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AUTHOR Cicmanec, Karen Mauck; Johanson, George; Howley, Aimee
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ABSTRACT

Survey data gathered from 230 respondents from a random sample of 500 Ohio public school teachers explores the association between teachers' practice of assigning grades based on nonachievement grading factors and teachers' pupil control orientation (PCI). Responding high school mathematics teachers provided information that relates to the use of nonachievement grading practices and their orientation to PCI. Survey data, validated by interviews with teachers, suggest that the context of the classroom contributed more to shaping teachers' grading practices than the teachers' orientation to pupil control. Significant predictors are the proportion of at-risk students (ADC) in the teachers' school districts and the proportion of upper level mathematics courses (UL). When a variable representing teachers' mean class size (CS) replaces school size in the regression equation that provides for block entry of predictor variables (CS, UL, and ADC), nearly 20% of the variance in grading practices is explained. An exhibit contains the teacher survey. (Contains 12 tables and 29 references.) (Author/SLD)

HIGH SCHOOL MATHEMATICS TEACHERS:

GRADING PRACTICE AND PUPIL CONTROL IDEOLOGY

Karen Mauck Cicmanec, PhD

Towson University

George Johanson, EdD & Aimee Howley, PhD

Ohio University

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ABSTRACT

Survey data gathered from a random sample of 500 Ohio public school teachers explores the association between teachers' practice of assigning grades based on non-achievement grading factors and teachers' pupil control orientation (PCI). Responding high school mathematics teachers provide information that relates to the use of non-achievement grading practices and their orientation to pupil control (PCI). Survey data, validated by interviews with teachers, suggest that the context of the classroom contributes more to shaping teachers' grading practices than the teachers' orientation to pupil control. Significant predictors are the proportion of at-risk students (ADC) in the teachers' school district and the proportion of upper level mathematics courses (UL). When a variable representing teachers' mean class size (CS) replaces school size (SS) in the regression equation that provides for block entry of predictor variables (CS, UL, and ADC), nearly 20 percent of the variance in grading practices is explained.

INTRODUCTION

Although grading practices are often recognized as arbitrary measures of student learning (Cross & Frary, 1996; Mead, 1992; Olson, 1989), final grades continue to be relied upon to communicate important information about student progress and success (Cizek, 1996; Stiggins & Bridgeford, 1985). Because it is usually the teacher who assigns final grades to students, a study involving classroom teachers is central to any exploration of grading practices. The importance of the teachers' role is illustrated by evidence from research suggesting that from one-third to one-half of teachers' professional time is involved with activities related to assessment (Stiggins, 1992). Commentary and research reflect that grading is a complex and time-consuming task, a task that many teachers find unpleasant (Cunningham, 1986; Mead, 1992; Seeley, 1994; Terwilliger, 1989).

Research indicates that the methods teachers use to assign final grades are under their control (Agnew, 1985; US Department of Education, 1997) and the methods used to assign grades tend to be inconsistent regardless of the presence of school district grading policies (Cizek, Fitzgerald, & Rachor, 1995/1996). However, a small proportion of the substantial body of literature relating to various aspects of student assessment is empirical research focusing on grading practices of teachers (Brookhart, 1994; Senk, Beckmann, & Thompson, 1997; Stiggins, Frisbie, & Griswold, 1989). Of this research, there are few studies that focus upon a single discipline or grade level, such as the practices of high school mathematics teachers (Mead, 1992; Senk et al., 1997; Taylor, 1992). Instead, much of the research examines the practices of small samples of pre-service teachers or teachers representing many disciplines. As a result, research provides little to guide today's teachers in their choice of grading practices.

Outcome of existing research suggests that final grades may be used as tools to motivate, praise, reward, and punish students. There is evidence of the association between teachers' orientation toward classroom control—democratic versus authoritarian—and their methods of rewarding and punishing students (Forlow, 1992; Myers, 1990; O'Reily, 1988). Researchers have noted, for example, that democratic leaders who were responsible for youth programs used less praise and criticism than did autocratic leaders (White & Lippitt, 1960). Researchers have also demonstrated that teachers who were under pressure to get the best performance from their students were more critical and controlling than

teachers who were not exposed to the same pressures (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982). Although these studies, conducted outside of the context of the high school mathematics classroom, are insufficient to confirm an association between teachers' pupil control orientation and their grading practices, they provide an argument for linking these two constructs. This intersection—between teachers' pupil control orientation and teachers' grading practices—is the focus of the research summarized in this paper.

RESEARCH METHODOLOGY

A two-page survey, shown in Exhibit A, was designed to collect information about teachers' grading practices. The first section of the survey requested that respondents identify the grading factors that teachers use in final grade assignment. The grading factors selected for this survey were identified based on current practice and records of those factors that referenced in literature.

The second section of the survey consisted of an 11-item, 5-point Likert scale designed to measure orientation to pupil control. The 10-item version of the Pupil Control Ideology (PCI) scale was selected to measure teachers orientation to pupil control (Willower, Eidell, & Hoy, 1967/1973). The 11th item was added to the scale to determine whether the scale was measuring constructs in agreement with teachers' concerns about classroom management. (The 11-item scale is referenced throughout this paper as the PCI+.)

The selection of the 10-item PCI scale was based on numerous studies suggesting an association between teachers' orientation to classroom control and classroom practice. It was also selected based on indications that the reliability of the scale was adequate, 0.71 and 0.94 (Graham, Benson, & Henry, 1985). The PCI scale, used extensively over the past 30 years for the study of school climate and teacher ideology, continues to be used in contemporary research (Baum, 1997; Denig, 1996; Mankowsky, 1998; Tuggle, 1995).

The PCI identifies the extent to which teachers value compliance with authority. Respondents with a custodial orientation tend to 1) emphasize the maintenance of order, 2) prefer impersonal

relationships in the classroom, 3) express mistrust of students, and 4) harbor punitive attitudes toward students. In contrast, respondents with a humanistic orientation emphasize the student's ability to be self-disciplined and trustworthy. The notion that teachers' pupil control orientation and teachers' grading practice are linked is supported by the fact that research findings about teachers' grading practice resemble findings about teachers' orientation to pupil control.

Two research questions were put forward for this study of Ohio high school mathematics teachers: 1) What proportion of the various grading factors, commonly used by high school mathematics teachers to assign final grades, represent non-achievement factors? and 2) What degree of association exists between teachers' pupil control orientation and the use of non-achievement grading factors when variables representing the average economic level of the teachers' students, school size (or class size), and assigned proportion of upper-level mathematics courses taught are held constant?

Following a pilot conducted in Pennsylvania, the survey was mailed in the Spring of 1999 to a random sample of 500 State of Ohio secondary, full time, public school mathematics teachers. A total of 230 responses were received (46 percent response rate). The survey data, in addition to data gathered from a post card follow-up of survey non-respondents (33 percent response rate) and personal interviews with five practicing teachers were analyzed. Descriptive statistics were used to describe and calculate the proportion of commonly used grading factors that are unrelated to student achievement and calculate a PCI+ score. Multiple regression was used to determine if the teachers' Pupil Control Ideology (PCI+) was a significant predictor of the use of non-achievement grading factors when variables reflecting the proportion of at-risk students (ADC) in the teacher's school district, school size (SS), and the proportion of high-level (UL) mathematics course assigned to the teacher were held constant. A second regression equation was created replacing school size (SS) with class size (CS), based on information obtained in the pilot. Qualitative, data, gathered from personal interviews with a convenience sample of five (5) Ohio high school mathematics teachers and two free response survey questions facilitated the interpretation of the quantitative data gathered from the survey. Demographic data were also collected from the responding teachers.

DATA ANALYSIS

The analysis of data collected from Ohio public school, 9-12, mathematics teachers who completed the survey supports the conclusion that teachers determine final grades in many different ways. Their grading practices, however, are most often based on factors directly related to mathematics achievement. When mean percentages of the weights given to grading factors are calculated across all teachers in the sample, approximately 60 percent of the final grade assigned to mathematics students is comprised of tests and quizzes (55, and 4 percent, respectively). The emphasis on tests and quizzes conforms to reports from other research about the grading practices of high school mathematics teachers (Cizek et al., 1995/1996; Frary, Cross & Webber, 1993). (Tables of summary statistics are presented in Exhibit B.)

Although there is a general consensus among the majority of the responding teachers that tests and quizzes are the most important components of final grades, some teachers indicate that they base their students' final grades on an assortment of non-achievement grading factors such as effort, growth, interest, or student participation. These results also conform to reports from other researchers who note the wide variation in elementary and high school teachers' grading practices (Cizek et al.. 1995/1996; Frary et al., 1993).

When using a regression model to analyze the data, the researcher found that nearly 20 percent of the variation in teachers' practice of assigning grades based on non-achievement factors was explained by variables relating to the context of the classroom. The factors used in this analysis were school size, class size, proportion of at-risk students, and proportion of teaching assignment in upper level courses. When these variables are controlled in the regression equation and a measure of teachers' orientation to pupil control (PCI+) was added, a non-significant increase in the variance was explained. Respondents indicated that their grades were influenced by the context in which they teach (e.g., class size, proportion of at-risk students, and portion of upper-level mathematics classes).

The contextual variables with the greatest simple correlation with the proportion of non-achievement grading practices (GP) were proportion of at-risk students (ADC, 0.25), proportion of

assignment to upper-level classes (UL, -0.32), and mean class size (CS, -0.25). (The simple correlation between school size and class size was 0.29.) These associations are supported by the literature on grading practices that suggest that teachers place more emphasis on attendance, effort, behavior or other non-achievement factors when assigning grades to remedial and low-status students (Agnew, 1985; Natriello, Riehl, & Pallas, 1994).

The outcome of this study of Ohio high school mathematics teachers showed that the PCI+ explains little of the variation in teachers grading practices and contributes little to an equation predicting teachers tendencies to incorporate non-achievement factors in final grade assignment. The question of whether there are underlying beliefs about pupil control that shape teachers' choice of grading factors remains unanswered. Similarly, multidisciplinary research on middle and high school teachers conducted by Cross and Frary (1996) resulted in an inability to detect any overt use of grades to control student behaviors.

Comments from the personal interviews with five teachers indicated that some teachers were actively experimenting with different grading practices and some teachers were looking for ways to acquire more information about successful grading practices. Teachers noted that they were not aware of how other teachers graded but they did expect differences in practice to emerge based on the level of students in the classroom. Survey respondents noted that if grades were not given, students would not engage in learning activities. As one high school vocational mathematics teacher reflected, "the system wouldn't work."

Two teachers offered examples of the rationales supporting teachers' choice of grading practices. One teacher commented on each non-achievement grading factor as follows: (The full text of five interviews appears in the Appendix E of the dissertation.)

> Seems to me, ability is taken care of in tests and homework and everything else. I don't understand how you can penalize a student based on behavior. Complexity, haven't thought about it. Cooperation, haven't done a whole lot. Effort, I'm not sure how to be fair about that. Extra credit, I don't do. Should have done the work in the first place. Growth, is what they are supposed to do and why are you giving extra credit for that? Projects. How do you measure it? Participation in discussions penalizes some and rewards others. I don't do group activities. Standard scores, I don't see how those would be reflective of what I do in the classroom. The notebook, at 25 percent of the grade, reflects work and shows up in quizzes.

The other teacher noted that the choice of grading practices used in the classroom was shaped by personal experiences as a college student. This teacher expressed difficulty in assigning percentages when completing survey Section A because of the teacher's "structured grading practice that is used in all mathematics classes." (The teacher teaches all upper-level classes.)

> I really have four grading areas. One is called "content" or all the major work in the mathematical content that we do and includes tests, major graded assignments, and that sort of thing. My next category is "developmental" and that is the type of work students do to develop the concepts. This can be graded homework, homework checked on effort, readings, cooperative learning, effort, and teacher observations of progress. I have a third category called "enrichment work" which is worth 10 percent of the total grade. That is completely individualized. Finally, I do count "participation" as 10 percent. This would include working at the board, participating in class discussions, etc.

Although the association between teachers' Pupil Control Orientation (PCI+) and the use of grades to control students remains obscure, teachers who participated in the study provided some evidence that grades may be used to control student behaviors. Several teachers noted that if this happened, it was unintentional. Others noted that grades were motivators for some students and not meaningful for other students. Of the questions that assessed teachers' pupil control orientation, the question with which most teachers agreed was question 11: "Classroom management is one of the most difficult aspects of teaching."

The marginal reliability (0.63) of the PCI+, a measure of internal consistency, reduced the predictability of this variable in the regression equation. One possible explanation for the depressed reliability lies in the multiple interpretation teachers assigned to the items, suggesting that the scale is multi-dimensional. The teachers' overall difficulty with making sense of the items on the PCI+ became evident during the personal interviews with high school teachers. Examples of hand-written notes on the survey form are illustrated here: "moral (?)", "vague", "Number 3 is poorly worded. Number 5 is a poor question.", "What is a 'few'? Two percent?", "Depends on class and environment.", "Depends on pupils.", "On occasion.", "Section B wording is poor. There are subjective words that mean very different things to different people. It seems designed to be or have negative representation.", "Some questions are ambiguous. For example, item 7. Some students consistently break rules and require stricter discipline. Whether this is treating them like hoodlums is dependent on your definition."

Through survey respondents' handwritten commentary, the researcher concluded that issues other than those addressed in the survey might influence the grading practices of mathematics teachers. These issues include class load, competing assignments, and educational programming. Teachers' commentary illustrate:

> Class load
> I am presently teaching seven classes a day, three preps with one conference period in an eight-period day. I teach AP calculus, geometry and Algebra II. This is a killer schedule. Somehow, administrators need to be made aware of the strenuous work involved in teaching and grading mathematics so that they will take this into account when scheduling classes.
>
> Competing interests
> It has been a busy year. I teach seven math classes, coach cross-country, 7th boys' basketball, high and junior high track.
>
> College-bound student pull-out programs
> Less than 10 percent of our students go to college. Our best students go to college early in a state-funded program. Our advanced programs have been devastated. (This teacher's response to Question 2, survey Section C: "Yes, final exam failure is the only threat left to control some students.")

Question 1 on the survey Section C asked teachers to indicate what they believe to be the most important component of final (semester) grades. Although many teachers responded using the grading components listed in Section A of the survey (tests, ability, effort, homework, quizzes, etc.), many survey respondents provided clues to the overall meaning of grades. A number of meanings arise:

> Grades measure long term retention.
> Grades prepare students (for college, life, to take standardized tests).
> Grades reflect the daily work during the semester, not the semester exam.
> Grades reflect scores earned on a comprehensive exam, not chapter exams for which student tend to cram.
> Grades reflect the students' effort. (Students should show that they have tried their hardest.)
> Grades reflect the amount of knowledge gained.
> Grades reflect whether course goals have been reached.
> Grades reflect overall knowledge.
> Grades reflect effective study skills acquired by the student.
> Grades reflect whether the student has learned what they need for the next level.

Some teachers indicated that they disagreed with the practice of giving a semester grade ("I don't like a comprehensive grade."). Some indicated that they believed that grades don't mean much, and that there is really not ONE most important factor.

Teachers appeared to use this free-response section of the survey to make an association between the grading components they used in assigning grades to students with other assessment issues. For example, teachers specified that tests should be 'good' tests", "...valid and reliable." They provided indirect references to criterion and normative assessments, gain scores, and competency/mastery based assessments. Absent, however, from any commentary from teachers was reference to the distinction between summative and formative assessments of students. One explanation for their diverging responses is that teachers may shape their grades based on the meaning or information that the grade is to ultimately convey and the needs of their students.

Researchers have uncovered similar connections between teachers' beliefs about grades and the meaning of grades, noting that teachers think of grades as "pay" and that teachers were reluctant to limit their grades to measures of achievement because they were not certain that the grades would be interpreted as such (Brookhart, 1993). Researchers have found that college preparation students endorsed the subjective grading practices of their teachers (Cross & Frary, 1996). As a consequence, the meaning and interpretation of final grades may be clear for some students but not so clear for other students.

LIMITATIONS

Three issues limit the overall generalizability of the study. First, there was no information from survey non-respondents to help determine whether their beliefs and grading practices were similar to or different from those who responded to the survey. From the response of the teachers who either had the time or took the time to complete the survey or postcard follow up, it was learned that the most important component of final grades were tests and quizzes. However, it is impossible to assess the beliefs of the non-respondents without additional information from them.

The second limitation of this study is the marginal ability of the PCI+ score to measure teachers' pupil control orientation. Reported measures of reliability for the 20-item version of the PCI are higher (0.95 and 0.91, for elementary and secondary school studies respectively, and as reported by Willower et al., 1967/1973) than obtained in this study (0.62). The use of the 20-item version of the PCI may have resulted in a higher reliability but a lower response rate. Certainly, the comments received by respondents

regarding the wording of the PCI are also limitations to the overall ability of the PCI to measure teachers' pupil control orientation. Given these limitations in the survey instrument, it is difficult to completely abandon the speculation that teachers' grading practices are shaped by teachers' beliefs about student control.

A third limitation of this study is the use of *school district* variable to describe the proportion of at-risk (ADC) students enrolled at the *school* level. This variable is sensitive to reporting protocol and issues of confidentiality.

SUMMARY

The findings of this research study indicates that the class size, percentage of at-risk (ADC) students in the district, and the percentage of the teachers' assignment to upper level mathematics courses account for approximately 20 percent of the variance in teachers' practice of assigning grades based on factors other than tests and quizzes. The grading practices of teachers appear to be shaped by the context of their classroom.

Most teachers who directly answer free-response question on the use of grades to control students (53 percent) believe that final grades are not used to control student behaviors. Some teachers (36 percent) believe that they might be used in this way. In contrast, eight percent of the teachers surveyed believe that grades are definitely used to control students. Teachers indicate that classroom management is one of the most difficult aspects of teaching. And written responses provide clues to issues that might support explanations of why teachers' assign final grades the way that they do.

Major research findings are reviewed below and recommendations follow:

- There is no significant association between teachers' practice of assigning final grades based on non-achievement grading factors and pupil control orientation (PCI+) when the prediction equation is adjusted for block entry of SS, ADC, UL and block entry of CS, ADC, UL.
- Simple correlations between the research variables suggest a positive association between the proportion of non-achievement grading factors used to calculate final grades (GP) and the proportion

of at-risk students (ADC). Simple correlation suggest a negative association between the proportion of non-achievement grading factors (GP) used to calculate final grades and the size (CS) and academic level (UL) of the teachers' classes. Stated another way, the assignment of grades based on higher proportions of non-achievement grading factors is positively correlated with higher proportions of at-risk students. The assignment of grades based on higher proportions of non-achievement grading factors is associated with small classes and teachers who teach fewer upper level classes.

- For this study, the PCI provided a marginally reliable measure of pupil control orientation.

RECOMMENDATIONS

Several recommendations for future research on the association of teachers' pupil control orientation and grading practices are supported by this study. First, it is important to develop of a unidimensional scale equivalent to the PCI or to select another scale to assess teachers' beliefs about pupil control before replicating this study. Alternatively, the wording of the 10-item PCI scale could be updated and tested for reliability and internal consistency before similar data are collected from high school mathematics teachers.

Second, it may be helpful to capitalize on teachers' overall interest in grading practices. Given the time teachers devote to grading and importance attached to grades, it would be worthwhile to engage teachers in research studies on grading practices, a practice about which they apparently have substantial control. This engagement may help dissuade any misconceptions that teachers have about how studies of grading practices impact their work. Collaboration between teachers and researchers may result in larger response rates and facilitate the interpretation of data gathered from classroom-based research.

Third, researchers might include in the survey instrument a question that will help discriminate between teachers' conceptions about formative assessments and their conceptions about summative assessments, and identify how frequently tests are given in the class. These issues and other assessment practices may support the identification of associations between classroom variables, teachers' beliefs and the practice of using non-achievement factors in final grade assignment.

Other issues relating to grading practices may support an overall understanding of this activity that takes so much of a teacher's time and has such an impact upon students. These issues may be external to the classroom (e.g., parents, counselors, administrators, community, college entrance requirements, content relating to student assessment in teacher preparation courses, workplace opportunities/restrictions), or classroom based (e.g., number of hours student works each week, student participation in extra curricular activities, student understandings or misunderstandings of the meaning of grades, students' level of interest in mathematics, teachers' number of class preparations, teachers' extra curricular assignments).

As in the past, high school mathematics grading practices will continue to be shaped by unexplained factors until additional research is conducted to learn more about the variations that exist. Although grading practices may be fluid and variable, it is important to establish a meaningful way to interpret these assignments to individual students. While this research study does not establish teachers' use of grades to control students, the speculation should be laid to rest.

EXHIBIT A: SURVEY INSTRUMENT

High School Mathematics Grading Practices

SECTION A

Directions: Circle "yes" or "no" to indicate whether the grading component listed below is factored into your students' final course (semester) grade. If "yes", provide the proportion of the total final grade in the space provided. The total should sum to 100 percent.

Grading Component			percentage
1. ability	no	yes	_____
2. attendance	no	yes	_____
3. attitude	no	yes	_____
4. behavior	no	yes	_____
5. complexity of the mathematics presented in the course	no	yes	_____
6. cooperative learning	no	yes	_____
7. effort	no	yes	_____
8. extra credit	no	yes	_____
9. growth (improvement)	no	yes	_____
10. homework	no	yes	_____
11. individual projects	no	yes	_____
12. interest	no	yes	_____
13. participation in class discussions	no	yes	_____
14. participation in group activities	no	yes	_____
15. standardized test scores (i.e., PSAT, CAT achievement scores)	no	yes	_____
16. teacher observations of progress	no	yes	_____
17. reports	no	yes	_____
18. test scores	no	yes	_____
19. other (please indicate: _____)			_____
	Total:		**100%**

*SECTION B

Directions: Indicate your level of agreement with each of the following statements by circling one of the following responses using the following response key.

Key:		
	sd	strongly disagree
	d	disagree
	n	neutral
	a	agree
	sa	strongly agree

1. Too much pupil time is spent on activities unrelated to academic preparation.	sd d n a sa
2. Being friendly with pupils often leads pupils to become too familiar with their teachers.	sd d n a sa
3. It is more important for pupils to learn to obey rules than it is for them to learn to make decisions.	sd d n a sa
4. Student governments are good "safety valves" but should not influence school policy.	sd d n a sa
5. Pupils can be trusted to work together without supervision.	sd d n a sa
6. If a pupil uses obscene or profane language in school, it must be considered a serious offense.	sd d n a sa
7. A few pupils are just young hoodlums and should be treated accordingly.	sd d n a sa
8. It is often necessary to remind pupils that their status in school differs from that of teachers.	sd d n a sa
9. Pupils cannot perceive the difference between democracy and anarchy in the classroom	sd d n a sa
10. Pupils often misbehave in order to make the teacher look bad.	sd d n a sa
11. Classroom management is one of the most difficult aspects of teaching.	sd d n a sa

*Items 1-20, Willower, Eidell, & Hoy (1967/1973)

SECTION C

Directions: Please indicate your beliefs about grading practices.

1. What do you believe is the most important component of final (semester) grades?

_____

_____

2. Do you believe that final (semester) grades are used to control student behaviors?

_____

_____

SECTION D

Directions: Please provide the following information by circling or completing the response that applies to you.

1. I am a full time high school (grade 9-12) mathematics teacher. Yes ____ No ____
2. My primary teaching discipline is mathematics. Yes ____ No ____

3. I am certified to teach high school mathematics. Yes ____ No ____
4. I have completed a college-level course in student assessment Yes ____ No ____

5. The following represents the number years that I have been a teacher: _____
6. I am: male ___ female ___

7. I have the following post secondary degrees: Bachelor ____ Master ____ Doctor ____
8. My age is: _____

9. The following represents the number of years that I have taught mathematics: _____
10. The following represents the number of students enrolled in the school in which I teach: _____

11. The following represents the average number of students in the classes (class size) in which I teach: _____
12. The following represents the proportion of my total teaching assignment that is in classes of a level greater than geometry (i.e., Algebra II, trigonometry, statistics, pre-calculus, or calculus): _____%

Thank you for your time. If you wish to add comments, please do so below.

_____

_____

_____

EXHIBIT B: SUMMARY TABLES

Table 1

Demographics of Survey Respondents: Percent Response (n=215)

	N	%
Full time teacher	201	94%
Math, primary discipline	201	94%
Math certified	206	97%
Completed college-level assessment course	173	82%
Male	118	55%
Female	97	45%
Bachelors degree	82	38%
Masters degree	128	60%
Doctors degree	4	2%

Table 2

Demographics of Survey Respondents: Mean Response (n=215)

	N	mean	range
Number of years a teacher	208	15	0-37
Number of years a mathematics teacher	214	15	0-37
Age	201	40	21-64
School size (SS)	215	1070	110-2680
Class size (CS)	214	22	5-32
Percent upper level math classes (UL)	213	33%	0-100%

Table 3

Factors Teachers Use to Assign Final Grades: Mean Percent (n=205)

Factor (number responding)	mean	std. error
Ability (49)	2.3	0.6
Attendance (39)	0.9	0.2
Attitude (39)	0.5	0.1
Behavior (41)	0.7	0.1
Complexity of Math (28)	0.7	0.1
Cooperative Learning (58)	1.7	0.3
Effort (93)	3.3	0.4
Extra Credit (86)	1.6	0.2
Growth (40)	0.9	0.2
Homework (194)	19.9	0.8
Individual projects (20)	3.1	0.4
Interest (9)	0.1	0.1
Participation in discussions (59)	1.4	0.2
Participation in group activities (62)	1.5	0.2
Standardized test scores (2)	0.1	0.1
Teacher observations (42)	1.2	0.3
Reports (26)	0.7	0.2
Tests (204)	55.2	1.5
Quizzes (33)	3.5	0.6
Portfolios (2)	0.1	0.1
Notebook/journal (9)	0.6	0.2

Table 4

Means and Standard Deviations of 11-item PCI+ (n=217)

item		mean	sd
B1	Too much pupil time is spent on activities...	2.99	0.93
B2	Being friendly with pupils often leads pupils...	2.29	0.98
B3	It is more important for pupils to learn to obey....	2.55	0.93
B4	Student governments are good "safety valves"...	2.74	0.85
B5	Pupils can be trusted to work together...	3.19	1.00
B6	If a pupil uses obscene or profane language...	3.32	1.10
B7	A few pupils are just young hoodlums...	3.21	1.10
B8	It is often necessary to remind pupils...	3.21	1.10
B9	Pupils cannot perceive the difference...	2.62	0.89
B10	Pupils often misbehave in order to make...	2.31	0.90
B11	Classroom management is one of the most...	3.70	1.07
Item Means		2.85	0.46

1=strongly disagree; 5=strongly agree

Table 5

PCI+ Item-total Statistics (n=217)

Item	Scale Mean if Item Deleted	Corrected Variance if Item Deleted	Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
B1	28.39	21.90	0.25	0.10	0.61
B2	29.08	21.35	0.29	0.13	0.60
B3	28.82	20.75	0.39	0.22	0.58
B4	28.63	22.92	0.16	0.15	0.63
B5	28.18	21.34	0.28	0.11	0.60
B6	28.06	20.97	0.27	0.12	0.61
B7	28.92	21.51	0.23	0.08	0.62
B8	28.17	20.05	0.37	0.19	0.58
B9	28.75	21.28	0.35	0.21	0.59
B10	29.06	21.39	0.33	0.20	0.60
B11	27.67	21.90	0.19	0.13	0.62

Table 6

Teachers' Responses: Are Grades used to Control Students? (n=204)

Response	Frequency	%	Cummulative %
Maybe, sometimes	74	36.3	36.3
No	108	52.9	89.2
Unrelated reply	3	1.5	90.7
No response	2	1.0	91.7
Yes, sure, definitely	17	8.3	00.0

Table 7

Means and Standard Deviations of Criterion and Predictor Variables (n=204)

Variable	Mean	Standard Deviation
GF (% nonacademic)	41.41	21.19
SS (school size)	1062.46	584.05
ADC (% at-risk in school district)	6.18	8.10
UL (% upper level courses)	33.29	32.72
PCI+ (score)	31.22	5.09
CS (class size)	22.14	4.38

Table 8

Correlation Among Criterion and Predictor Variables (n=204)

	GP	SS	ADC	UL	PCI+
GP					
SS	-0.08				
ADC	0.25**	0.12			
UL	-0.32**	0.04	-0.12		
PCI+	-0.05	0.03	-0.05	-0.06	
CS	-0.25**	0.29**	-0.10	0.09	0.00

**correlation is significant at the 0.01 level (two-tail)

Table 9

Summary: Models 1 - 4 (n=204)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.395	0.156	0.144	19.6078
2	0.399	0.160	0.143	19.6190
3	0.445	0.198	0.186	19.1135
4	0.449	0.202	0.186	19.1199

Table 10

Summary: Change Statistics (n=204)

Model	R Square Change	F Change	df1	df2	Sig. F Change
1	0.156	12.352	3	200	0.000
2	0.003	0.770	1	199	0.381
3	0.198	16.491	3	200	0.000
4	0.003	0.867	1	199	0.353

Table 11

Coefficients for Dependent Variable (GP): Model 1 and Model 2 (n=204)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	47.46	3.27		14.51	0.00
SS	0.00	0.00	-0.09	-1.38	0.17
ADC	0.59	0.17	0.23	3.44	0.00
UL	-0.19	0.04	-0.29	-4.41	0.00
2 (Constant)	54.97	9.16		6.00	0.00
SS	0.00	0.00	-0.09	-1.33	0.18
ADC	0.59	0.17	0.23	3.37	0.00
UL	-0.19	0.04	-0.29	-4.46	0.00
PCI+	-0.24	0.27	-0.06	-0.88	0.38

Table 12

Coefficients for Dependent Variable (GP): Model 3 and Model 4 (n=204)

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
3 (Constant)	67.84	7.04		9.63	0.00
CS	-1.01	0.31	-0.23	-3.53	0.00
ADC	0.56	0.17	0.22	3.38	0.00
UL	-0.18	0.04	-0.27	-4.26	0.00
4 (Constant)	75.64	10.94		6.91	0.00
CS	-1.08	0.31	-0.22	-3.52	0.00
ADC	0.56	0.17	0.21	3.32	0.00
UL	-0.18	0.04	-0.28	-4.32	0.00
PCI+	-0.25	0.27	-0.06	-0.93	0.35

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Karen B. Mauck Cicmanec	Karen Mauck Cicmanec, Ph.D. (Faculty)	
Organization/Address: Dept. Reading & Instructional Tech. Towson University 8000 York Road. Towson, MD 21252-0001	Telephone: 410-704-2282	Fax: 410-704-2733
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