NT	+	o	+	o	+	-
Graduate courses not in education		NT	+	o	+	o	+	o
National professional journals		NT	+	o	+	o	+	+
Non-local professional meetings		NT	+	o	+	o	+	o
News media, TV, books, newspapers, magazines other than professional journals		NT	+	o	+	o	+	+

TABLE 1 (Continued)

Variables[1]	LEVEL OF MEASUREMENT							
	School Board		Superintendent		Principal		Teacher	
	Hypothesis[2]	Finding[3]	Hypothesis	Finding	Hypothesis	Finding	Hypothesis	Finding
Non-local superintendents		NT	+	o	+	o		NT
Non-local principals, supervisors, consultants, or teachers		NT	+	o	+	o	+	+
INSIDE SOURCES								
Local professional journals		NT	o	o	o	o		o
Local in-service workshop		NT		NT		NT		+
Fellow teachers in building or district		NT		NT		NT		o
Local administrators		NT	o	o	o	o	o	o
Curriculum consultants or supervisors								

[1] Independent variables compared to district innovativeness score for board members and superintendents, to average teacher score for principals, and to individual teacher's score for teachers.

[2] A + indicates a positive relationship was hypothesized, a -, indicates a negative relationship way hypothesized, and a o, that no relationship was hypothesized.

[3] A +, -, or o, in this column indicates the finding with respect to each variable, positive, negative, or no relationship to the dependent variable.

NT - Not Tested

TABLE 2

THE HYPOTHESIZED AND EMPIRICAL RELATIONSHIPS BETWEEN ADOPTION OF INNOVATION AND INDIVIDUAL VARIABLES CLASSIFIED AS MODES OF BEHAVIOR AND ATTRIBUTES

Variables[1]	LEVEL OF MEASUREMENT							
	School Board		Superintendent		Principal		Teacher	
	Hypothesis[2]	Finding[3]	Hypothesis	Finding	Hypothesis	Finding	Hypothesis	Finding
MOBILITY								
Length of residency	-	o	-	o	-	o	-	o
Move from outside	+	o	+	o	+	o	+	o
ORGANIZATIONAL MEMBERSHIP								
Professional organizations	+	o	+	o	+	o	+	o
Non-professional organizations		NT	o	o	o	o	o	+
Service organizations	o	+		NT		NT		NT
Total organizational membership	o	-	o	o	o	o		NT
READING HABITS								
Number of newspaper subscriptions local papers	o	o	o	o	o	o	o	-
Number of newspaper subscriptions non-local	+	+	+	o	+	o	+	o
Number of magazine subscriptions	+	o	+	o	+	o	+	o
Number of newsmagazine subscriptions	+	o	+	o	+	o	+	o

TABLE 2 (Continued)

	LEVEL OF MEASUREMENT							
	School Board		Superintendent		Principal		Teacher	
	Hypothesis[2]	Finding[3]	Hypothesis	Finding	Hypothesis	Finding	Hypothesis	Finding
EDUCATION								
Years of schooling	+	o	+	o	+	o	+	o
Recency of course work	o	o	o	o	o	o	o	+
Majored in education		NT	o	o	o	o	o	+
Majored in other		NT		NT		NT	o	o
Administrative experience		NT	-	o	-	o		NT
Teaching experience		NT		NT		NT	-	o
Age	-	o	-	o	-	o	-	o
Hours spent on board duties	o	+		NT		NT		NT
Attendance at professional meetings outside the district	+	-	+	o	+	o	+	o

[1]Independent variables compared to district innovativeness score for board members and superintendents, to average teacher score for principals, and to individual teacher's score for teachers.

[2]A + indicates a positive relationship was hypothesized, a -, indicates a negative relationship was hypothesized, and a o, that no relationship was hypothesized.

[3]A +, -, or o, in this column indicates the finding with respect to each variable, positive, negative, or no relationship to the dependent variable.

NT - Not Tested

TABLE 3

THE HYPOTHESIZED AND EMPIRICAL RELATIONSHIPS BETWEEN ADOPTION OF INNOVATIONS AND MEASURES OF INTERPERSONAL RELATIONS WITH THE SYSTEM

	LEVEL OF MEASUREMENT							
	School Board		Superintendent		Principal		Teacher	
VARIABLES[1]	Hypothesis[2]	Finding[3]	Hypothesis	Finding	Hypothesis	Finding	Hypothesis	Finding
Frequency of communication with superintendent	+	+		NT		NT		NT
Frequency of communication with fellow board members	+	+		NT		NT		NT
Frequency of "spirited" agrument between board members	-	+		NT		NT		NT
Frequency of unexpected items on agenda	-	+		NT		NT		NT
Opinion leadership in curriculum ideas		NT		NT		NT	+	+

[1]Independent variables compared to district innovativeness score for board members and superintendents, to average teacher score for principals, and to individual teacher's score for teachers.

[2]A + indicates a positive relationship was hypothesized, a - indicates that a negative relationship was hypothesized, and a o that no relationship was hypothesized.

[3]A +, -, or o in this column indicates the finding with respect to each variable, positive, negative, or no relationship to the dependent variable.

NT - Not Tested.

TABLE 4

CORRELATIONS BETWEEN SELECTED ORGANIZATIONAL AND COMMUNITY VARIABLES AND INNOVATION*

	Ages of Homes†	Social Rank†	Pupil Teacher Ratio	Percent Faculty Men	Size of District	Size of School†	Teacher Salary	Expenditure per Pupil	Assessed Valuation per Pupil
DISTRICT INNOVATION			.02	.04	.38		.52	.56	.31
MEAN TEACHER INNOVATION	.00	-.15	.01	.13	.27	.33	-.16	-.21	-.42

*.62 significant at the .01 level of confidence.

†Not measured at the district level.

TABLE 5

MULTIPLE REGRESSION ANALYSIS OF SCHOOL VARIABLES WITH INNOVATION AS THE DEPENDENT VARIABLE

Order of Entry	Direction of Correlation	Variables	Multiple R	Multiple R^2	F Ratio	F value needed for significance at .05	F value for entering variable
		INNOVATION					
1	+	Frequency of communication with fellow board members	.34	.11	8.07	4.08	8.07
2	+	Membership in service organizations	.43	.19	7.14	3.23	5.63
3	-	Perception of community attitude toward adoption of innovations	.50	.25	6.88	2.90	5.36
4	+	Frequency of communication with superintendents	.56	.31	6.72	2.65	4.90
5	-	Attendance at non-local professional meetings	.61	.37	6.96	2.50	5.79
6	+	Subscriptions to non-local newspapers	.65	.42	7.02	2.40	4.99
7	-	Aspiration level	.68	.46	6.96	2.33	4.23
8	+	Frequency of unexpected items on agenda	.70	.49	6.91	2.27	4.02
9	+	Degree of argumentation at board meetings	.72	.52	6.65	2.22	2.76
10	-	Organizational membership	.74	.55	6.53	2.19	3.14
11	+	Hours spent on board duties	.75	.57	6.36	2.17	2.67

TABLE 6

MULTIPLE REGRESSION ANALYSIS OF TEACHER VARIABLES WITH INDIVIDUAL TEACHER INNOVATIVENESS AS DEPENDENT VARIABLE

Order of Entry	Direction of Correlation	Variables	Multiple R	Multiple R^2	F Ratio	F value needed for significance at .05	F value for entering variable
1	+	Perception of innovation	.31	.09	36.54	3.92	36.54
2	+	Opinion leadership on innovation	.36	.13	26.35	3.07	14.75
3	+	Non-local educators useful as source for educational ideas	.41	.17	23.54	2.68	15.72
4	-	Grade level taught	.43	.19	20.16	2.45	8.52
5	-	Other teachers the single most important source for educational ideas	.46	.21	18.42	2.29	9.53
6	-	Graduate level courses in education useful as a source for educational ideas	.47	.22	16.64	2.08	6.37
7	+	National professional journals useful as a source for educational ideas	.48	.23	15.31	2.02	5.88
8	+	Cosmopolitanism	.49	.24	14.16	-	4.90
9	+	Local in-service workshops useful as a source for educational ideas	.50	.25	13.19	1.96	4.39
10	+	Single most important source for educational ideas - the children	.51	.26	12.23		2.87
11	+	Membership in non-professional organizations	.52	.27	11.36		2.28
12	-	Local newspaper subscriptions	.52	.27	10.67		2.43
13	+	Recency of education	.52	.27	10.01		1.95
14	-	Recent course work related to education	.53	.28	9.45		1.79
15	+	Education a major in college	.53	.28	8.97		1.82
16	+	New educational ideas	.53	.29	8.54	1.59	1.82

TABLE 7

TEACHER VARIABLES CORRELATED WITH INNOVATION

Direction of Correlation	Hypothesized Correlation	
		AWARENESS
+	+	Perception of Innovativeness
+	+	Cosmopolitanism
		STATUS
+	+	Opinion leadership on innovation
		INFORMATION GATHERING
+	+	Non-local educators useful as a source of educational ideas
+	+	National professional journals useful as a source of educational ideas
+	o	Local in-service workshops useful as a source of educational ideas
-	+	Graduate level courses useful as a source of educational ideas
-	o	The single most important source - other teachers
+	o	The single most important source - the children

TABLE 8

MULTIPLE REGRESSION ANALYSIS OF ORGANIZATIONAL AND SUPERINTENDENT VARIABLES WITH INNOVATION AS THE DEPENDENT VARIABLE

Order of Entry	Direction of Correlation	Variable	Multiple R	Multiple R^2	F Ratio	F Needed for Significance at .01 Level
1	+	Expenditure per pupil	.56	.31	6.42*	8.86
2	+	Conflict on educational policy	.74	.55	8.02	6.70
3	-	Non-local professional meetings useful	.82	.67	8.14	5.95
4	+	Perception of innovation of district	.88	.78	5.28*	5.67

*Not significant at .01.

TABLE 9

MULTIPLE REGRESSION ANALYSIS OF SYSTEM VARIABLES WITH DISTRICT INNOVATION AS THE DEPENDENT VARIABLE

Variables in the Equation	F Ratio	F needed for Significance	Multiple R	R^2	Variables not in the Equation	Partial Correlation
STEP I						
Board Perception of Attitude Toward Innovation	14.83	8.86	.72	.51	National journals useful (superintendent)	.05
					Superintendent perception of innovativeness	.36
					Expenditure	.36
					Conflict on budgetary policy	.36
					Conflict on educational policy	.47
					Superintendent-board communication	.44
STEP II						
Board Perception of Attitude Toward Innovation	10.63	6.70	.79	.61	National journals useful (superintendent)	.26
					Superintendent perception of innovativeness	.27
Conflict on Educational Policy					Expenditure	.64
					Conflict on budget	.09
					Superintendent-board communication	.57
STEP III						
Board Perception of Attitude Toward Innovation	13.89	5.95	.88	.77	National journals useful (superintendent)	.17
					Superintendent perception of innovation	.35
Conflict on Educational Policy					Conflict on budget	.08
					Superintendent-board communication	.26
Expenditure						

TABLE 10

A COMPARISON OF THE INNOVATIVENESS OF SCHOOL DISTRICTS TO THE PERCEPTION OF INNOVATIVENESS BY THE SCHOOL BOARDS OF THESE DISTRICTS

	District Rank	Innovative Score	Perception Score[1]	Error[2]	Average Error
ABOVE AVERAGE	1	493	38 Average	1	1.0
	2	483	30 Below Average	2	
	3	459	40 Above Average	0	
	4	451	32 Below Average	2	
	5	445	35 Average	1	
	6	409	40 Above Average	0	
AVERAGE	7	400	32 Below Average	1	.3
	8	400	35 Average	0	
	9	370	36 Average	0	
BELOW AVERAGE	10	354	40 Above Average	2	1.9
	11	354	40 Above Average	2	
	12	345	37 Average	1	
	13	340	48 Above Average	2	
	14	303	45 Above Average	2	
	15	290	46 Above Average	2	
	16	268	45 Above Average	2	

[1] 39 - 48 Above Average Perception, 33 - 37 Average Perception, 32 or less Below Average Perception.

[2] With one point of difference between each level a maximum error score of 2 is possible in substracting rank on perception from rank on innovation.