DOCUMENT RESUME

ED 455 303 TM 033 162

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TITLE Factors for Teacher Response Rate in a Nationwide Middle Grades Survey.

PUB DATE 1999-04-00

NOTE 13p.; Paper presented at the Annual Meeting of the American Educational Research Association (Montreal, Quebec, Canada, April 19-23, 1999).

PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.

DESCRIPTORS Algorithms; *Classification; *Middle School Teachers; Middle Schools; Research Methodology; *Response Rates (Questionnaires); School Demography; Teacher Attitudes; *Teacher Surveys

ABSTRACT

This study examined factors related to survey response rate, particularly for teachers who participated in a nationwide survey. Using a newly developed statistical technique, the classification tree algorithm (CART), this study classified the lowest response rate and highest response rate groups based on their school demographic characteristics. It also examined the differences in teacher satisfaction, decision making autonomy, and classroom climate between the two groups of responders. The teachers participated in the High Performance Learning Communities (HiPlaces) Assessment in 1996-1997, an assessment that was designed to examine the degree to which a broad range of recommendations for effective school reform were implemented in a school and the impact of these reform efforts. In 1996-1997, 207 schools in 15 states participated in HiPlaces, and response data were available for 142 schools. The percentage of students eligible for free lunch appeared to be the most important factor among demographic variables in classifying schools with the lowest and highest response rates. In general, schools with the higher percentage of free lunch students have lower staff response rate, but the relationship is not linear. The CART approach allowed the examination of the nonlinear relationship. School size and the year the school joined the initiative were also important factors explaining the highest and lowest response rate groups. Systematic differences regarding the quality of the school as a work place and as an educational setting were found between the highest and lowest response rate groups. Teachers in the highest response rate group were more satisfied with their work, had less role conflict, and reported fewer barriers to implementation of the reform practices. The cumulative pattern of these findings suggests that response rates from staff tend to be lower in the schools that are of particular concern to educational reform efforts. (Contains 2 tables, 1 chart, and 10 references.) (SLD)

Factors for Teacher Response Rate in A Nationwide Middle Grades Survey

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Paper Presented at the Annual meeting of the American Educational Research Association in Montreal, Canada, 1999

Introduction

In various social science research, survey methods provide critical information regarding perceptions and opinions of the public. In educational research, survey research methodology is most often used to measure attitudes, feelings of teachers and students, and their perception of the school environment (Gay & Airasian, 2000). The accuracy of any results from survey data depends on who provides an answer to a particular question. In every survey, there are some people who agreed to respond but who do not answer all the questions. Those people who self-selected themselves not to provide any data at all are of great concern in any survey data collection (Fowler, 1993; Teston, 1998). Non-responses have two negative consequences for the quality of the estimates derived from the survey. First, non-responses can reduce the number of cases for whom data are available. As a result, the survey results would have less explanatory power. In many surveys where the sample size is fixed, researchers try to sample additional cases to compensate for those lost. Second, a more critical concern of non-responses is that they bias the sample, and make the sample systematically different from the population from which it was drawn (Sudman & Bradburn, 1984). This bias cannot be corrected with additional cases. The response rate, that is, the percentage of a sample who actually provides information is a basic parameter for evaluating a data collection effort. Researchers have provided many ways to reduce non-responses, from monetary incentives (James & Bolstein, 1990) to telephone follow-ups (Dillman, 1978). The primary purpose of the present study is to examine the factors that are related to response rate, especially for the teachers who participated in a nationwide survey. Using a newly developed statistical technique (classification tree algorithm), this study classifies the lowest response rate and highest response rate groups based on their school demographic characteristics. It also examines the differences in teacher satisfaction, decision making autonomy, and classroom climate between two groups as we believe these are the

factors that are related to overall feelings of well-being which is also related to higher response rate.

Data Collection

This study is particularly interested in response rate of teachers who participated in High Performance Learning Communities (HiPlaces) Assessment in 1996-97. Sampling bias is not a critical issue as this is not a nationally representative sample but a group of schools who participated in a nationwide educational reform initiative. HiPlaces Assessment is designed to examine the degree to which a broad range of recommendations for effective school reform are implemented in a school as well as to examine more fully their impact on students and staff. (Felner, Shim, Brand, Favazza, & Seitsinger, 2000). Nationally several reform initiatives employed the Hiplaces Assessment as an evaluation tool for their efforts. Among them, this study examines the response rate of teachers who participated in Middle Grade School State Policy Initiative (MGSSPI) sponsored by Carnegie Corporation of New York. A total of 207 schools in 15 states (Arkansas, California, Colorado, Connecticut, Delaware, Illinois, Maryland, Massachusetts, New Mexico, New York, North Dakota, Rhode Island, South Carolina, Texas, and Vermont) participated in HiPlaces Assessment in 1996-97. As many of the schools have participated in the survey for several years – the longest being started in 1993-94, there is a growing concern for lower response rate for the schools who have stayed in the initiative longer. In addition to Survey data, socio-demographic data from the National Public School Locator, a database maintained by the National Center for Education Statistics (NCES) are used in this study. The Locator carries school information and student and teacher data as of school year 1995-96, as reported to NCES by state education agency officials in each state.

Method

In this study, the primary method to classify the lowest response rate groups and highest

response rate groups is classification tree algorithm known as CART (classification and regression tree; Breiman et al. 1984). When the typically more stringent theoretical and distributional assumptions (multivariate normality, common covariance matrix) of traditional methods are met, the traditional methods such as discriminant analysis and cluster analysis may be preferable method of classification. But as an explanatory technique, or as a technique when the assumptions of traditional methods are not met (more than often in real data), classification trees are unsurpassed in its accuracy. Our data clearly shows the violation of multivariate normality and common covariance matrix assumption (homogeneity). Among three of the most popular classification tree algorithms, CHAID (chi-square automatic interaction detection), CART (classification and regression tree) and QUEST (quick, unbiased, efficient, statistical tree), we used CART. CART algorithm is a procedure for analyzing categorical (classification) or continuous (regression) data. CART is a non-parametric procedure using exhaustive searches and computer-intensive testing to select the optional tree. It is typically more accurate for classifying new data than conventional stepwise procedures like linear regression, discriminant analysis, and logistic regression (Breiman et al.: 1984). Previous research has shown that CART is often is often 10 to 15 percent more accurate than parametric models. The program includes reliable estimates of error rates and is robust to outliers. Moreover, this method allows us to examine the interactions among several variables used in classification.

The dependent (target) variable of this study is the response rate of teachers. The predictor variables are percentage of students who are eligible for free lunch, percentage of minority (non-white) students, school size (total number of students), urbanicity (rural, suburban, urban), network (year started participating in the initiative), building configuration (elementary and middle grades; middle grades only, middle and high school grades). These demographic variables were selected

based on previous research on survey non-responses (Monaco et. al.: 1997). The descriptive statistics of the sample is presented in Table 1.

We selected only the schools that have complete data on those variables. The resulting sample consists of 142 schools in 11 states. Average teacher response rate for those schools is 76.46% with the standard deviation of 18.7. After we classify the lowest and highest response rate groups based on those factors, we examined the survey responses to see whether there are differences between two groups in terms of their report of job satisfaction, decision making, work and classroom climate, and barriers to implementation using t-test. When teachers are more satisfied with their work and initiative, they would have more positive attitudes towards the survey.

Results

Among the predictor variables that were used in the model, percentage of students eligible for free lunch was selected for the first level tree (see Chart 1). School in which 26% or more of the students were eligible for free lunch showed significantly lower response rate than those with smaller proportion of free lunch students (73.81% compared to 83.49%). For the higher response rate groups, percent free lunch (10% or higher) and school size (with less than 480 students) significantly separate the response rate groups. That is, relatively small size schools with percentage of free lunch between 10% and 26% have the highest response rate among all schools (94.83% - 6 schools). On the other hand, for the lowest response rate groups, percent free lunch students and network appeared to be significant factors. As we hypothesized, schools which participated in the survey 2 years or more had significantly lower response rate than those participated in the survey for the first time in 1996-97. The lowest response rate group appears to be the schools that participated in the survey 2 years or more with percentage of free lunch students between 60% and 73% (58.67% - 15 schools).

In general, teachers at schools with higher percentage of students eligible for free lunch have

lower response rate. However, one of the interesting findings of this study is that this relationship is not always linear. Teachers at 8 schools with less than 10% free lunch students have lower response rate that those at 13 schools with more than 73% free lunch students (71.25% compared to 82.38%). Again, 13 schools with more than 73% free lunch students have higher staff response rate than 15 schools with percentage free lunch students between 60% and 73% (82.38% compared to 58.67%). School size was a significant factor for explaining higher response groups only and network was a significant factor for explaining lower response rate groups only.

In order to better understand the linkage between the demographic characteristics of the school and staff response rates, we next examined staff ratings of their work environment in the lowest and the highest response rate groups (see Table 2). Systematic differences were found between these groups in ratings of job satisfaction, work and classroom climate. Teachers in the highest response rate group have significantly higher ratings of their job satisfaction regarding students, parents, resources and overall although their satisfaction with the pay was lower than those in the lowest response rate group. They reported higher decision making autonomy, less role conflict, more positive and less disruptive behaviors of students in their classroom. They also rated their work climate more highly than those in the lowest response rate group. Finally, they reported less barriers to implementation of middle grades practice.

Conclusions and Implementation

In classifying schools with lowest and highest response rates, percentage of students eligible for free lunch appears to be the most important factor among other demographic variables. In general, schools with higher percentage of free lunch students have lower staff response rate. However, the relationship is not linear. CART allows us to examine the non-linear (interaction) relationship between response rate and socio-demographic characteristics of the schools. Among

other demographic variables, school size and year they joined the initiative were important factors for explaining the highest and the lowest response rate groups. Systematic differences regarding the quality of the school as a work place and as an educational setting were found between the highest and the lowest response rate groups. Teachers in the highest response rate group are more satisfied with their work, have less role conflict, and report less barriers to implementation of the reform practices.

The cumulative pattern of these findings suggest that response rates from staff tend to be lower in those schools that are of particular concern to educational reform efforts; i.e., high poverty and large schools. The relatively low response rates in those schools may reflect, in part, work conditions in which teachers are demoralized and dissatisfied. In order to increase response rates from staff in these conditions, it may be particularly important to cultivate conditions under which staff "buy in" to the survey process and the underlying school reform initiative under which the survey is conducted. In the absence of such buy-in, low response rate may yield less complete information on practices and attitudes in low-income school settings.

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Table 1. Descriptive Statistics of the Sample (N=142)

Variable Name	Variable Label	Mean	Standard Deviation	Minimum	Maximun
Sfrate	Staff response rate	76.46	18.70	27	100
Pfrlunch	Percent of students who are eligible for free/reduced lunch	40.46	21.62	0	91.63
Pminor	Percent of non-white students	43.15	30.73	0	98.81
Totstud	Total student enrollment	719.76	269.21	101	1431

Variable	Variable Label	Value	Value Label	Frequency	Percent
Location	Urbanicity	1	Rural	44	31.0
		2	Suburban	37	26.1
		3	Urban	61	43.0
Network	Year started participating in the initiative	4	1994	38	26.8
		5	1995	21	14.8
		6	1996	56	39.4
		7	1997	27	19.0
Building	Building configuration	1	Elementary and middle	5	3.5
		2	Middle only	130	91.5
		3	Middle and high	7	4.9

Chart 1

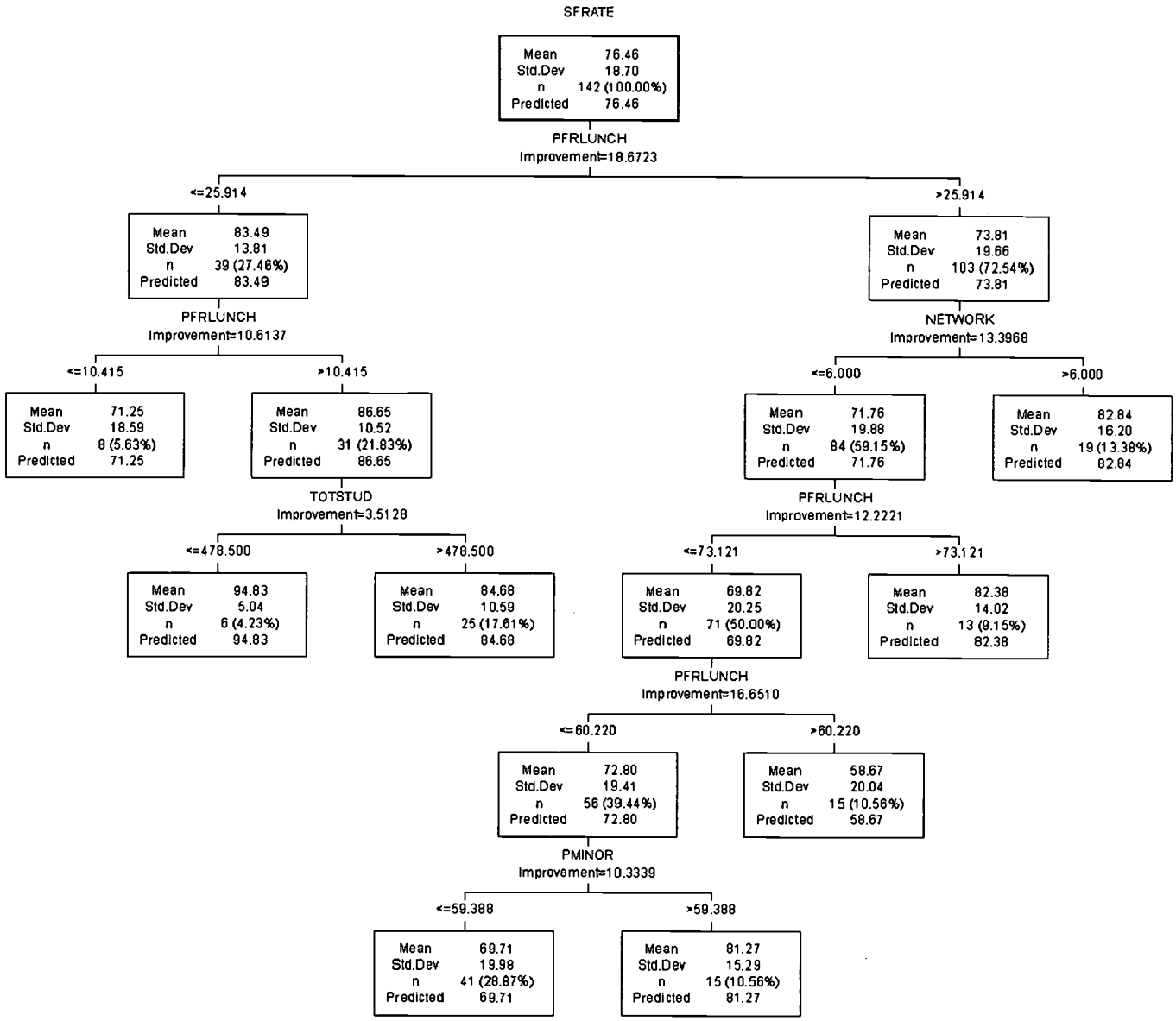
SFRATE
Mean 76.46
Std.Dev 18.70
n 142 (100.00%)
Predicted 76.46
PFRLUNCH
Improvement=18.6723
<=25.914
Mean 83.49
Std.Dev 13.81
n 39 (27.46%)
Predicted 83.49
>25.914
Mean 73.81
Std.Dev 19.66
n 103 (72.54%)
Predicted 73.81
PFRLUNCH
Improvement=10.6137
NETWORK
Improvement=13.3968
<=10.415
Mean 71.25
Std.Dev 18.59
n 8 (5.63%)
Predicted 71.25
>10.415
Mean 86.65
Std.Dev 10.52
n 31 (21.83%)
Predicted 86.65
<=6.000
Mean 71.76
Std.Dev 19.88
n 84 (59.15%)
Predicted 71.76
>6.000
Mean 82.84
Std.Dev 16.20
n 19 (13.38%)
Predicted 82.84
TOTSTUD
Improvement=3.5128
PFRLUNCH
Improvement=12.2221
<=478.500
Mean 94.83
Std.Dev 5.04
n 6 (4.23%)
Predicted 94.83
>478.500
Mean 84.68
Std.Dev 10.59
n 25 (17.61%)
Predicted 84.68
<=73.121
Mean 69.82
Std.Dev 20.25
n 71 (50.00%)
Predicted 69.82
>73.121
Mean 82.38
Std.Dev 14.02
n 13 (9.15%)
Predicted 82.38
PFRLUNCH
Improvement=16.6510
<=60.220
Mean 72.80
Std.Dev 19.41
n 56 (39.44%)
Predicted 72.80
>60.220
Mean 58.67
Std.Dev 20.04
n 15 (10.56%)
Predicted 58.67
PMINOR
Improvement=10.3339
<=59.388
Mean 69.71
Std.Dev 19.98
n 41 (28.87%)
Predicted 69.71
>59.388
Mean 81.27
Std.Dev 15.29
n 15 (10.56%)
Predicted 81.27

Table 2. Differences between schools with highest and lowest staff response rates (MANOVA)

Variables		Mean difference	F	p
Job satisfaction	Extrinsic rewards	-.268	9.302	.002
	Intrinsic rewards	.057	.027	.869
	Instructional resources	.431	16.806	.000
	Colleagues	.085	1.233	.268
	Student behavior	.293	9.674	.002
	Parent/community support	.806	76.801	.000
	Job evaluation feedback	.086	.296	.587
	Building administration	.095	.988	.321
	Inputs in decision making	.092	.562	.454
	Overall job satisfaction	.206	10.107	.002
Decision making	Participation in decision making	.214	4.602	.033
	Centralization in decision making	-.070	.864	.353
	Decision making authority regarding intra- team(grade) practices	.211	9.024	.003
	Decision making authority concerning school-wide policies and practices	.232	12.952	.000
	Overall team/grade decision making	.157	7.944	.005
Classroom climate	Positive peer interaction	.178	5.810	.016
	Disruptiveness	-.151	3.872	.049
	Positive interaction between teachers and students	.007	.010	.919
	Academic orientation	.230	7.368	.007
	Overall positive classroom climate	.147	6.952	.009
Barriers to implementation of reform initiatives	School and teacher readiness	-.289	15.238	.000
	Parental concerns	-.150	5.868	.016
	Lack of external formal organizational support	-.322	14.044	.000
	Overall barriers to implementation	-.235	17.442	.000

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