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THE TEACHING AMERICAN HISTORY PROJECT:
AN ASSESSMENT OF STUDENT PERFORMANCE

by

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Abstract: This report summarizes a quasi-experimental design study to estimate selected effects of The Teaching American History (TAH) Project on student performance in the Elk Grove (CA) Unified School District during the 2005-2006 school year. The TAH Project was a professional development effort for selected fifth-grade teachers. As part of the project and after the professional development experiences, students were taught a nine-week unit on U. S. History in the Colonial and Revolutionary Period. Experimental classes, taught by TAH Project teachers, and control classes, taught by non-TAH Project teachers, were given pretests and posttests using a locally constructed history test and a locally prepared interest survey. The descriptive and multiple regression analyses produced mixed results. While the mean history posttest score for the experimental classes was significantly higher than that for the control classes, there was little difference between the experimental and control classes on the mean interest survey posttest score.

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November 13, 2006

THE TEACHING AMERICAN HISTORY PROJECT:
AN ASSESSMENT OF STUDENT PERFORMANCE

The Teaching American History (TAH) Project was a professional development program carried out in the Elk Grove Unified School District (EGUSD) in Elk Grove, California, under a three-year grant from the U. S. Department of Education. The Project was managed by David Byrd, Project Director, with the assistance of Dr. James E. Davis, Project Evaluator, and an advisory team of four EGUSD teachers.

The TAH program consisted of one-hundred hours of instruction for thirty fifth-grade EGUSD teachers in three professional development events during the 2005 school year. The first event was a three-day colloquium on U. S. History from Pre-Columbian Times to the Mid-1800s by staff from the National Council on History Education. The second event was a one-day workshop on the U. S. Constitution by staff from the Center for Civic Education, Calabasas, CA. The third event was a one-week intensive institute on the Colonial Period at Colonial Williamsburg. The intent of the TAH program was to provide the thirty selected teachers with a foundation for the effective implementation of the California Grade Five History-Social Science Content Standards.

The evaluation plan of the TAH Project called for an assessment of the effect of the professional development program on student learning. The assessment involved comparing the performance of students instructed by TAH Project teachers with students of teachers not participating in the TAH Project. Namely, did the TAH program have a differential impact on selected aspects of student learning?

This report summarizes the assessment of the impact of the TAH professional development program on student learning. The report is presented in three parts. The first part discusses the design of the

study. The second part summarizes the results of the investigation. The third part provides a concluding comment on the study.

I. Design of the Study

The study was carried out using a quasi-experimental design which permitted comparison of the performance of 21 experimental classes of students with that of 25 control classes of students. The experimental classes were taught a nine-week unit on the Colonial Period and the American Revolution in U. S. History by TAH Project trained teachers. The control classes were also taught a nine-week unit on the same content, but the students were instructed by non-TAH Project teachers.

The analyses centered on two facets of student performance. The first aspect was student performance on the 25-item United States Colonial History and American Revolution Test, a locally constructed test of understanding of the historical information contained in the instructional unit. Test items were selected from a publisher provided test bank. A copy of this test is provided in Appendix A of this report. The second dimension consisted of a 7-item Survey of Interest in History and Social Studies, also a locally constructed Likert-scored instrument suggestive of the level of student interest in history and social studies. A copy of this survey appears in Appendix B of this report. Both instruments were administered as pretests prior to the unit of instruction, and then again as posttests at the conclusion of the unit. Additional information on class size as well as selected teacher and school characteristics was acquired by questionnaire and incorporated into this analysis.¹

The variables used in the study are listed and defined in Table 1. The actual data set used in the analyses appear in Appendix C.

Table 1
Variables Used in the Analysis

Variable	Variable Definition
Dependent variables:	
HPOS	History Posttest Score; mean score for the <i>i</i> th class; number of questions correct out of 25
IPOS	Interest Posttest Score; mean score for the <i>i</i> th class; Likert scale from 7 (low interest) to 24 (high interest)
Experimental variable:	
TCHX	Class of an Experimental Teacher or Control Teacher 1 = Class taught by TAH program teacher 0 = Class taught by non-TAH program teacher
Control variables:	
HPRE	History Pretest Score; mean score for the <i>i</i> th class; number of questions correct out of 25
IPRE	Interest Pretest Score; mean score for the <i>i</i> th class; Likert scale from 7 (low interest) to 24 (high interest)
STUN	Number of Students in Class;* number of complete posttest answer sheets for the <i>i</i> th class
TCHG	Gender of Teacher; 1 = female teacher, 0 = male teacher
TCHE	Teaching Experience of Teacher; number of years teaching in all grades
TCHF	Teaching Experience of Teacher; number of years teaching in grade 5
TCHD	Highest University Degree of Teacher; 1 = graduate degree, 0 = undergraduate degree
TCHM	Major Field of Study of Teacher; 1 = history, 0 = other field
SCHT	Title 1 / Non-Title 1 School Variable; 1 = class in Title 1 school, 0 = class in non-Title 1 school
SCHY	Year Around / Traditional School Variable; 1 = class in year around school 0 = class in traditional school

*See footnote in Table 2.

These data permit both descriptive analysis of the results and inferential analyses involving the use of least squares linear regression techniques to estimate two models.

The first model, given in the following expression, is cognitive:

$$(1) \quad \text{HPOS} = f(\text{TCHX}, \text{CVAR})$$

where HPOS is the history posttest score for the i th class, TCHX is the class of an experimental teacher or control teacher variable, and CVAR is a set of control variables for history pretest, interest posttest, class size, teacher traits, and school characteristics. The desired differential effect of the TAH Project would be found in a positive and statistically significant coefficient on the TCHX variable. This result would suggest that the classes of TAH Project teachers scored higher on the history test at the end of the instructional unit than the classes of the non-TAH Project teachers, other control variables held constant. This result would mean that the TAH Project may have had the intended effect of increasing student cognitive performance.

The second model, given in the following equation, is affective:

$$(2) \quad \text{IPOS} = f(\text{TCHX}, \text{CVAR})$$

where IPOS is the interest posttest score for the i th class, TCHX is again the class of an experimental teacher or control teacher variable, and CVAR is a set of control variables for interest pretest, history posttest, class size, teacher traits, and school characteristics. The intended differential effect of the TAH Project would be found, once again, in a positive and statistically significant coefficient on the TCHX variable. This result would suggest that the classes of TAH Project teachers concluded the instructional unit with a higher level of interest in history and the social studies than the classes of the

non-TAH Project teachers, other control variables held constant, a result indicating that the TAH Project may have generated more student interest in history and the social studies.

II. The Results of the Study

The descriptive results are presented in Table 2. Presented here are the mean, standard deviation, and minimum and maximum values for each of the variables in the study. These statistics are presented for the classes of control teachers and the classes of experimental teachers.

Descriptive Results

The observed mean on the history test for the students in the control group increased from 10.367 to 14.251 questions correct, while the mean on the history test for the students in the experimental group increased from 10.313 to 16.120.² At the same time the means on the interest survey for the two groups did not change much: that for students in the control group decreased from 16.273 to 16.215, while that for the students in the experimental group decreased from 16.892 to 16.891.³

And how did the control and experimental groups compare on the other variables? The average control class size was 25.880 students; the average experimental class size was 25.667 students.

While 92 percent of the control teachers were female and 8 percent male, just 76.2 percent of the experimental group teachers were female with 23.8 percent male. The average number of years teaching experience of the control teachers was 10.960 years and that for the experimental teachers was 10.857 years. The mean number of years teaching at the fifth-grade level among the control teachers was

Table 2
Descriptive Statistics

Variable	Arithmetic Mean	Standard Deviation	Minimum	Maximum
Classes of Control Teachers (n = 25)				
HPRE	10.367	2.055	6.000	15.348
HPOS	14.251	2.320	8.957	18.348
IPRE	16.273	0.722	15.143	17.794
IPOS	16.215	1.193	14.091	19.909
STUN	25.880	5.615	16	33
TCHX	0	0	0	0
TCHG	0.920	0.277	0	1
TCHE	10.960	6.680	2	28
TCHF	5.560	4.547	1	20
TCHD	0.240	0.436	0	1
TCHM	0.080	0.277	0	1
SCHT	0.440	0.507	0	1
SCHY	0.880	0.332	0	1

Classes of Experimental Teachers (n = 21)				
HPRE	10.313	1.701	7.818	14.724
HPOS	16.120	1.949	11.348	18.800
IPRE	16.892	0.664	15.485	18.250
IPOS	16.891	1.116	15.333	18.739
STUN*	25.667	5.102	12	32
TCHX	1	0	1	1
TCHG	0.762	0.436	0	1
TCHE	10.857	7.818	3	30
TCHF	5.286	3.509	2	18
TCHD	0.238	0.436	0	1
TCHM	0.143	0.359	0	1
SCHT	0.286	0.463	0	1
SCHY	0.905	0.301	0	1

*Forty-five of the teachers in this study each taught the history unit to one class of students. One experimental teacher taught the unit to three classes with a total enrollment of 95 students. These three classes are being treated as one class in this study. And while the pretest and posttest statistics for this class were calculated using the input of all 95 students, the STUN variable was set at 32 students, the approximate average of the three classes, so as to avoid the misleading effects of an obvious outlier in the STUN variable.

5.560 years, and for the experimental teachers was 5.286 years. While 24 percent of the control teachers had graduate degrees and 8 percent majored in history, 23.8 percent of the experimental teachers had graduate degrees and just 14.3 percent majored in history.

Forty-four percent (44%) of the control classes were taught in Title 1 Schools, with 88 percent of the control classes taught in year around schools. Twenty-eight point six percent (28.6%) of the experimental classes were taught in Title 1 Schools, with 90.5 percent of these classes taught in year around schools.

The standard deviations and minimum and maximum values reported in Table 1 show the variation in each of the variables considered in the study. And a matrix of correlation coefficients appears in Appendix D.

Results for Model 1

The results for Model 1, the cognitive history test findings, are presented in Table 3. Model 1A considers the history posttest (HPOS) performance as a function of the experimental variable (TCHX). Model 1B examines the same relationship along with the control variables that turned out to be significantly related to the HPOS performance. This Model approximates the *ceteris paribus*, other things equal, assumption insofar as these data permit.

The results for Model 1A indicate that the mean score for the classes of students taught by the TAH Project teachers was 1.869 points higher than the average score for the classes of students taught by the non-TAH Project teachers. This difference is statistically significant at the one percent level. And the R^2 suggests that some 14 percent of the variation in HPOS is attributable to the variation in TCHX.

Table 3
History Test Regression Analysis
(Dependent Variable: HPOS)

Independent Variables	Model 1A	Model 1B
Constant Term	14.251+++ (33.005)	-3.212 (-0.908)
TCHX	1.869+++ (2.925)	1.531+++ (3.163)
HPRE	--	0.640+++ (5.081)
IPOS	--	0.674+++ (3.207)
STUN	--	--
TCHG	--	--
TCHE	--	--
TCHF	--	--
TCHD	--	--
TCHM	--	-1.322+ (-1.704)
SCHT	--	--
SCHY	--	--

Adj. R ²	.144	.549
SE	2.159	1.566
F	8.555	14.708
n	46	46

Values in parentheses are t-statistics.
†Significant at the 10 percent level, two-tail test.
††Significant at the 5 percent level, two-tail test.
†††Significant at the 1 percent level, two-tail test.

The results for Model 1B indicate a similarly significant 1.531 point difference in favor of the students of TAH Project teachers, other things equal. In addition to the experimental variable, three control variables turned out to be statistically significant. The coefficient on the HPRE variable suggests that for each one point higher that a class history pretest mean score was, the posttest history mean was .640 points higher; the coefficient on the IPOS variable indicates that for each one point higher that a class interest posttest mean score was, the posttest history mean was .674 points higher; and the coefficient on the TCHM variable indicates that the posttest history mean was 1.322 points lower in classes instructed by teachers having a major in history than in classes instructed by teachers having other majors. The R^2 suggests that nearly 55 percent of the variation in HPOS is accounted for by the variation in the four independent variables in the equation.

Results for Model 2

The results for Model 2, the affective interest survey findings, are presented in Table 4. Model 2A considers the interest survey posttest (IPOS) performance as a function of the experimental variable (TCHX). Model 2B considers the same relationship together with the control variables that turned out to be significantly related to the IPOS performance. This latter model approximates the other factors held constant assumption insofar as these data permit.

The results for Model 2A indicate that the mean interest survey score for the classes taught by the TAH Project teachers was .675 points higher than the average score for the classes of students taught by the non-TAH Project teachers. This difference is statistically

Table 4
Interest Instrument Regression Analysis
(Dependent Variable: IPOS)

Independent Variables	Model 2A	Model 2B
Constant Term	16.215+++ (69.962)	2.296 (0.724)
TCHX	0.675+ (1.969)	-0.279 (-0.889)
IPRE	--	0.745+++ (3.540)
HPOS	--	0.159++ (2.418)
STUN	--	--
TCHG	--	-1.031++ (-2.691)
TCHE	--	--
TCHF	--	0.073++ (2.131)
TCHD	--	--
TCHM	--	0.852+ (1.988)
SCHT	--	--
SCHY	--	--

Adj. R ²	.060	.495
SE	1.159	0.849
F	3.877	8.361
n	46	46

Values in parentheses are *t*-statistics.
 +Significant at the 10 percent level, two-tail test.
 ++Significant at the 5 percent level, two-tail test.
 +++Significant at the 1 percent level, two-tail test.

significant at the 10 percent level. And the R^2 suggests that merely 6 percent of the variation in IPOS is attributable to the variation in TCHX.

The results for Model 2B indicate a reverse finding, an observed .279 point difference in favor of the students of the non-TAH Project teachers, other things equal. However, this difference is not statistically significant. Five control variables, however, did turn out to be statistically significant in this Model. The coefficient on the IPRE variable suggests that for each one point higher that a class interest survey pretest mean score was, the posttest interest mean score was .745 points higher; the coefficient on the HPOS variable indicates that a one point increase in the mean score on the history posttest increased the posttest interest mean by .159 points; the coefficient on the TCHG variable suggests that the posttest interest mean was 1.031 points lower in classes taught by female teachers as compared to that in classes taught by male teachers; the coefficient on the TCHF variable indicates that the posttest interest mean score was .073 points higher for each additional year of fifth-grade teaching experience of the teacher; and the coefficient on the TCHM variable suggests that the posttest interest mean score was .852 points higher in classes instructed by teachers who had a major in history than in classes taught by instructors having other majors. Here, the R^2 suggests that nearly 50 percent of the variation in the IPOS variable is accounted for by the variation in the six independent variables in this equation.

III. Conclusions

The central conclusions that follow from these analyses are two.

First, the evidence is uniformly clear that the classes of students of the experimental teachers turned in higher scores on the history content posttest than the classes of students of the control teachers. The evidence is on the compelling side that the classes of students taught by TAH Project teachers learned more of the subject matter measured by the history test than the classes of students taught by non-TAH Project teachers. Second, the weight of the evidence suggests that there was little or no difference between the classes of students of experimental teachers and those of control teachers on the posttest interest survey. It is true that the results for Model 2A did show some differential level of posttest interest in favor of the classes taught by TAH Project teachers, but this finding did not hold up in the multiple regression Model 2B. Neither was this finding even remotely suggested in the observed mean and standard deviation data for IPRE and IPOS variables for the two groups. Thus, the credible conclusion is that the levels of interest in history and social studies of both the students of TAH Project teachers and the students of non-TAH Project teachers were about the same at the end of instruction as they were at the beginning of the unit.

There is, of course, the risk of reading too much into these conclusions. One might, for example, be tempted to attribute the history test differential to the professional development events in the TAH Project, that the performance on the history test of the classes of the TAH Project teachers was higher than that of the classes of the non-TAH Project teachers because of the TAH professional development program. This claim, alas, cannot be made in any credible sense, since neither random selection nor random assignment techniques were used in

selecting or assigning teachers and students to treatments. In the face of this, all we can do is suggest that the TAH Project may have produced some intended results without having caused too much in the way of unintended consequences.

Endnotes

¹The demographic data for individual students supplied by Dr. Melissa Neuburger, Assessment and Evaluation Analyst, Research and Evaluation, Elk Grove Unified School District, were not used in the analyses in this study. These data may be used in subsequent analyses.

²In paired comparison *t*-tests, HPOS was found to be significantly greater than HPRE at the 1 percent level for both the control classes and the experimental classes. Thus, it appears that the level of historical understanding among the students was greater at the end of the instructional unit than it was at the beginning of the unit in the case of each group.

³In paired comparison *t*-tests, IPOS was not found to be significantly different than IPRE at any of the conventionally accepted levels of significance. Thus, it appears that the level of interest in history and social studies among the students was no different at the end of the instructional unit than it was at the beginning of the unit in the case of each group.

Appendix A

UNITED STATES COLONIAL HISTORY & AMERICAN REVOLUTION TEST
Elk Grove Unified School District

Please use a pencil to answer these test questions on the separate answer form. Erase all stray marks when you are finished.

1. Colonies in New England included
 - A. New Hampshire and Massachusetts.
 - B. Georgia and North Carolina.
 - C. New Jersey and Maryland.
 - D. Virginia and Delaware.
2. Colonies in the Southern Colonies included
 - A. Pennsylvania and New York.
 - B. New Jersey and Delaware.
 - C. Maryland and Pennsylvania.
 - D. North Carolina and South Carolina.
3. The Middle Passage described a slave's journey from
 - A. Europe to Africa.
 - B. Europe to North America.
 - C. North America to Africa.
 - D. Africa to the West Indies.
4. What three continents were part of the triangular trade route?
 - A. Europe, North America, and China
 - B. Europe, India, and Asia
 - C. North America, Europe, Africa
 - D. North America, India, and Africa
5. Representatives in the Virginia legislature were called
 - A. Anglicans.
 - B. debtors.
 - C. plantation owners.
 - D. burgesses.
6. Which sentence about slaves' lives is true?
 - A. Slave masters made their lives easier.
 - B. Most slaves lived long lives.
 - C. Many slaves adopted Christianity.
 - D. Most slaves were taught to read and write by private teachers.
7. Why was Virginia's government important?
 - A. It had the first elected legislature in the colonies.
 - B. It was the only colonial government to separate church and state.
 - C. It was the first colonial government to make laws for religious tolerance.
 - D. It was the only colony to give every adult male the right to vote.

Appendix A (continued)

8. Many colonists didn't want to pay taxes because
 - A. no one else in the British Empire paid taxes.
 - B. they thought the taxes were too low.
 - C. they had no say in making tax laws.
 - D. they didn't have any money.
9. At the Stamp Act Congress in 1765, colonists decided that
 - A. they would pay the Stamp Act.
 - B. it was fair for them to help pay for the French and Indian War.
 - C. they would boycott British goods.
 - D. they would end all boycotts on British goods.
10. Why did the British put a new tax on tea after the Stamp Act ended?
 - A. Britain wanted the colonists to drink more tea.
 - B. Britain knew colonists didn't grow tea.
 - C. Britain didn't want to make the colonists angry.
 - D. Britain wanted to prove it could still tax the colonies.
11. The Sons of Liberty held the Boston Tea Party in 1773 because Britain
 - A. passed the Coercive Acts.
 - B. stopped all trade between Boston and Britain.
 - C. forced people to quarter soldiers in their homes.
 - D. tried to make the colonists pay a tax on tea.
12. Why did the British Parliament need to tax the colonies?
 - A. The British owed money to the American Indians.
 - B. The French and Indian War had cost them a lot of money.
 - C. The British owed money to the French.
 - D. The British owed money to the Spanish.
13. How did the colonists work together to oppose the British government?
 - A. They created the Committees of Correspondence.
 - B. They elected new representatives to the British government.
 - C. They met with the American Indians to oppose the taxes.
 - D. They met with the King of England.
14. Colonists who wanted independence from Britain were called
 - A. Loyalists.
 - B. Yankees.
 - C. Rebels.
 - D. Patriots
15. What was the name of the pamphlet that convinced many colonists to support independence?
 - A. Declaration of Independence
 - B. *Common Sense*
 - C. Revolt Against the King
 - D. Rights for All Colonists

Appendix A (continued)

16. Which famous American wrote much of the Declaration of Independence?
 - A. Thomas Paine
 - B. Abigail Adams
 - C. George Washington
 - D. Thomas Jefferson
17. What did the Declaration of Independence say?
 - A. Wanting to be free from Britain was treason.
 - B. The American colonies should stay under the rule of King George.
 - C. People have the right to life, liberty and the pursuit of happiness.
 - D. People do not have the right to a new government.
18. Ben Franklin was a
 - A. General from Virginia who led the Continental Army.
 - B. Writer and inventor from Pennsylvania who asked Parliament to give the colonists representation.
 - C. King from England who raised colonial taxes.
 - D. Lawyer from Virginia who wrote the Declaration of Independence
19. The oldest permanent European settlement in the United States is
 - A. St. Augustine.
 - B. Jamestown.
 - C. Plymouth.
 - D. New Orleans.
20. The Puritans founded their colony in Massachusetts mostly to
 - A. search for gold.
 - B. make a profit from fishing.
 - C. sell furs to New France
 - D. practice their religion.
21. What was the purpose of a town meeting?
 - A. to collect taxes for the king
 - B. to educate boys and girls
 - C. to have people work together to build wagons
 - D. to make decisions about laws and town workers
22. How did market towns help farmers who lived near them?
 - A. Market towns were a place where women, Africans, and Native Americans could vote.
 - B. Farmers could trade their crops for goods and services.
 - C. Every market town had a college where people could finish their education.
 - D. British merchants visited these towns to buy tobacco.
23. Indentured servants
 - A. were in charge of trade in the cities.
 - B. always went willingly to the colonies.
 - C. worked for a set period of time to pay for passage to the new world, then were set free.
 - D. agreed to work for a lifetime in trade for their children's freedom.

Appendix A (continued)

24. Patrick Henry was famous for saying
- A. "We hold these truths to be self evident, that all men are created equal."
 - B. "The British are coming! The British are coming!"
 - C. "...give me Liberty or give me death!"
 - D. "The colonists should pay their taxes!"
25. The writer of the Declaration of Independence included a list of the colonists' complaints in order to
- A. show the unfair things the King and Parliament had done.
 - B. explain why the colonists were boycotting British tea.
 - C. apologize to the British King for the actions of the Patriots.
 - D. persuade Parliament to repeal the Stamp Act.

Test Key:

- | | | | | |
|------|-------|-------|-------|-------|
| 1. A | 6. C | 11. D | 16. D | 21. D |
| 2. D | 7. A | 12. B | 17. C | 22. B |
| 3. D | 8. C | 13. A | 18. B | 23. C |
| 4. C | 9. C | 14. D | 19. A | 24. C |
| 5. D | 10. D | 15. B | 20. D | 25. A |

Appendix B

Survey of Interest in History and Social Studies

The next seven questions ask you what you think about the subject of history. For these questions “history” and “social studies” are the same thing. Please give your honest answers to these questions.

1. Which of these is your favorite subject?
 - A. History/Social Studies
 - B. Mathematics
 - C. Science
 - D. Reading/Language Arts
2. This is a word I use to describe history.
 - A. Boring
 - B. OK
 - C. Interesting
3. I like to read stories of people I learned about in history.
 - A. No
 - B. Sometimes
 - C. Yes
4. I want to learn more about history.
 - A. No
 - B. Maybe
 - C. Yes
5. I really like history.
 - A. No
 - B. Sometimes
 - C. Yes
6. How would you describe your effort in history?
 - A. I don't try very hard.
 - B. I try a little bit.
 - C. I try most of the time.
 - D. I try my best.
7. What grade would you give history?
 - A. Grade of D or F
 - B. Grade of C
 - C. Grade of B
 - D. Grade of A

Appendix C
Data Set Used in the Analysis

Teacher	HPRE	HPOS	IPRE	IPOS	STUN	TCHX	TCHG	TCHE	TCHF	TCHD	TCHM	SCHT	SCHY
01	7.190	8.957	15.143	15.435	23	0	1	14	9	1	0	1	1
02	9.636	12.909	16.879	16.667	33	0	1	7	4	0	0	0	1
03	11.147	15.182	16.706	16.879	33	0	1	19	2	0	0	0	1
04	8.708	16.950	16.708	17.300	20	0	1	21	12	0	0	1	1
05	9.222	15.429	16.185	16.464	28	0	1	8	3	1	0	0	1
06	10.667	17.500	15.833	15.917	24	0	1	13	5	0	0	1	1
07	6.000	11.045	17.000	16.636	22	0	0	16	5	1	0	1	1
08	10.226	13.250	15.710	15.594	32	0	1	5	4	0	0	0	1
09	9.467	14.848	16.500	16.394	33	0	1	6	6	0	0	0	1
10	10.000	12.125	15.813	16.250	16	0	1	10	7	0	0	1	1
11	11.400	14.158	15.400	16.526	19	0	0	15	2	0	0	1	1
12	8.875	13.452	17.313	16.452	31	0	1	6	5	0	0	0	1
13	15.348	18.348	16.130	16.435	23	0	1	4	1	0	0	0	1
14	11.941	18.182	17.794	19.909	33	0	1	28	16	1	1	0	0
15	9.783	14.174	16.043	15.826	23	0	1	5	3	0	0	1	1
16	9.424	13.156	15.152	14.625	32	0	1	20	8	0	1	0	1
17	8.381	10.227	16.048	14.091	22	0	1	9	3	0	0	1	1
18	12.750	15.059	17.563	17.000	17	0	1	20	20	0	0	0	1
19	9.435	13.286	16.217	15.524	21	0	1	6	5	0	0	1	1
20	10.033	17.148	17.267	17.185	27	0	1	2	1	0	0	0	1
21	11.304	13.500	15.783	14.885	26	0	1	6	3	0	0	1	1
22	13.833	13.531	15.600	14.656	32	0	1	5	2	0	0	0	0
23	13.469	15.533	16.219	16.600	30	0	1	14	5	1	0	0	0
24	11.171	14.316	16.024	14.737	19	0	1	7	4	1	0	1	1
25	9.767	14.000	15.800	17.393	28	0	1	8	4	0	0	0	1

Appendix C (continued)
Data Set Used in the Analysis

Teacher	HPRE	HPOS	IPRE	IPOS	STUN	TCHX	TCHG	TCHE	TCHF	TCHD	TCHM	SCHT	SCHY
26	7.818	11.348	17.227	17.487	23	1	1	6	6	0	1	1	1
27	10.905	15.650	16.810	17.900	20	1	1	10	9	0	1	1	1
28	11.542	17.409	18.250	18.318	22	1	1	6	6	0	0	1	1
29	12.000	16.955	16.000	15.955	22	1	1	29	5	1	0	0	0
30	8.097	15.040	16.774	18.320	25	1	0	7	2	0	0	0	1
31	10.250	15.290	16.313	16.968	31	1	0	5	5	0	0	0	1
32	12.581	18.800	16.516	15.333	30	1	1	4	3	0	0	0	1
33	8.458	13.333	16.708	15.905	21	1	1	9	6	0	0	1	1
34	10.345	17.867	17.103	15.929	28	1	1	3	2	0	0	0	1
35	10.515	14.821	15.485	16.107	28	1	0	11	4	1	0	0	1
36	14.724	17.781	17.552	17.375	32	1	1	8	6	0	0	0	1
37	9.105	16.833	16.947	16.583	24	1	0	20	5	1	0	1	1
38	9.937	17.063	17.844	18.594	32	1	1	11	8	0	0	0	1
39	9.880	18.217	16.800	18.739	23	1	1	11	2	1	0	0	1
40	9.708	17.385	17.500	16.038	26	1	1	5	5	0	0	0	1
41	9.520	15.767	17.000	15.967	30	1	1	22	5	1	0	0	1
42	7.905	12.826	15.810	16.870	23	1	0	12	2	0	1	1	1
43*	9.891	17.063	17.543	16.084	32 (95)	1	1	5	3	0	0	0	0
44	10.871	17.742	16.613	16.065	31	1	1	6	6	0	0	0	1
45	12.467	17.083	16.767	18.500	24	1	1	30	18	0	0	0	1
46	10.250	14.250	17.167	15.667	12	1	1	8	3	0	0	0	1

* See footnote in Table 2.

Appendix D
Correlation Coefficients

	HPRE	HPOS	IPRE	IPOS	STUN	TCHX	TCHG	TCHE	TCHF	TCHD	TCHM	SCHT	SCHY
HPRE	1												
HPOS	.555	1											
IPRE	.043	.464	1										
IPOS	.054	.423	.580	1									
STUN	.042	.208	.197	-.014	1								
TCHX	-.015	.403	.412	.285	.122	1							
TCHG	.297	.150	.175	-.120	.096	-.219	1						
TCHE	.045	.086	-.005	.287	-.149	-.007	-.082	1					
TCHF	.114	.074	.272	.397	-.131	-.034	.196	.619	1				
TCHD	-.108	-.002	-.103	.059	-.075	-.002	-.188	.433	.041	1			
TCHM	-.140	-.132	.001	.247	-.029	.101	-.046	.212	.240	-.032	1		
SCHT	-.388	-.451	-.222	-.179	-.371	-.159	-.177	-.003	-.004	-.007	.167	1	
SCHY	-.354	-.174	-.035	-.035	-.468	.040	-.148	-.261	-.066	-.295	-.102	.267	1